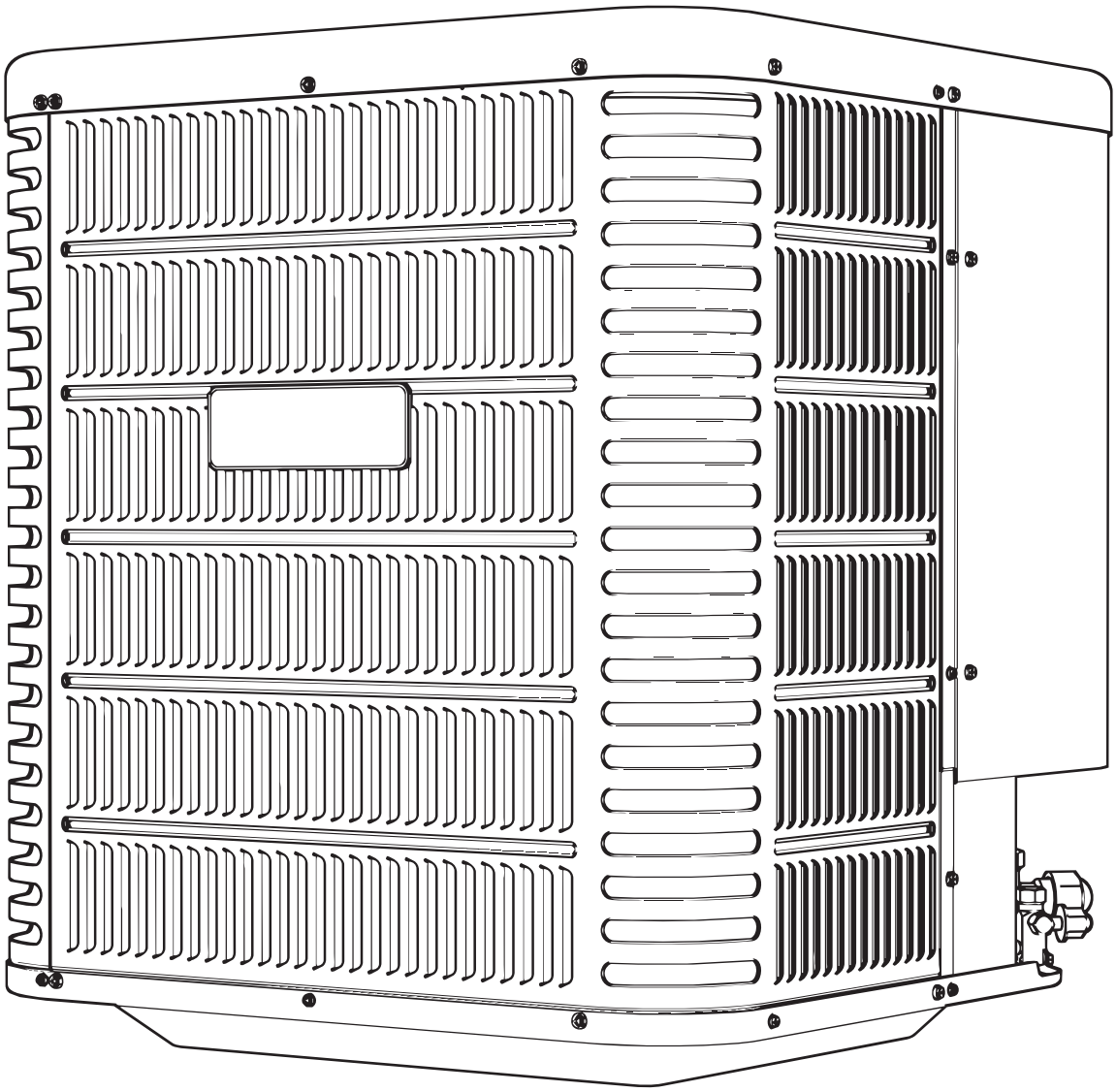
A-SERIES CONDENSER



Owner's & Installation Manual

Outdoor Split System Unit 1.5, 2, 2.5, 3, 3.5, 4, & 5 Ton R454B	*Split System* *Heat Pump & Air Conditioner*	*Version Date:* *10 / 20 / 26*

Initial Release	07 / 24 / 25
Revision A	10 / 20 / 26

IMPORTANT SAFETY INFORMATION

WARNING

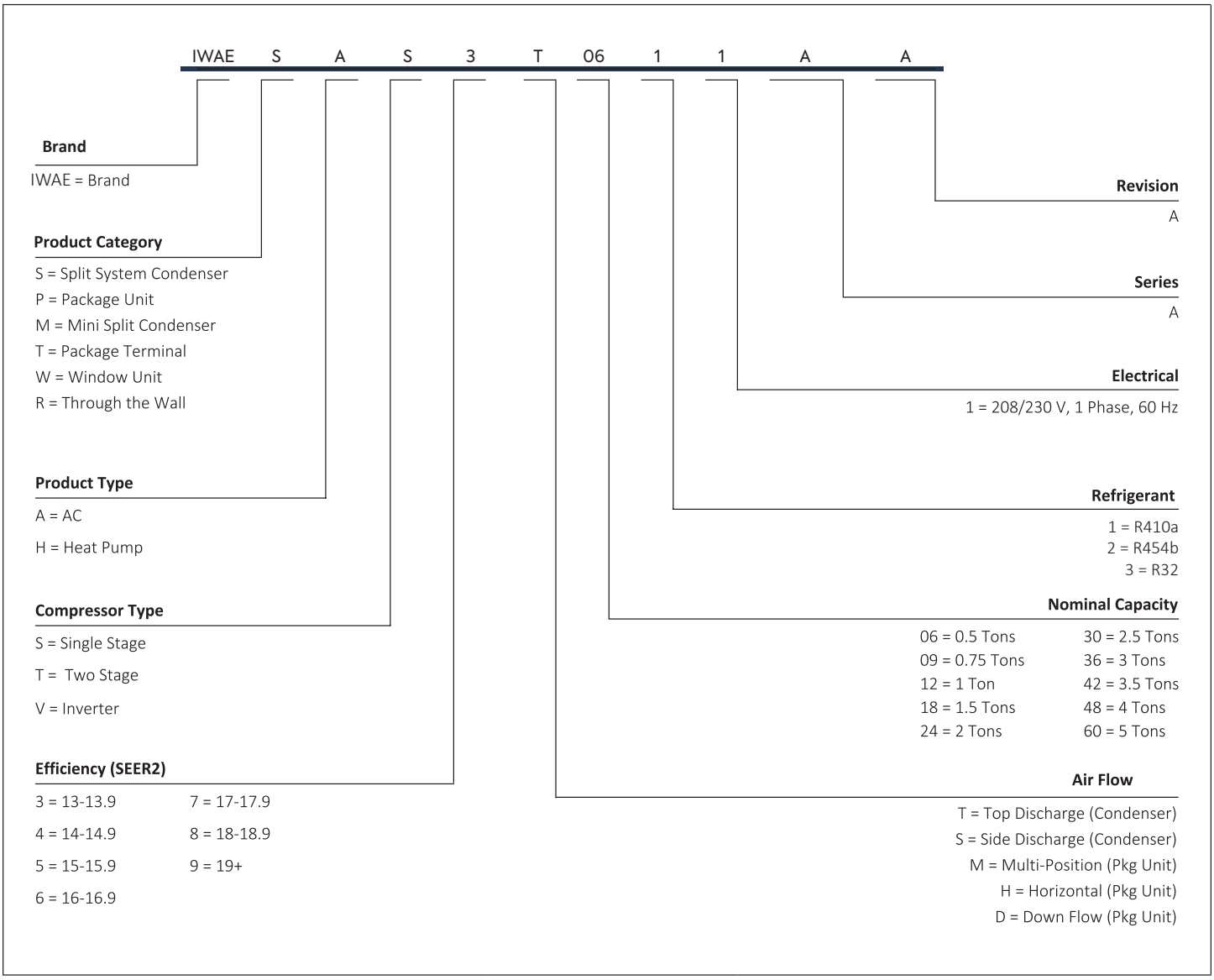
THESE INSTRUCTIONS ARE INTENDED FOR REFERENCE BY QUALIFIED LICENSED PERSONNEL FOR THE PROPER INSTALLATION, ADJUSTMENT, AND OPERATION OF THIS UNIT. READ THESE INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING ANY INSTALLATION OR OPERATION. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN IMPROPER INSTALLATION, ADJUSTMENT, SERVICE, OR MAINTENANCE, POSSIBLY RESULTING IN FIRE, ELECTRICAL SHOCK, PROPERTY DAMAGE, PERSONAL INJURY, OR DEATH.

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DO NOT DESTROY THIS MANUAL
Please read carefully and keep in a safe place for future reference by a serviceman.


IWAE S A S 3 T 06 1 1 A A
Brand
IWAE = Brand
Product Category
S = Split System Condenser
P = Package Unit
M = Mini Split Condenser
T = Package Terminal
W = Window Unit
R = Through the Wall
Product Type
A = AC
H = Heat Pump
Compressor Type
S = Single Stage
T = Two Stage
V = Inverter
Efficiency (SEER2)
3 = 13-13.9
4 = 14-14.9
5 = 15-15.9
6 = 16-16.9
7 = 17-17.9
8 = 18-18.9
9 = 19+
Air Flow
T = Top Discharge (Condenser)
S = Side Discharge (Condenser)
M = Multi-Position (Pkg Unit)
H = Horizontal (Pkg Unit)
D = Down Flow (Pkg Unit)
Nominal Capacity
06 = 0.5 Tons
09 = 0.75 Tons
12 = 1 Ton
18 = 1.5 Tons
24 = 2 Tons
30 = 2.5 Tons
36 = 3 Tons
42 = 3.5 Tons
48 = 4 Tons
60 = 5 Tons
Refrigerant
1 = R410a
2 = R454b
3 = R32
Electrical
1 = 208/230 V, 1 Phase, 60 Hz
Series
A
Revision
A

This document is customer property and must remain with the unit. These instructions do not cover all system variations nor does it include every possible installation scenario. All phases of this installation must comply with ***NATIONAL STATE AND LOCAL CODES****. If additional information is required, contact your local distributor.*

NOTE: INDOOR UNIT IS REQUIRED
This condenser is intended to be paired with an indoor unit equipped with piston or TXV. The model of piston and TXV is selected by manufacturer. Do not change this on your own.

i. CREATING A SAFE WORKING AREA

1. Perform safety checks before working on systems containing flammable refrigerants to minimize the risk of ignition. Survey the area around the equipment for flammable hazards and ignition risks. Keep all possible ignition sources, including cigarette smoking, sufficiently far away from the site of installation, repair, or removal and disposal of the unit. Refrigerant might be released during work. Clearly display "No Smoking" signs.
2. The work area must be open or adequately ventilated before opening the system or conducting any hot work. Continue ventilation during the period of work to safely disperse any released refrigerant or expel it externally.
3. Repair and maintenance of electrical components must include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply may be connected to the circuit until the fault has been dealt with satisfactorily. In the initial safety check, confirm that:
   - Capacitors are discharged: this must be done in a safe manner to avoid the possibility of sparking.
   - No live electrical components and wiring are exposed while charging, recovering or purging the system.
   - There is continuity of proper grounding.
4. Disconnect all power to the unit before installing or servicing. More than one disconnect switch may be required to de-energize the equipment. Hazardous voltage can cause personal injury or death.
5. Maintain all required signs. Employers should ensure that employees receive sufficient training on the meaning of appropriate safety signs and the actions that need to be taken in connection with these signs.
6. Signs for similar appliances used in a work area are generally addressed by local regulation and give the minimum requirements for the provision of safety and/or health signs for a work location.
7. The effectiveness of signs should not be diminished by too many signs being placed together.
8. Any pictograms used should be as simple as possible and contain only essential details.

ii. SAFETY RULES AND INSTALLER RECOMMENDATIONS

1. The installation, service, and maintenance of this unit should only be performed by a trained, qualified service personnel. These instructions are intended for use by individuals with sufficient electrical and mechanical experience background. Read these instructions thoroughly before attempting installation or operation. Failure to follow these instructions may result in improper installation, adjustment, service, or maintenance, possibly resulting in fire, electrical shock, property damage, personal injury, or death.
2. Servicing may only be performed as recommended by the equipment manufacturer.
3. Maintenance and repair requiring the assistance of other skilled personnel must be carried out under the supervision of a person competent in the use of flammable refrigerants.

⚠ WARNING: HOT SURFACE ⚠
Do not touch the top of the compressor as it may cause mild to severe burns. Failure to observe this caution may result in property damage or personal injury.

⚠ WARNING: DANGEROUS VOLTAGE ⚠

Disconnect all power before maintenance, including remote disconnection. Follow proper locking/tagging procedures to ensure that the power supply will not be energized accidentally. Failure to observe this warning may result in property damage, serious personal injury or death.

4. Work on electrical equipment may only be carried out by a qualified electrician.
5. This unit must be permanently grounded. Failure to do so can result in electrocution, personal injury, or death.
6. Be sure the air conditioner is grounded to avoid electric shock. Make sure the unit is ground and the ground wire is not connected to a gas or water pipe, lightning conductor, or telephone ground wire.
7. In order to avoid electric shock or fire, make sure that a ground leak protector is installed.

⚠ WARNING: GROUNDING REQUIRED ⚠

There is a potential for high current leakage if this product is not grounded before connection to the power supply. 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 must be 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. Failure to observe this warning may result in property damage, serious personal injury or death.

8. Where electrical components are being charged, they must be implemented according to their intended purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines must be followed. If in doubt, consult the manufacturer's technical department for assistance.
9. Before accessing the connection terminals, all power circuits must be disconnected.
10. Wait for 3 minutes after disconnecting the power supply before touching the electrical components.
11. If an electrical fault is found and cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution must be used. This must be reported to the owner of the equipment so that all parties are advised. Do not use means to accelerate the defrosting process or to clean the unit other than those recommended by the manufacturer.
12. This appliance must be stored in a room that does not have continuously operation ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater.)
13. Do not pierce or burn the unit or the refrigerant lines.

⚠ WARNING ⚠

Refrigerants may not contain an odor. If refrigerant gas leaks during installation, ventilate the area immediately.

14. Objects touching the fan at high speed can be dangerous.
15. When the system is installed and operated in a small room, maintain the refrigerant concentration below the limit, in case a leak occurs. Otherwise, oxygen in the room may be affected, resulting in a serious accident.
16. Keep ventilation openings clear of obstruction. To avoid oxygen deficiency, ventilate the room sufficiently if equipment with a burner is used with the air conditioner.
17. Arrange the drain hose to ensure smooth drainage. Incomplete drainage may cause leaks that can damage the building, furniture, etc.
18. Additional transportation regulations may exist for equipment containing flammable gas. The maximum number of pieces of equipment or the configuration of the equipment permitted to be transported together will be determined by the applicable transport regulations.
19. Store the appliance in accordance with the applicable regulations or instructions, whichever is more stringent.
20. Storage package protection should be constructed such a way that mechanical damage to the equipment inside the package will not cause a leak of the refrigerant charge.
21. The maximum number of pieces of equipment permitted to be stored together is determined by local regulations.
22. Before cleaning, stop operation, turn the breaker off, or unplug the supply cord. Otherwise, electric shock and injury may occur.

⚠ FLAMMABLE REFRIGERANT WARNING ⚠
Sealed electrical components must be replaced
Intrinsically safe components must be replaced

iii. SAFETY PROHIBITIONS

1. This appliance is not intended for use by people (including children) with reduced physical, sensory, or mental capabilities, or people who lack experience and knowledge, unless they are supervised or have been given instructions by a person responsible for their safety. Do not allow children to play with the appliance.
2. Do not use the air conditioner for other purposes. In order to avoid any quality deterioration, do not use the unit for the cooling of precision instruments, food, plants, animals, or works of art.
3. Never touch the air outlet or the horizontal blades while the swing flap is in operation. Your fingers may get caught or the unit may break down.
4. Never put any objects into the air inlet or outlet. Touching the high speed fan with objects can be dangerous.
5. Never touch the internal parts of the controller. Do not remove the front panel. Some parts inside are dangerous to touch. Machine troubles may occur.
6. Never inspect or service the unit by yourself. You must call a qualified service person.
7. Do not dispose of this product as unsorted municipal waste. Do not dispose of electrical appliances as unsorted municipal waste. Use separate collection facilities. Contact your local government for information regarding the connection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, harming your health and well-being.
8. In the event of a suspected refrigerant leak, do not use the air conditioner until a service person confirms that the leak is repaired.
9. Do not operate the air conditioner with wet hands, or else you could be electrocuted.
10. Do not operate the appliance when using a room fumigation insecticide, which could deposit the chemicals in the unit. This could endanger anyone who is hypersensitive to chemicals or trigger the refrigerant sensor alarm.
11. Do not place appliances which produce open flame in places exposed to the air flow from the unit or under the indoor unit. It may cause incomplete combustion or deformation of the unit due to the heat.
12. Do not install the air conditioner in a location where flammable gas may leak out. If the gas leaks out and stays around the air conditioner, a fire may break out.

⚠ WARNING: REFRIGERANT OIL ⚠

Attempting to repair central air conditioning products may result in property damage, serious personal injury, or death. These devices use R454B refrigerant, with a safety level of A2L. Use only R-454B approved service equipment. The refrigerant cylinder is painted ashen to indicate the type of refrigerant, and may contain a dip tube to allow liquid refrigerant to be filled into the system. All R-454B systems use POE oil , 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 dryer when you open the system for component replacement.

CAUTION

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.

iv. DETECTING REFRIGERANT LEAKS

1. This outdoor unit must combine the indoor unit with a refrigerant leak detection device.
2. The refrigerant in the air conditioner is safe and normally does not leak.
3. 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.
4. If the refrigerant leaks into the room and comes into contact with a burner fire, heater, or cooker, a harmful gas could be released. Turn off any combustible heating devices, ventilate the room, and contact the dealer from whom you purchased the unit if this occurs.
5. Under no circumstances may potential sources of ignition be used while searching for or detecting refrigerant leaks. A halide torch (or any other detector using a naked flame) must not be used.
6. 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 recalibration. Detection equipment must 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 must be set at a percentage of the LFL of the refrigerant and must be calibrated for the refrigerant employed. The appropriate percentage of gas (25% maximum) must be confirmed.
7. If a leak is suspected, all naked flames must be removed or extinguished.
8. If a leakage of refrigerants that requires brazing is found, all refrigerant must be recovered from the system, or isolated by means of shut off valves in a part of the system remote from the leak.
9. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine must be avoided as the chlorine may react with the refrigerant and corrode the copper pipe work.
10. Examples of Leak Detection Fluids:
    - Bubble Method
11. To prevent a refrigerant leak, contact your dealer.

⚠ RISK OF FIRE ⚠

1. Mild flammable refrigerant used. Follow handling instructions carefully in compliance with national regulations. To be repaired only by trained service personnel.
2. Do not puncture refrigerant tubing.
3. Dispose of properly in accordance with federal or local regulations.
4. Auxiliary devices that may be ignition sources must not be installed in the ductwork, other than auxiliary devices listed for use with the specific appliance. See instructions.
5. Store in a well ventilated room without continuously operating flames or other potential sources of ignition.

v. REPAIRING REFRIGERANT SYSTEMS

When repairing the refrigerating system, heed the following precautions prior to conducting work on the system:

1. Work on the refrigerant circuit with A2L mildly flammable refrigerant may only be carried out by authorized heating contractors trained in accordance with UL 60335-2-40, Section HH, who must have a certificate of competence from an industry accredited body .
2. Perform work according to controlled procedures to minimize the risk of leaking flammable gases or vapors.
3. All maintenance staff and others working in the local area must be instructed on the nature of the work being carried out. Avoid working in confined spaces.
4. Check the work area with an appropriate refrigerant detector before and during work for potentially toxic or flammable environments. The leak detection equipment must be suitable for use with all applicable refrigerants, i.e., non-sparking, adequately sealed or intrinsically safe.
5. Before initial commissioning, all safety related points must be checked by certified heating contractors. The system must be commissioned by the system installer or a qualified person authorized by the installer.
6. If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment must be available and easily accessible. Keep a dry powder or CO2 fire extinguisher near the charging area.
7. When working on a refrigerating system that involves exposing pipe work, do not use any sources of ignition that may lead to fire or explosion.
8. The actual refrigerant charge is in accordance with the room size the refrigerant containing parts are installed in.
9. The ventilation machinery and outlets are operating adequately and are not obstructed.
10. If an indirect refrigerating circuit is used, the secondary circuit must be checked for the presence of refrigerant.
11. Equipment marking must remain visible and legible. Markings and signs that are illegible shall be corrected.

⚠ WARNING: SERVICE VALVE ⚠

Failure to observe this warning will result in sudden discharge of system charge, 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.

vi. RECOVERING & RECHARGING REFRIGERANT

1. When breaking into the refrigerant circuit to make repairs or for any other purpose conventional procedures must be used. However, for flammable refrigerants it is important that best practices be followed, since flammability is a consideration. You must adhere to the following procedure:

- Safely remove refrigerant following local and national regulations
- Evacuate the refrigerant
- Purge the circuit with inert gas
- Evacuate again
- Continuously flush or purge with inert gas when using flames to open the circuit
- Open the circuit

⚠ 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.

2. The refrigerant must be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, purge the system 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 must not be used for purging refrigerant systems.
3. For appliances containing flammable refrigerants, you must purge refrigerant by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to the atmosphere, and finally pulling down to a vacuum. This process must be repeated until no refrigerant is in the system. When the final oxygen-free nitrogen charge is used, the system must be vented down to atmospheric pressure to enable work to take place.
4. The vacuum pump outlet must not be near any potential ignition sources, and ventilation must be available.
5. Ensure that the contamination of different refrigerants does not occur when using charging equipment. Hoses or lines must be as short as possible to minimize the amount of refrigerant they contain.
6. Cylinders must be kept upright. Ensure that the refrigeration system is grounded prior to charging the system with refrigerant.
7. Label the system when charging is complete (if it is not already labeled).
8. Take extreme care not to overfill the refrigeration system.
9. Before recharging the system, perform a pressure test with the appropriate purging gas. On completion of charging but before commissioning, leak test the system. Perform a follow up leak test before leaving the site.
10. Before carrying out this procedure, the technician **MUST** be completely familiar with the equipment and all its details. All refrigerants should be recovered safely. Prior to recovering refrigerant, an oil and refrigerant sample must be taken in case analysis is required before reusing the reclaimed refrigerant. Electrical power must be available before the task is commenced.
    - Isolate the system electrically
    - Become familiar with the equipment and its operation
    - Before attempting the procedure, ensure that:
        - Mechanical handling equipment is available, if required, for handling refrigerant cylinders
        - All personal protective equipment is available and used correctly
        - The recovery process is supervised at all times by a competent person
        - Recovery equipment and cylinders conform o the appropriate standards
    - Pump down the refrigerant system, if possible
    - If a vacuum is not possible, make a manifold so refrigerant can be removed from various parts of the system
    - Make sure that they cylinder is situated on the scales before recovery takes place
    - Start the recovery machine and operate it in accordance with the manufacturer's instructions
    - Do not overfill cylinders (No more than 80% volume liquid charge)

- Do not exceed the maximum working pressure of the cylinder, even temporarily
- When the cylinders have been filled correctly and the process is complete, make sure the cylinders and the equipment are removed from the site promptly and all isolation valves on the equipment are closed
- Do not charge recovered refrigerant into another refrigeration system unless it has been cleaned and checked

11. Equipment must be labeled stating that it has been decommissioned and emptied of refrigerant. The label must be dated and signed. You must label the equipment stating the equipment contains flammable refrigerant.
12. Ensure that there are labels on the equipment stating that the equipment contains flammable refrigerant.
13. When removing refrigerant from a system, either for servicing or decommissioning, it is recommended that all refrigerants are removed safely.
14. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are used. 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 labeled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders must be complete with a pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
15. The recovery equipment must be in good working order and come with a set of instructions for proper use. The equipment should be suitable for safely recovering flammable refrigerants. If in doubt, consult the manufacturer. A set of calibrated weighing scales must be available and in good working order. Hoses must be complete with leak-free disconnect couplings and in good condition.
16. The recovered refrigerant must be processed according to local legislation in the correct recovery cylinder. Arrange the relevant waste transfer note. Do not mix refrigerants in recovery units, especially not in cylinders.
17. If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to be certain that flammable refrigerant does not remain within the lubricant. The compressor body must not be heated by any open flame or other ignition sources to accelerate this process. When oil is drained from a system, it must be carried out safely.
18. When use a refrigerant tank with siphon to add refrigerant, the refrigerant tank should be placed upright. When use a refrigerant tank without siphon to add refrigerant, the refrigerant tank should be placed upside down. Ensure that the refrigeration system is grounded prior to charging the system with refrigerant.
19. In general, R454B doesn't have a siphon tube or dip tube into the tank. For this situation, it must be charged in liquid form to prevent fractionation of the blended refrigerant. This requires the jug to be inverted during charging.

vii. Refrigerant Piping

1. Pipework including piping material, pipe routing, and installation must include protection from physical damage in operation and service, and be in compliance with national and local codes. Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check should also take into account the effects of aging or continual vibration from sources such as compressors or fans.
2. Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substances which may corrode refrigerant containing components, unless the components are constructed of materials that are inherently resistant to corrosion or are suitably protected against corrosion.
3. After completing the field piping for split systems, the field pipework must be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements.
4. The minimum test pressure for the low side of the system is the low side design pressure, and the minimum test pressure for the high side of the system is the high side design pressure, unless the high side of the system cannot be isolated from the low side of the system, in which case the entire system should be pressure tested to the low side design pressure.
5. Ducts connected to an appliance must not contain a potential ignition source.
6. Precautions must be taken to avoid excessive vibration or pulsation to refrigerating piping .
7. The protection devices, piping and fittings must be protected as much as possible against adverse environmental effects. For example the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris.

8. Design and install piping in refrigerating systems to minimize the chance of hydraulic shock damaging the system.
9. The solenoid valves must be correctly positioned in the piping to avoid hydraulic shock and must not block in liquid refrigerant unless adequate relief is provided.
10. Protect steel pipes and components against corrosion with a rustproof coating before applying any insulation.

vii. Proposition 65

This appliance contains fiberglass insulation. Respirable particles of fiberglass are known to the State of California to cause cancer. All manufacturer products meet current federal OSHA guidelines for safety. California Proposition 65 requires warnings for products sold in California that contain or produce any of the over 600 listed chemicals known to the State of California to cause cancer or birth defects such as fiberglass insulation, lead in brass, and combustion products from natural gas. All "new equipment" shipped for sale in California will have labels stating that the product contains and/or produces Proposition 65 chemicals. Although we have not changed our processes, having the same label on all our products facilitates manufacturing and shipping. We cannot always know "when or if" products will be sold in the California market.

You may receive inquiries from customers about chemicals found in, or produced by, some of our heating and air conditioning equipment, or found in natural gas used with some of our products. Listed below are those chemicals and substances commonly associated with similar equipment in our industry and other manufacturers:

- Glass Wool (Fiberglass) Insulation
- Carbon Monoxide (CO)
- Formaldehyde
- Benzene

More details are available at the websites for OSHA (Occupational Safety and Health Administration) at www.osha.gov and the State of California's OEHHA (Office of Environmental Health Hazard Assessment), at www.oehha.org. Consumer education is important because the chemicals and substances on the list are found in our daily lives. Most consumers are aware that products can present safety and health risks when improperly used, handled, and maintained.

This appliance uses R454B refrigerant.



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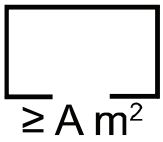
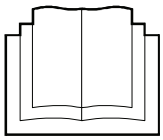
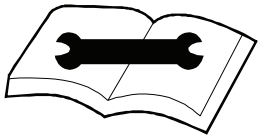
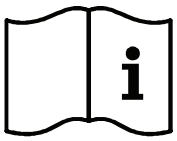
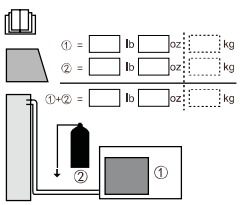
8. Troubleshooting

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The following safety codes are used in this manual. Pay close attention to them to minimize safety risks.

DANGER
Indicates a dangerous situation, which, if not avoided, ***will*** lead to death or serious injury.
WARNING
Indicates a dangerous situation, which, if not avoided, ***may*** lead to death or serious injury.
CAUTION
Indicates a dangerous situation, which, if not avoided, ***may*** cause mild to moderate injury.
Note
Used to indicates additional information unrelated to personal injury, such as installation tips.

The following symbols are displayed on the unit. Pay close attention to them to minimize safety risks.

	**DANGER**	This appliance uses a mildly flammable refrigerant. If this refrigerant leaks and is exposed to an external ignition source, it will create a fire risk.
	**WARNING**	This appliance must be installed, operated, and stored in a room with a floor area no less than the minimum allowed floor area.
	**CAUTION**	Carefully read this manual.
	**CAUTION**	A service personnel should handle this equipment in accordance with this manual.
	**CAUTION**	Relevant information is available in the operational or installation manual.
	**CAUTION**	This symbol shows that when additional charge is required by the manufacturer, you must record the resulting total refrigerant charge for each refrigerant system.

Abbreviation	Meaning
Mc	Actual refrigerant charge in the system
A	Actual room area where the appliance is installed
A_{min}	Required minimum room area
M_{max}	Allowable maximum refrigerant charge in a room
Q_{min}	Minimum circulation airflow
Anv_{min}	Minimum opening area for connected rooms
TA_{min}	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

NOTE

These instructions are exclusively intended for qualified contractors and authorized installers.

1. 1 Precautions

1. Check the information in this manual to find the dimensions of space needed for proper device installation, including minimum distances allowed compared to adjacent structures.

⚠ WARNING ⚠

The appliance must be stored in a well-ventilated area where the room size corresponds to the room area specified for operation. The appliance must be stored in a room without continuously operating open flames (an operating gas appliance, etc.) and ignition sources (an operating electric heater, etc.)

2. You must comply with national gas regulations.
3. The mechanical connections must be accessible for maintenance purposes.
4. You **must** follow instructions in this manual for handling, installing, cleaning, maintaining, and disposing refrigerant.
5. Make sure ventilation openings are clear of obstruction.
6. The appliance must be stored in a way to prevent mechanical damage from occurring.
7. Unauthorized servicing is strictly prohibited.
8. Every working procedure that affects safety may only be performed by competent persons.
9. Work on electrical equipment may only be carried out by a qualified electrician.
10. Before initial commissioning, all safety related points must be checked by the certified heating contractors. The system must be commissioned by the system installer or a qualified person authorized by the installer.
11. For installation of the indoor unit, refer to the corresponding installation and operation manual. If an indoor unit is installed in an unventilated area, the area must be constructed so that if any refrigerant were to leak, it will not stagnate and create a fire or explosion hazard.
12. The appliance must be stored to prevent mechanical damage from occurring.
13. Do not stack combustible materials on the surface of the indoor unit.

⚠ WARNING ⚠

1. Do not use any means other than those recommended by the manufacturer to accelerate the defrosting process or to clean the unit.
2. Do not store this appliance near continuously operating fuel sources (e.g. open flames, operating gas appliances, operating electric heaters.)
3. Do not pierce or burn
4. Be aware that refrigerants may not emit an odor.

1. 2 Cleaning & Maintenance

⚠ WARNING ⚠

Any maintenance and cleaning of outdoor units 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, including benzene, paint thinner, polishing powder or other solvents, to clean this unit.

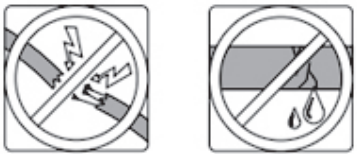
CAUTION

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

1. 2. 1 Pre-Season Inspection & Maintenance

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

Fig. 1-1 Pre-Season Inspection & Maintenance

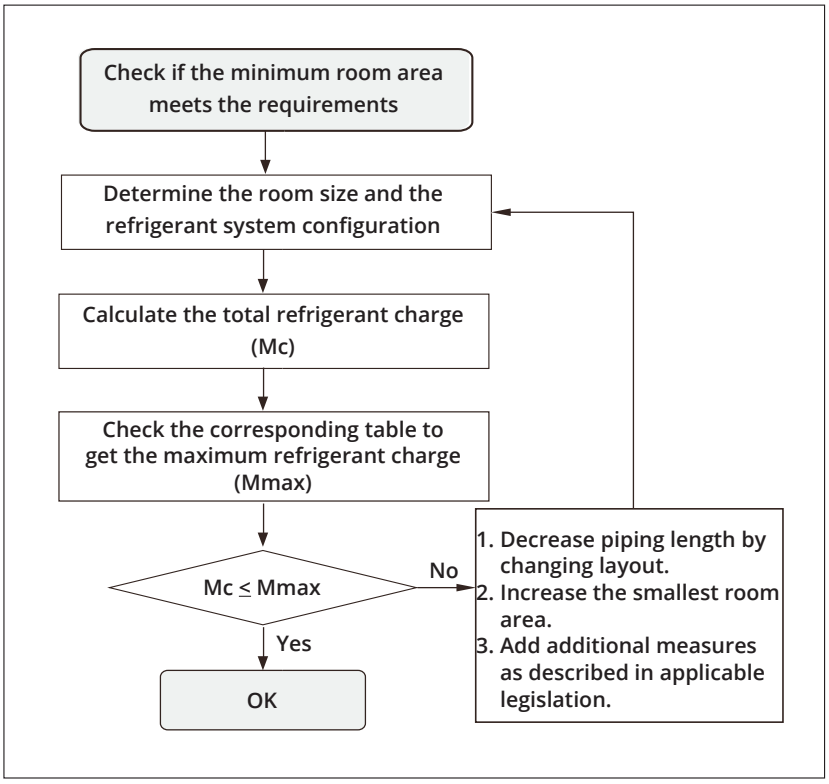
	Turn off the unit and disconnect the power supply.
	Check for damaged wires. Check for leaks
	Make sure that all air inlets and outlets are not blocked.

1. 3 Refrigerant Charge and Room Area Limitations

In UL/CSA 60335-2-40, R454B refrigerant is classified as class A2L, which is mildly flammable. Therefore, R454B refrigerant is suitable for systems needing additional refrigerant charge and that will limit the area of the rooms being served by the systems.

Similarly, the total amount of refrigerant in the system must be less than or equal to the allowable maximum refrigerant charge. The allowable maximum refrigerant charge depends on the area of the rooms being served by the system. Follow the matrix below to determine the appropriate refrigerant charge.

Fig. 1-2 Installation Scheme Flow Chart



1. 4 Room Area Calculation Requirements

CAUTION

The space considered is any space that contains refrigerant-containing parts or into which refrigerant could be released. The room area (A) of the smallest, enclosed, occupied space must be used in the determination of the refrigerant quantity limits.

To determine the room area (A) for use calculating the refrigerant charge limit:

- The room area (A) is defined as the room area enclosed by the projection to the base 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 are not considered a single space.

Units mounted higher than 70-55/64 inches and spaces divided by partition walls that are no higher than 62-63/64 inches are considered a single space. Rooms on the same floor and connected by an open passageway between the spaces can be considered a single room when determining compliances to A_{min}, if the passageway complies with all of the following.

1. It is a permanent opening
2. It extends to the floor
3. It is intended for people to walk through

The area of the connected rooms, on the same food, 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 A_{min}, provided all of the following conditions are met as **Fig 1-3**.

1. 4. 1 Low Level Opening

1. The opening must not be less than Anv_{min} in **Table 1-1**.
2. The area of any openings above 11-13/16 inches from the floor must not be considered in determining compliance with Anv_{min}.
3. At least 50% of the opening area of Anv_{min} must be below 7-7/8 inches from the floor
4. The bottom of the opening is not more than 3-15/16 inches from the floor.
5. The opening is a permanent opening that cannot be closed
6. For openings extending to the floor, height may be no less than 25/32 inches above the floor covering surface.

1. 4. 2 High Level Opening

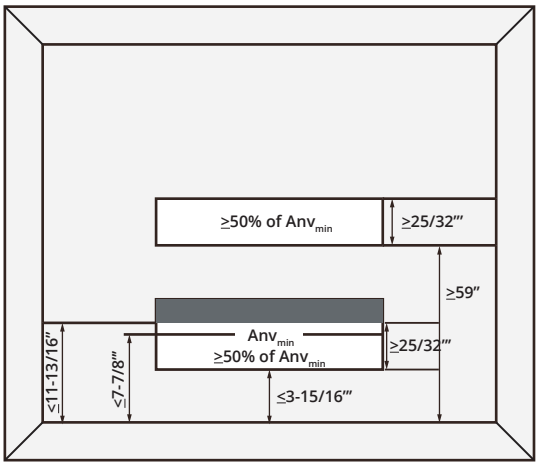
1. The opening must not be less than 50% of Anv_{min} in **Table 1-1.**
2. The opening is a permanent opening that cannot be closed.
3. The opening must be at least 59 inches above the floor.
4. The height of the opening cannot be less than 25/32 inches.

1. 4. 3 Room Size Requirement

1. The room that refrigerant can leak into plus the connected adjacent room(s) must not have a room area less than A_{min}.
2. The room area the unit is installed in cannot be less than 20% of A_{min}.

NOTE
The requirement for the second opening can be met by drop ceilings, ventilation ducts, or similar arrangements that provide an airflow path between the connected rooms.

Fig. 1-3 Opening Conditions for Connected Rooms



The minimum opening for natural ventilation (Anv_{min}) in connected rooms is related to the room area (A), the actual refrigerant charge of refrigerant in the system (Mc), and the allowable **MAXIMUM REFRIGERANT CHARGE** in the system (M_{max}), Anv_{min} can be determined according to **Table 1-1**.

Table 1-1 The Minimum Opening Area for Connected Rooms

A(ft^2)	Mc(□lb□oz)		M_{max}(□lb□oz)		Anv_{min}(ft^2)
	lb	oz	lb	oz	
100	17	3	6	10	1.3
110	17	3	7	5	1.2
120	17	3	8	0	1.1
130	17	3	8	10	1.0
140	17	3	9	5	1.0
150	17	3	10	0	0.9
160	17	3	10	10	0.8
170	17	3	11	5	0.7
180	17	3	12	0	0.6
190	17	3	12	10	0.5
200	17	3	16	5	0.5
210	17	3	14	0	0.4
220	17	3	14	10	0.3
230	17	3	15	5	0.2
240	17	3	16	0	0.1
250	17	3	16	10	0.1
260	17	3	17	5	0.0

NOTE

Take the Mc = 17 lb 3 oz as an example
For appliances serving one or more rooms with an air duct system, the room area calculation is determined based on the total area of the conditioned space (TA) connected by ducts taking into consideration that the circulating airflow distributed to all the rooms by the appliance integral indoor fan will mix and dilute the leaking refrigerant before entering any room.

CAUTION

If the actual room area, air outlet height, and refrigerant charge amount are not reflected in the provided tables, more severe cases need to be considered according to the data in **Table 1-1**, **Table 1-2, Table 1-3**, and **Table 1-4**.

1. 5 The Allowed Maximum Refrigerant Charge and Required Minimum Room Area

If the fan incorporated in the appliance is continuously operated or operation is initiated by a REFRIGERANT DETECTION SYSTEM with a sufficient CIRCULATION AIRFLOW RATE, the allowable maximum refrigerant charge (M_{max}) and the required minimum room area (A_{min}/TA_{min}) is shown in **Table 1-2** and **Table 1-3**.

CAUTION

The allowable maximum refrigerant charge of **Table 1-2** or the required minimum room area of **Table 1-3** is available only if the following conditions are met:

- Minimum velocity of 3.28 ft/s, which is calculated as the indoor unit airflow divided by the nominal face area of the outlet. Do not deduct the grill area.
- Minimum airflow rate must meet the corresponding values in **Table 1-4**, which is related to the actual refrigerant charge of the system (Mc).
- R454B refrigerant leakage sensor is configured.

NOTE

The maximum refrigerant limit described above applies to unventilated areas. If adding additional measures, such as areas with mechanical ventilation or natural ventilation, the maximum refrigerant charge can be increased or the minimum room area can be reduced. The R454B refrigerant leakage sensor is configured for the indoor unit and meets the incorporated circulation airflow requirements. The maximum refrigerant charge or minimum room area can be determined according to **Table 1-2** or **Table 1-3**.

Table 1-2 The Allowable Maximum Refrigerant Charge

A/TA		M_{max}		A/TA		M_{max}	
ft^2	m^2	lb-oz	kg	ft^2	m^2	lb-oz	kg
30	2.8	2-0	0.9	150	13.9	10-0	4.5
40	3.7	2-9	1.2	160	14.9	10-9	4.8
50	4.6	3-5	1.5	170	15.8	11-4	5.1
60	5.6	3-14	1.8	180	16.7	11-15	5.4
70	6.5	4-9	2.1	190	17.7	12-9	5.7
80	7.4	5-3	2.4	200	18.6	13-4	6.0
90	8.4	5-14	2.7	210	19.5	14-0	6.4
100	9.3	6-9	3.0	220	20.4	14-12	6.7
110	10.2	7-5	3.3	230	21.4	15-7	7.0
120	11.1	7-15	3.6	240	22.3	16-0	7.3
130	12.1	8-9	3.9	250	23.2	16-12	7.6
140	13.0	9-4	4.2	260	24.2	17-13	7.9

Table 1-3 The Required Minimum Room Area

Mc(□lb□oz)		$A_{min}/TA_{min}(ft^2)$	Mc(□lb□oz)		$A_{min}/TA_{min}(ft^2)$
lb	oz		lb	oz	
2	2	33.1	10	2	152.1
2	9	39.7	10	9	158.7
3	0	46.3	11	0	165.3
3	7	52.9	11	7	171.9
3	15	59.5	11	14	178.5
4	6	66.1	12	5	185.1
4	13	72.7	12	12	191.7
5	4	79.3	13	3	198.4
5	11	86.0	13	10	205.0
6	2	92.6	14	1	211.6
6	9	99.2	14	8	218.2
7	0	105.8	14	15	224.8
7	7	112.4	15	6	231.4
7	15	119.0	15	14	238.0
8	6	125.6	16	5	244.6
8	13	132.2	16	12	251.2
9	4	138.8	17	3	257.9
9	11	145.5			

Table 1-4 The Minimum Circulation Airflow

Mc(□lb□oz)		Q_{min} CFM (m^3/h)	Mc(□lb□oz)		Q_{min} CFM (m^3/h)
lb	oz		lb	oz	
2	2	59 (100)	10	2	275 (467)
2	9	71 (121)	10	9	287 (488)
3	0	83 (141)	11	0	298 (506)
3	7	95 (161)	11	7	310 (527)
3	15	107 (182)	11	14	322 (547)
4	6	119 (202)	12	5	334 (567)
4	13	131 (223)	12	12	346 (588)
5	4	143 (243)	13	3	358 (608)
5	11	155 (263)	13	10	370 (629)
6	2	167 (284)	14	1	382 (649)
6	9	179 (304)	14	8	394 (669)
7	0	191 (325)	14	15	406 (690)
7	7	203 (345)	15	6	418 (710)
7	15	215 (365)	15	14	430 (731)
8	6	227 (386)	16	5	442 (751)
8	13	239 (406)	16	12	454 (771)
9	4	251 (426)	17	3	466 (792)
9	11	263 (447)			

Table 1-5 Required Minimum Room Area for Altitude Installations Higher than 200 m

	Altitude (m)							
	201-400	401-600	601-800	801-1000	1001-1200	1201-1400	1401-1600	Above 1600
Charge lb	Minimum Conditioned Space (m^2)							
2	2.8	2.8	2.8	2.9	3.0	3.1	3.1	3.2
3	4.2	4.2	4.3	4.4	4.5	4.6	4.7	4.8
4	5.6	5.6	5.7	5.9	6.0	6.1	6.2	6.4
5	7.0	7.0	7.1	7.3	7.5	7.7	7.8	8.0
6	8.4	8.4	8.5	8.8	8.9	9.2	9.4	9.6
7	9.8	9.8	9.9	10.2	10.4	10.7	10.9	11.2
8	11.1	11.1	11.4	11.7	11.9	12.3	12.5	12.8
9	12.5	12.5	12.8	13.2	13.4	13.8	14.0	14.4
10	13.9	13.9	14.2	14.6	14.9	15.3	15.6	16.0
11	15.3	15.3	15.6	16.1	16.4	16.9	17.2	17.6
12	16.7	16.7	17.1	17.6	17.9	18.4	18.7	19.2
13	18.1	18.1	18.5	19.0	19.4	19.9	20.3	20.8
14	19.5	19.5	19.9	20.5	20.9	21.5	21.8	22.4
15	20.9	20.9	21.3	21.9	22.4	23.0	23.4	24.0
16	22.3	22.3	22.7	23.4	23.8	24.5	25.0	25.6
17	23.7	23.7	24.2	24.9	25.3	26.1	26.5	27.2
18	25.1	25.1	25.6	26.3	26.8	27.6	28.1	28.8
19	26.5	26.5	27.0	27.8	28.3	29.1	29.6	30.4
20	27.9	27.9	28.4	29.3	29.8	30.6	31.2	32.0

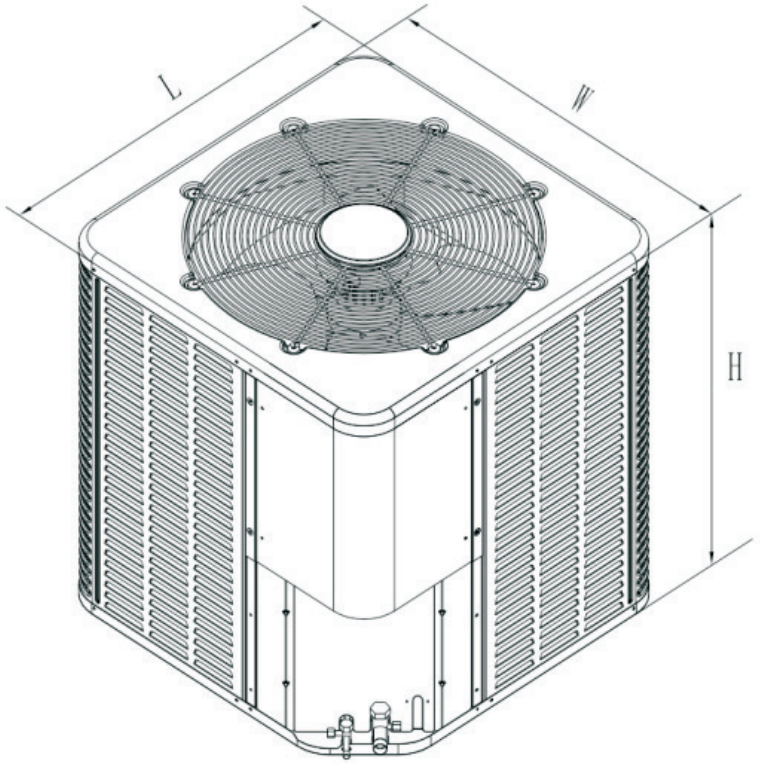
2. 1 Condenser Dimensions

Table 2-1 Unit Size

Model	H x W x L (inches)
18K / 24K / 30K	25 x 23-3/5 x 23-3/5
36K	25 x 29-1/7 x 29-1/7
42K / 48K / 60K	32-7/8 x 29-1/7 x 29-1/7

The weight of the unit is attached to the carton.

Fig. 2-1 Unit Dimensions



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 Heating Valve Core Information

Table 2-2 Heating Valve Core Information

Valve Core Information	Capacity (Kbtu/h)						
	18K	24K	30K	36K	42K	48K	60K
Valve Core Model	038	040	048	048	052	060	066
Valve Core Type	One-way Throttle Valve						
Connection Method	Brazing						
Note: Orifice Size (In) = Valve Core Model/1000							

3. 1 Refrigerant Pipeline Restrictions

Table 3-1 Refrigerant Pipeline Restrictions

Refrigerant Piping		Capacity (Kbtu/h)						
		18K	24K	30K	36K	42K	48K	60K
Liquid-Gas	In.	3/8-3/4	3/8-3/4	3/8-3/4	3/8-3/4	3/8-3/4	3/8-7/8	3/8-7/8
Max. Refrigerant Line Length*	Ft.	100			150			
Max. Elevation Vertical Lift**	Ft.	32			65			

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

- Maximum equivalent length of pipeline = 150 feet.
- Maximum vertical equivalent length = 65 feet.
- Use only the pipe diameters shown in **Table 3-1**.
- If the suction line exceeds 65 feet, do not use a larger suction line than recommended.

Fig. 3-1 Standard Line Set Length

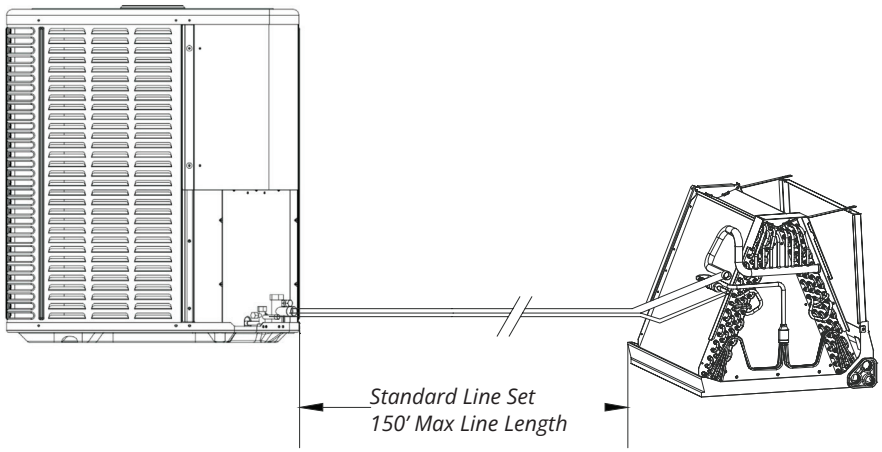


Fig. 3-2 Vertical Lift for Line Set Condenser Below Coils

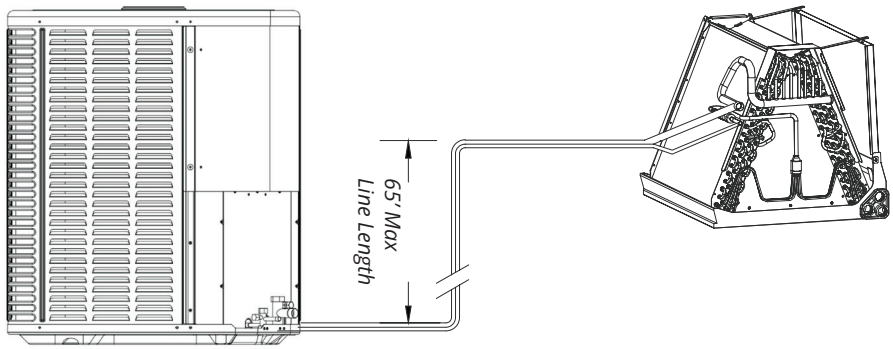
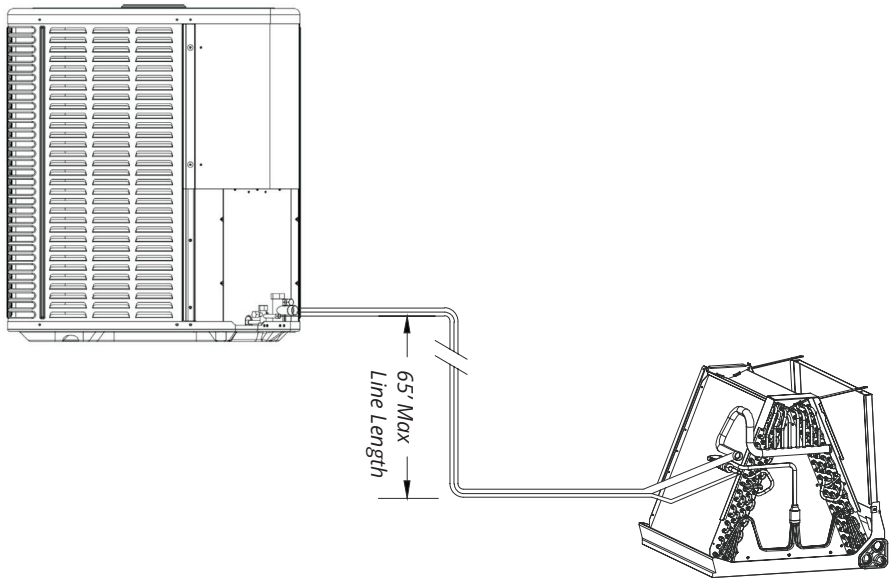


Fig. 3-3 Vertical Lift for Line Set Condenser Above Coils



3. 2 Position Restrictions

- Make sure that the discharge area is at least 60 inches above the top of the unit and unrestricted.
- Don't put the outdoor unit near the bedroom as the normal operating sound may be loud.
- Position the equipment with enough space for smooth airflow, wiring, refrigerant lines, and maintainability.
- The clearance from one side of the access panel to nearby structures should be at least 24 inches. Other sides need 12 inches minimum clearance.
- Keep a distance of 24 inches between adjacent units.
- Place the unit where water, snow, or ice cannot fall directly on the device from the roof or overhangs.

Fig. 3-4 Installation Clearances

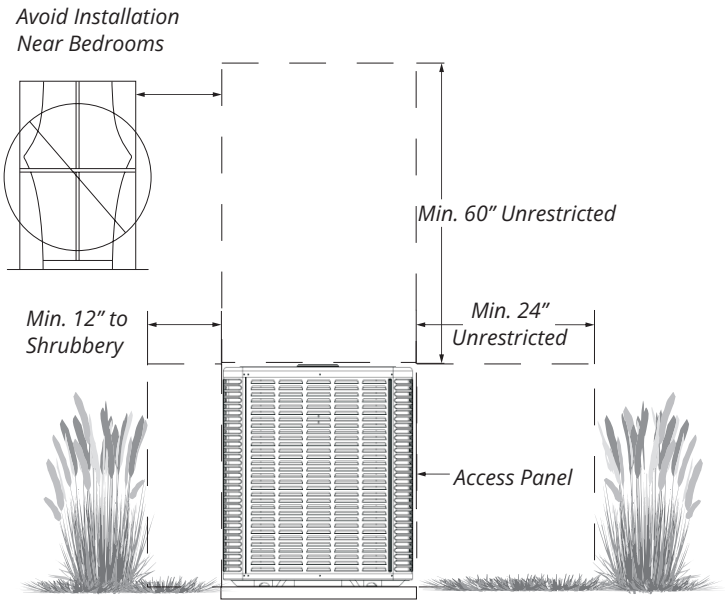
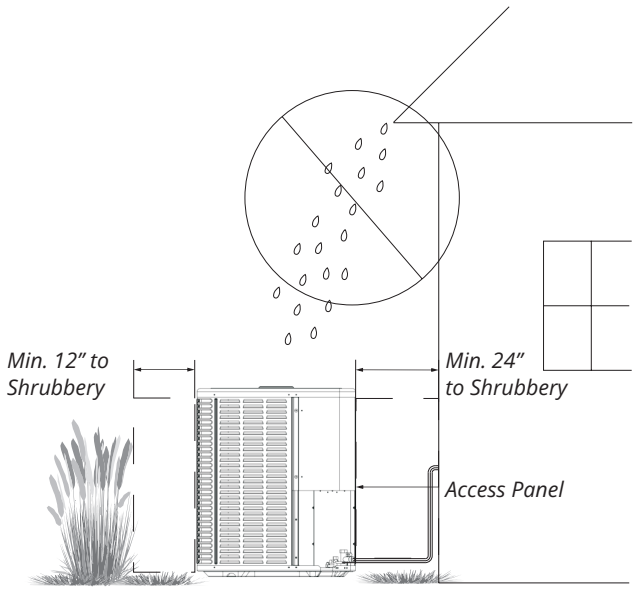


Fig. 3-5 Weather Considerations for Installation Position



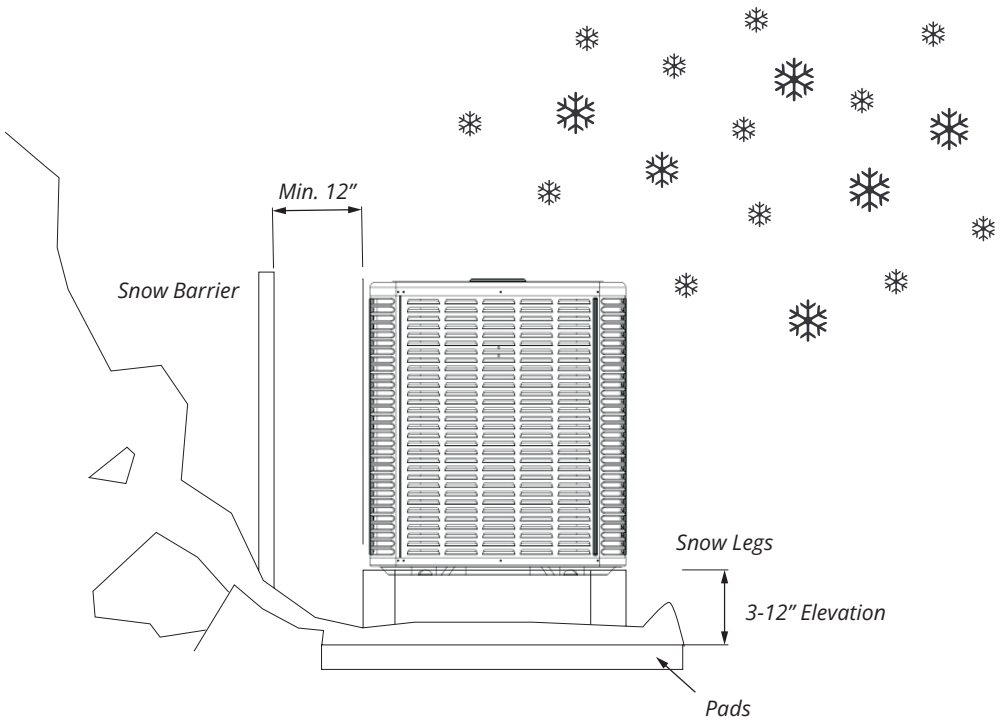
3. 3 Precautions in Cold Climate

Heat Pump Models Only

NOTE
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 as displayed in **Fig. 3-6**.
- 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.

Fig. 3-6 Snow & Ice Considerations for Installation



3. 4 Precautions for Corrosive Environments

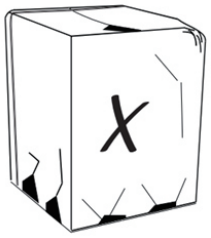
Exposure to corrosive environments may shorten the unit's service life, corrode metal parts, and/or negatively affect unit performance. Corrosive elements include but are not limited to: sodium chloride, sodium hydroxide, sodium sulfate, and other compounds commonly found in seawater, sulfur, chlorine,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

- Do not spray lawn sprinklers/hoses/waste water directly on the outer panel of the unit for an extended 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.

4. 1 Preparing the Unit for Installation

- Check whether there is any damage to the packaging or unit and report any damage to the unit to the manufacturer in a timely manner.
- The filler can be used to ensure that the refrigerant charge is maintained during shipment.

Fig. 4-1 Package Damage



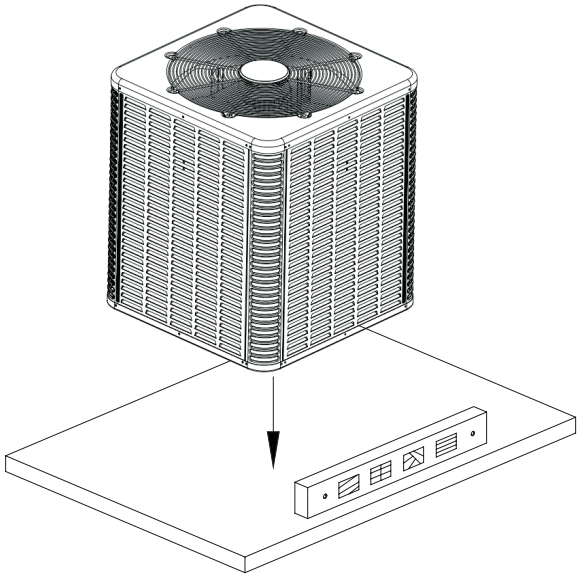
4. 2 Gasket Installation

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 gasket must be separated from any structure.
- The mat must be level.
- The cushion must be high enough above the ground for drainage.
- The location of the pad must comply with national, state and local regulations.

NOTE
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.

Fig. 4-2 Installing Unit on a Support Pad



5. 1 Connecting Dimensions of Refrigerant Lines and Service Valves

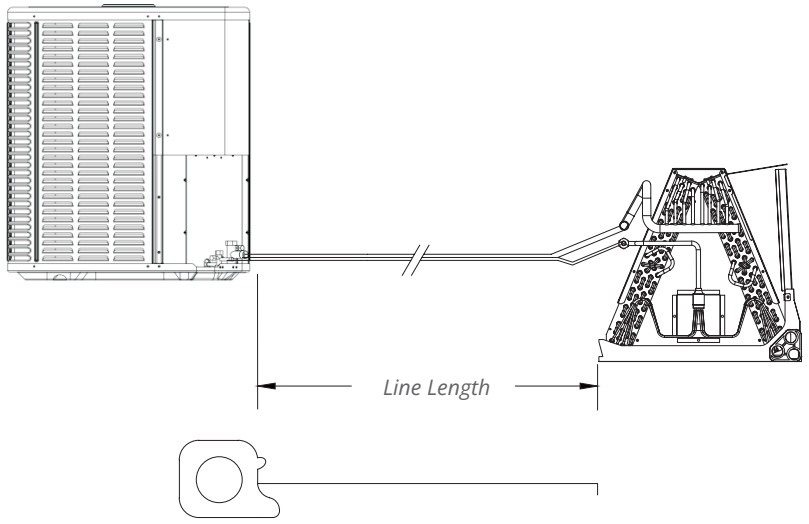
Table 5-1 Connecting Dimensions of Refrigerant Lines & Services Valves in Inches

Model	Suction Line	Liquid Line	Suction Line Connection	Liquid Line Connection
18K / 24K / 30K / 36K / 42K	3/4	3/8	3/4	3/8
48K / 60K	7/8	3/8	7/8	3/8

5. 2 Length of Required Refrigerant Pipeline

Determine the required pipeline length. Refer to section **3. 1 REFRIGERANT PIPELINE RESTRICTIONS** to determine this.

Fig. 5-1 Required Refrigerant Pipeline Length



5. 3 Refrigerant Pipe Insulation

NOTE

The air pipe must always be insulated. Do not let the liquid pipeline and gas pipeline come into direct contact (metal to metal).

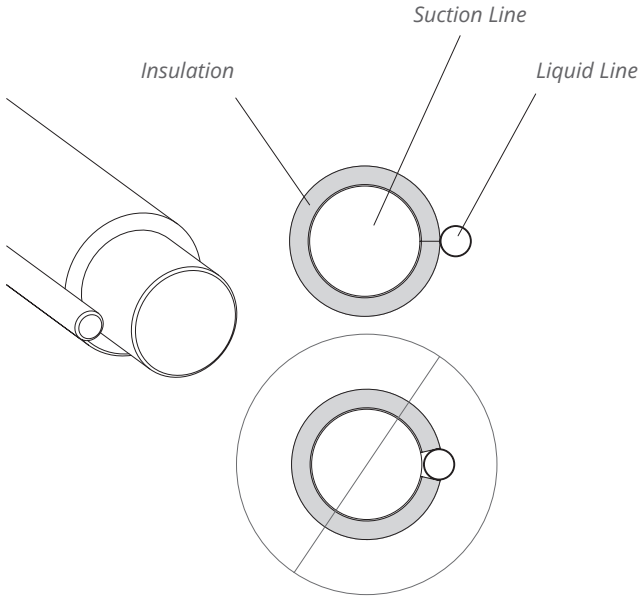


Fig. 5-2 Refrigerant Pipe Insulation

5. 4 Reusing the Existing Refrigerant Lines

CAUTION: 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 a retrofit application using the existing refrigerant pipeline:

- Make sure the refrigerant line size is correct. Refer to Section **3. 1 REFRIGERANT PIPELINE RESTRICTIONS** and **Table 3-1**.
- Make sure the refrigerant line is free of leakage, acid and oil.

NOTE
The manufacturer recommends that only approved matching indoor and outdoor systems be installed. All split systems are certificated by AHRI, the indoor unit is equipped with piston or TXV, and the model of piston and TXV is selected by manufacture, please do not change by yourself. The benefits of installing an approved indoor and outdoor split system are maximum efficiency, best performance and best overall system reliability.

5. 5 Refrigerant Pipeline Routing

5. 5. 1 Preventive Measures

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

- When the refrigerant pipeline must be fixed on floor joists or other structural frames, use isolated hangers.
- When the refrigerant pipeline runs in column space or a closed ceiling, use isolated hangers.
- When refrigerant lines pass through walls or windowsills, they should be insulated and isolated.
- Isolate the pipeline from all piping systems.
- Try to reduce the number of 90° laps.

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

When isolated from a beam or rafter, use isolators to fix the air pipes on the beams every 8 feet. Every 8 feet, use tape, wire, or other suitable methods to fix the liquid line directly to the suction line, as shown in **Fig. 5-3**.

When isolated on the wall, use isolators to fix the suction line every 8 feet. Every 8 feet, liquid line directly to the suction line with tape, wire or other suitable methods, as shown in **Fig. 5-4**.

Fig. 5-3 Wall / Beam Isolation

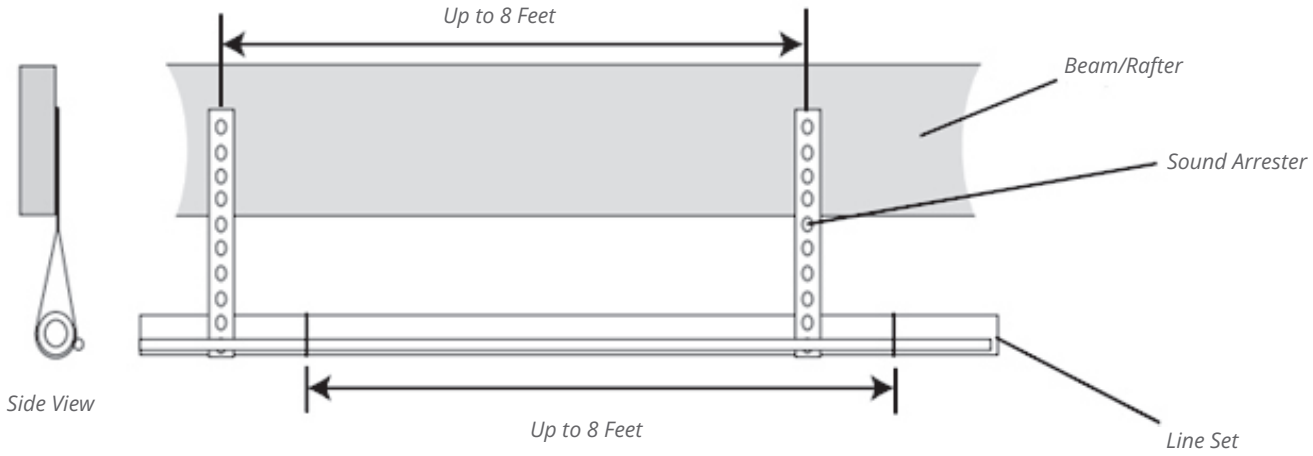


Fig. 5-4 Isolation on the Wall

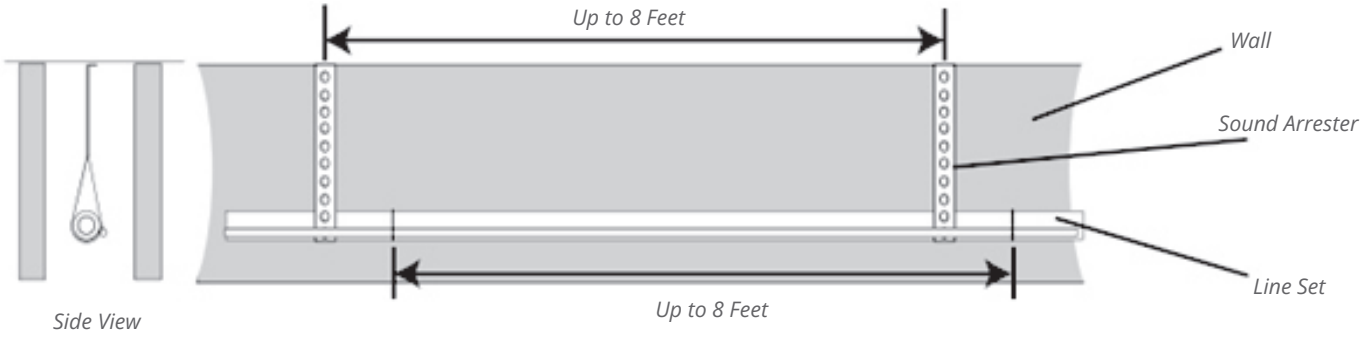
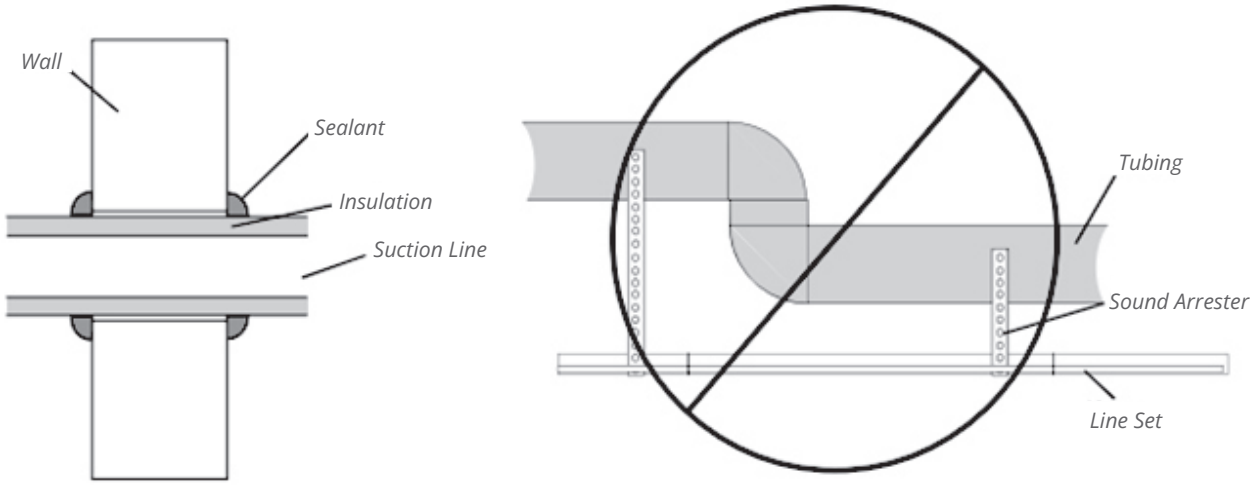
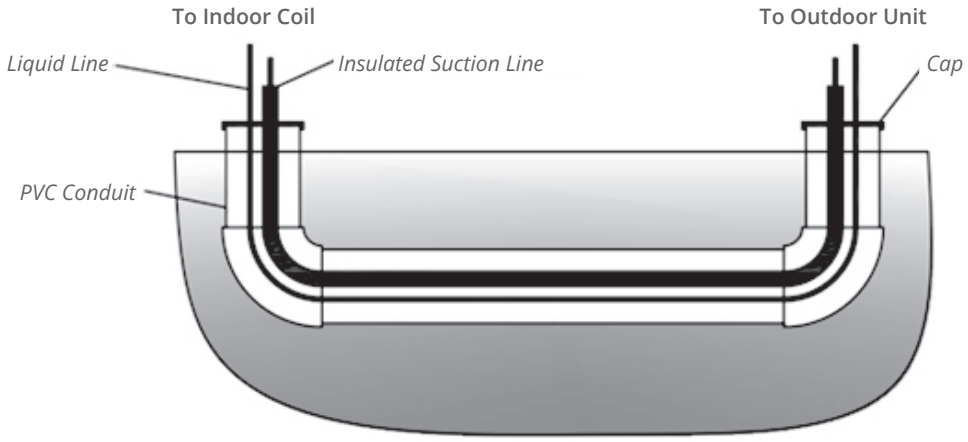


Fig. 5-5 Wall Isolation



Do not hang the pipeline on the duct work.

Fig. 5-6 Routing Through PVC Conduit



5. 6 Refrigerant Line Connection

⚠ WARNING ⚠

Pipe work and installation must be in compliance with national codes ASHRAE15. The installation of pipework should be kept to a minimum. It is recommended to install a filter dryer. The filter drier should be installed in the liquid line between the outdoor unit's liquid line service valve and the indoor coil's metering device. The filter dryer should compatible with R454B refrigerant.

1. All joints made in the installation between parts of the refrigerating system, with at least one part charged, must be in accordance with the following:
   - A brazed, welded, or mechanical connection must be made before opening the valves to permit refrigerant to flow between the refrigerating system parts. A vacuum valve must be provided to evacuate the interconnecting pipe or any uncharged refrigerating system part.
   - Mechanical connectors used indoors must comply with ISO 14903. When mechanical connectors are reused indoors, sealing parts must be renewed. When flared joints are reused indoors, the flare part must be refabricated.
   - Refrigerant tubing must be protected or enclosed to avoid damage.
   - Flexible refrigerant connectors (such as connecting lines between the indoor and outdoor unit) that may be displaced during normal operation must be protected against mechanical damage.
2. Compliance is checked according to the installation instructions and a trial installation, if necessary.
3. Field-made refrigerant joints indoors must be tightness tested. The test method must have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. Make sure no leaks are detected.
4. For installations with field applied joints that are exposed in the occupied space, these joints must be at least one of the following:
   - Mechanical joints in compliance with ISO 14903 or UL 207 (U.S. only).
   - Welded or brazed joints.
   - Joints in enclosures that vent to the unit or to the outside.
5. Compliance is checked by inspection and tests.

5. 7 Brazing the Refrigerant Pipeline

1. Remove the cover or plug. Use the deburring tool to deburr the pipe end. Clean the inner and outer surfaces of the pipeline with an emery cloth as shown in **Fig. 5-7**.
2. Remove the pressure taps from the two service valves as shown in **Fig. 5-8**.
3. Purge refrigerant lines and indoor coils with dry nitrogen as shown in **Fig. 5-9**.
4. Wrap the valve body with a wet rag to avoid thermal damage, and continue the dry nitrogen purging

   Braze the refrigerant line to the service valve.

   Continue the dry nitrogen purge. Don't take off the wet rag before all brazing is completed as shown in **Fig. 5-10**.

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

Fig. 5-7 Deburr Pipe Ends

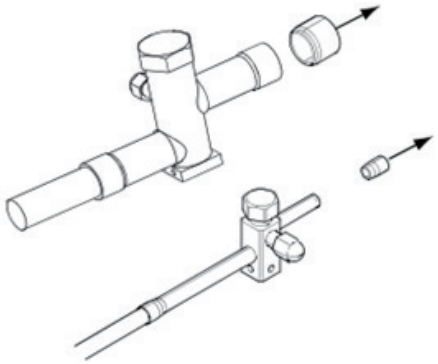


Fig. 5-8 Removing Pressure Taps

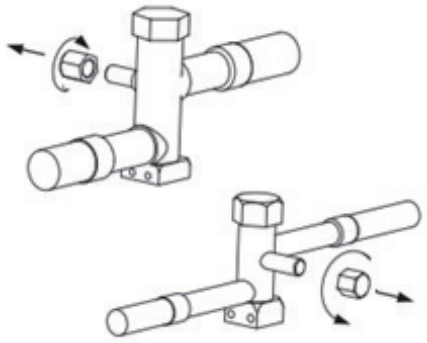


Fig. 5-9 Purge Refrigerant Lines

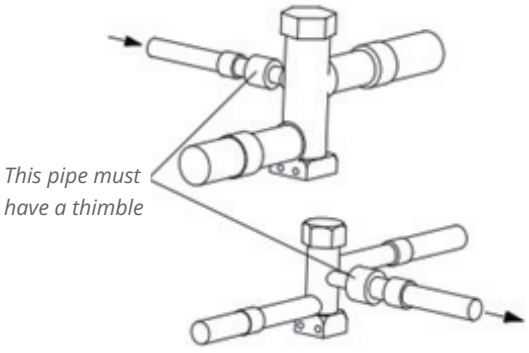
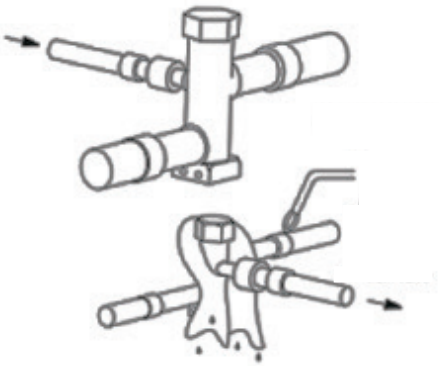
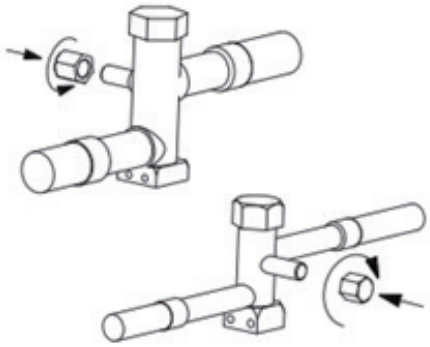


Fig. 5-10 Wrap Valve Body



5 After the service valve cools down, replace the pressure tap, as shown in **Fig. 5-11**.

Fig. 5-11 Replacing the Pressure Tap



5. 8 Checking for Leaks

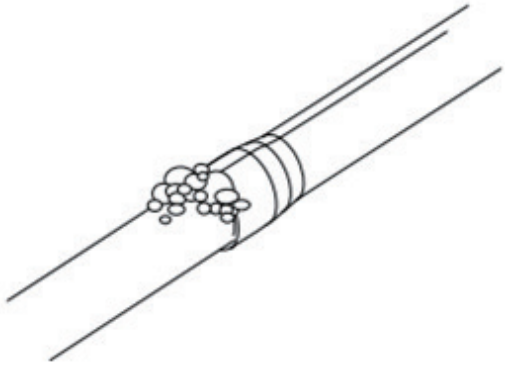
1 Use dry nitrogen to pressurize the refrigerant line and evaporator coil to 150 PSIG, as shown in **Fig. 5-12**.

2 Use soapy water or foam at each soldering position to check for leaks, as shown in **Fig. 5-13**.

Fig. 5-12 PSIG Check



Fig. 5-13 Leak Test



⚠ WARNING ⚠

After completing the field piping for split systems, pressure test the field pipework with an inert gas, and then vacuum test prior to refrigerant charging, according to the following requirements:

- Entire line set and evaporator coil should hold 600 PSIG for 1 hour.
- Field-made refrigerant joints indoors must be tightness tested. The test method must have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0,25 times the maximum allowable pressure.
- Ensure there are no leaks detected.

5. 9 Emptying the Refrigerant Pipeline and Indoor Coil

NOTE
Do not open the service valve until you have completed the leakage inspection and emptying of refrigerant lines and indoor coils.

1. Evacuate until the micrometer reading is not higher than 350 micrometers, and then close the valve of the vacuum pump, as shown in **Fig. 5-14**.
2. Observe micrometer gauge. If the micrometer meter does not rise above 500 micrometers within one (1) minute, the evacuation is completed, as shown in Fig. **5-15**.

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

Fig. 5-14 Micrometer Gauge

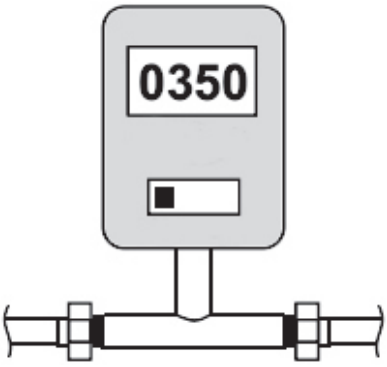


Fig. 5-15 Evacuation Micrometer Test



5. 10 Opening the Service Valve

⚠ WARNING: MODERATE TO SEVERE BURNS ⚠
Failure to observe this warning will result in sudden discharge of system charge, 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. No torque is required.

NOTE
Before opening the service valve, the leakage inspection and emptying 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.

NOTE
Before opening the Liquid side service valve, the gas side service valve must be opened first.

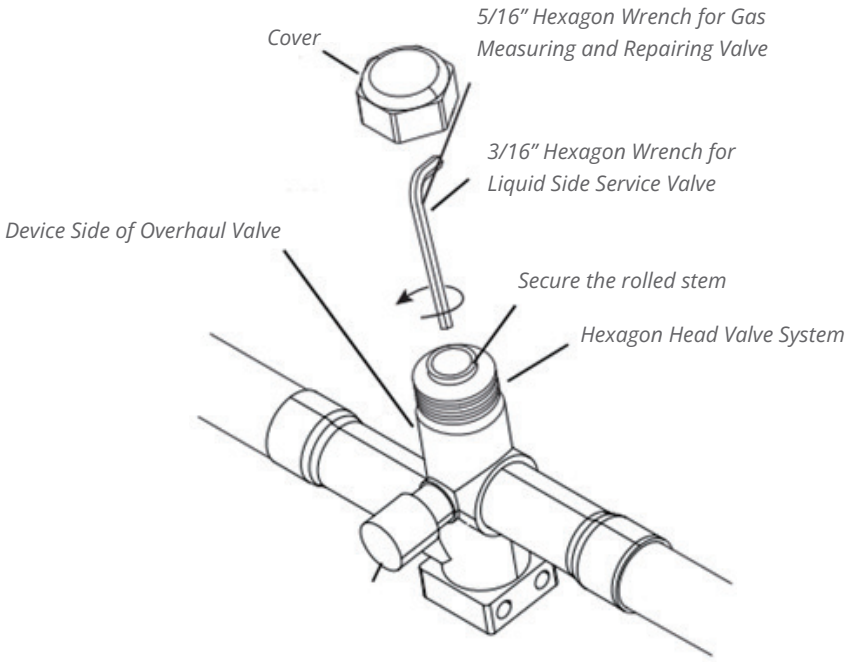
1. Remove the valve cover

2. Insert the hex wrench into the valve stem completely and back out counterclockwise until the valve stem just touches the bead.

3. Replace the valve stem cap to prevent leakage. Tighten it with your fingers and turn it for another 1/ turn.

4. Repeat steps 1-3 for the liquid side service valve.

Fig. 5-16 Opening the Service Valve



5. 11 System Refrigerant Charging Regulation

5. 11. 1 Weighing Method of Charging

The weighing method should be used during the initial installation, or when the refrigerant quantity of the updated system is charged. When there is no power supply at the site of the unit or the operating conditions (indoor/outdoor temperature) are not within the range verified by the subcooling charging method. All models have a charge factor of 0.69 oz/ft for refrigerant pipe length.

NOTE
For a 25-ft standard size interconnecting liquid pipe, the factory refrigerant charge of the outdoor unit is sufficient.

New installation-Calculate the charging amount of connecting pipes larger than 25 ft.

1. Total length of pipeline (ft) = _____(a)
2. Standard piping setup (ft) =25 (b)
3. (a) minus (b) = _____ (c)
4. Refrigerant multiplier = 0.69 oz/ft (d)
5. Additional refrigerant quantity (c*d) = _____(e)*
   * If the line set is less than 25 feet, e=0

Closed system maintenance-calculate the total filling amount of the system.

1. Total length of pipeline (ft) = _____(a)
2. Standard piping setup (ft) =25 (b)
3. (a) minus (b) = _____ (c)
4. Refrigerant multiplier = 0.69 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 25 feet, e =0

NOTE
The only mode approved for verifying system charging is “forced cooling mode”. The outdoor temperature range must be 55°F - 120°F and the indoor temperature range must be 70°F - 80°F.

5. 11. 2 Subcooling Charging and Refrigerant Quantity Adjustment in Cooling Mode

Check the outdoor ambient temperature.

Subcooling (cooling mode) is the only recommended charging method when the outdoor ambient temperature is higher than 55°F.
For outdoor ambient temperature below 55°F use the weighing charging method.

NOTE
When the outdoor ambient temperature is higher than 55°F, be sure to return in spring or summer, so as to accurately charge the system in cooling mode.

Fig. 5-17 Outdoor Temperature Higher than 55°F

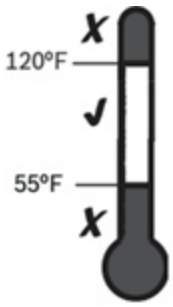


Fig. 5-18 Outdoor Temperature Below 55°F

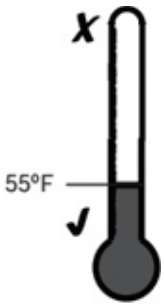
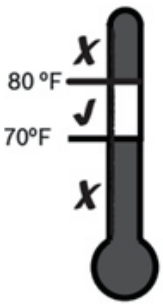


Fig. 5-19 Indoor Temperature

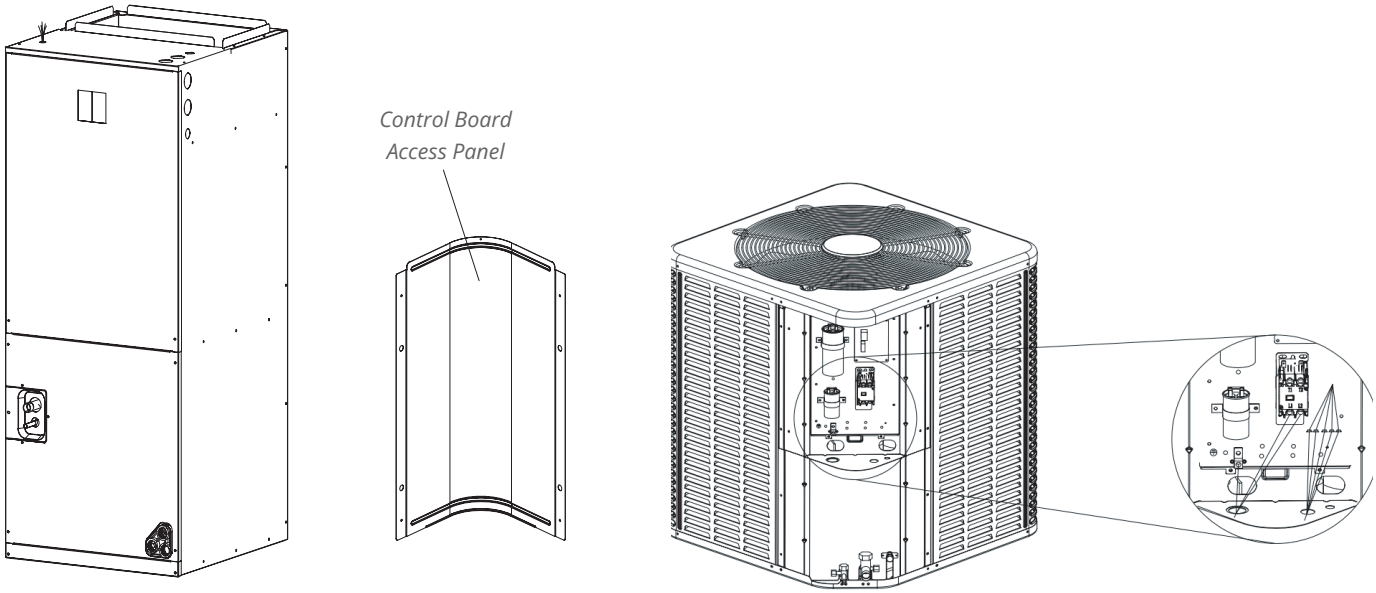


For best results, the indoor temperature should be kept between 70°F and 80°F during installation.

Make sure that all previous parts have been completed.

6. 1 Low Voltage Connection Diagram

Fig. 6-1 Low Voltage Connection Diagram



6. 2 Thermostat Wiring Diagram

- 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 is the smallest conductor of NO. 22 AWG.
- "-----" On-site installation of electrical auxiliary thermal 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

NOTE
The dotted line in **Fig. 6-2** indicates optional wiring (electric heating). For the wiring of the thermostat, please refer to the user manual of the thermostat.

NOTE
Terminal B will be connected with the thermostat (O/B) wiring. The reversing valve is energized during heating.

Fig. 6-2 Wiring Connection for A/C Systems

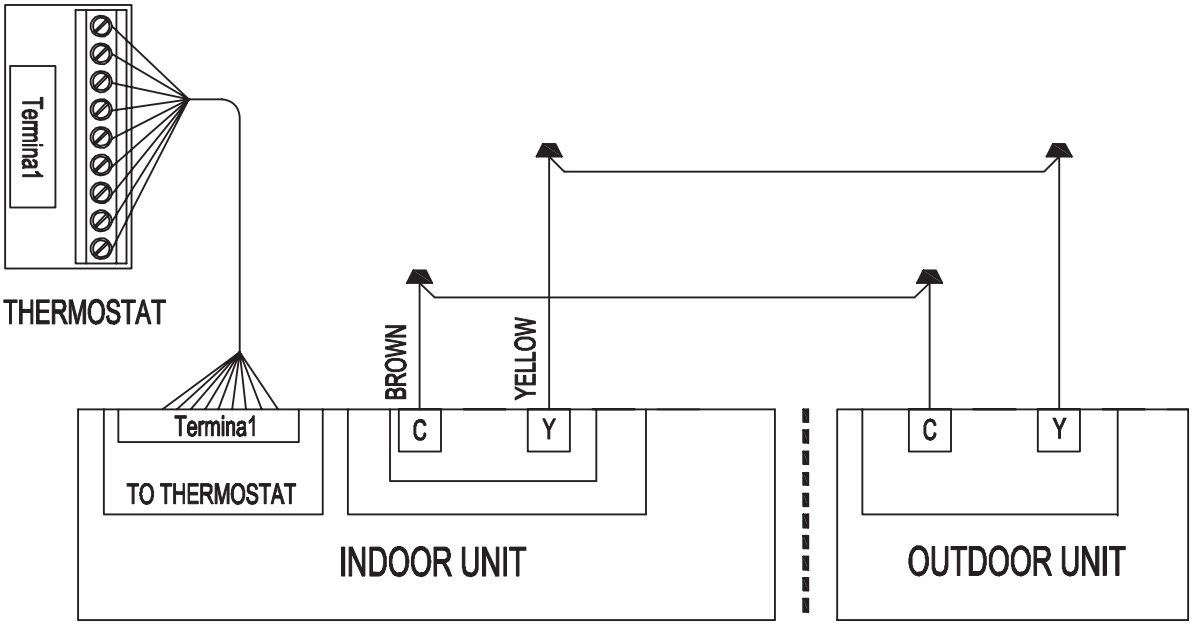
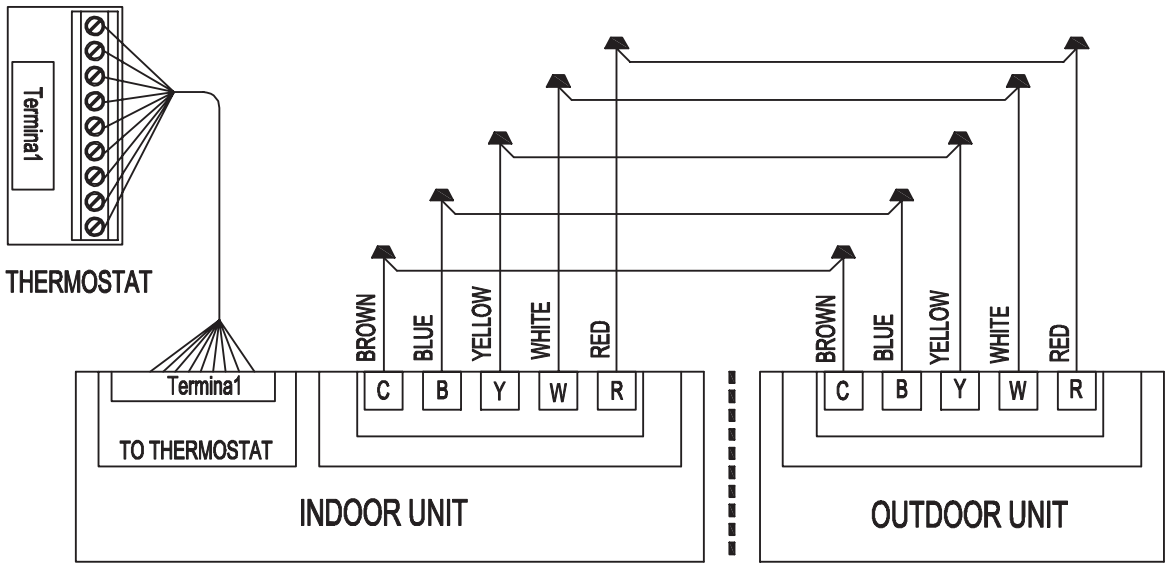


Fig. 6-3 Wiring Connection for Heat Pump Systems



6. 3 High Voltage Power Supply

⚠ WARNING: LIVE ELECTRICAL PARTS ⚠

Failure to observe this warning will result in sudden discharge of system charge, 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. No torque is required.

NOTE

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

NOTE

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

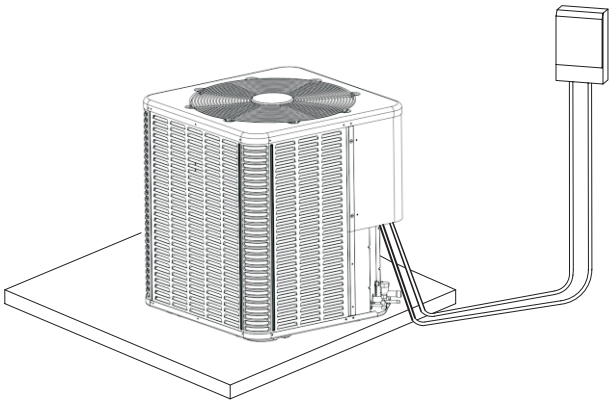
Follow the instructions of the unit wiring diagram located inside the access panel of the control box, and refer to the wiring diagram in this manual.

6. 3. 1 High Voltage Isolating Switch

Install a separate disconnect switch on the outdoor unit.

High-voltage wiring must use flexible electrical conduit supplied on site.

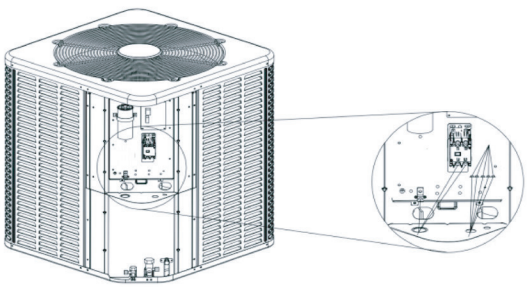
Fig. 6-4 High Voltage Isolating Switch



6. 3. 2 High Voltage Grounding

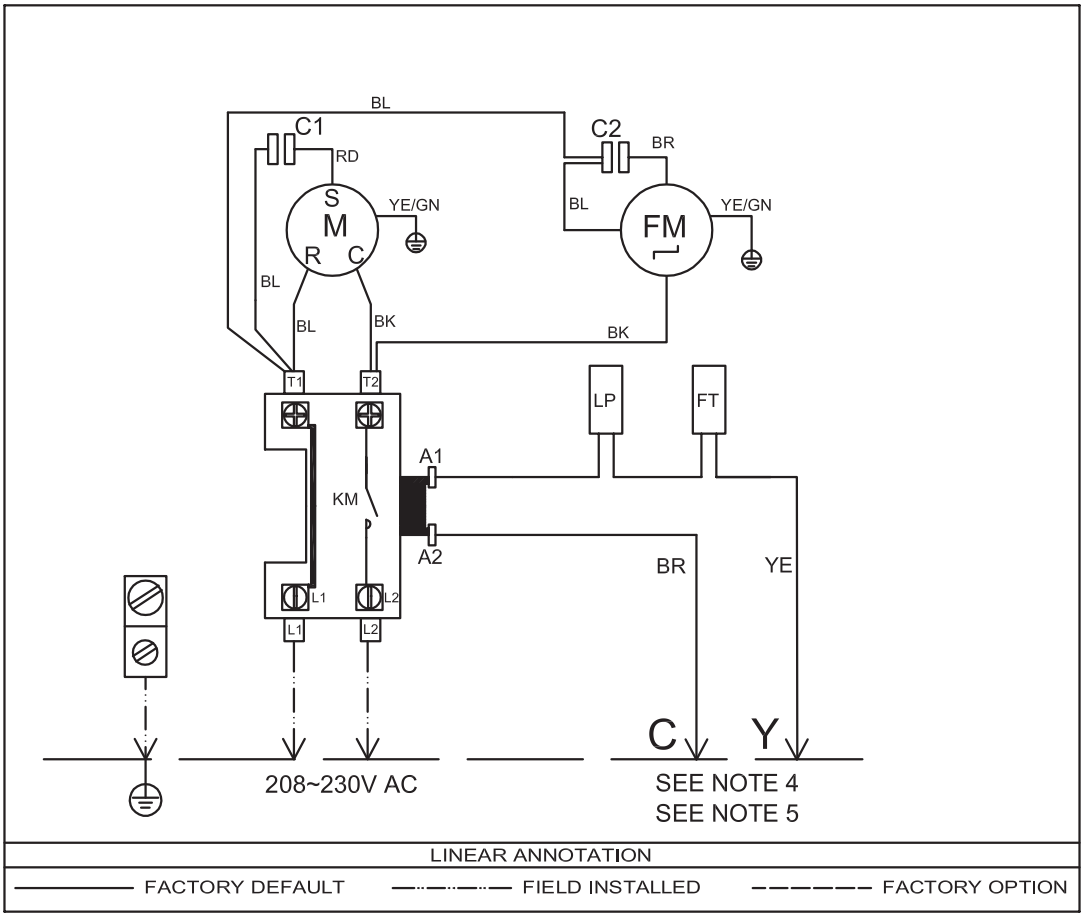
Ground the outdoor unit according to the requirements of national, state, and local regulations.

Fig. 6-5 High Voltage Grounding



6. 4 Wiring Diagram for AC Systems

Fig. 6-6 Wiring Diagram for AC Systems



Applicable for 18K,24K,30K,36K,42K,48K,60K cooling only type.

For reference only. Default to the actual diagram.

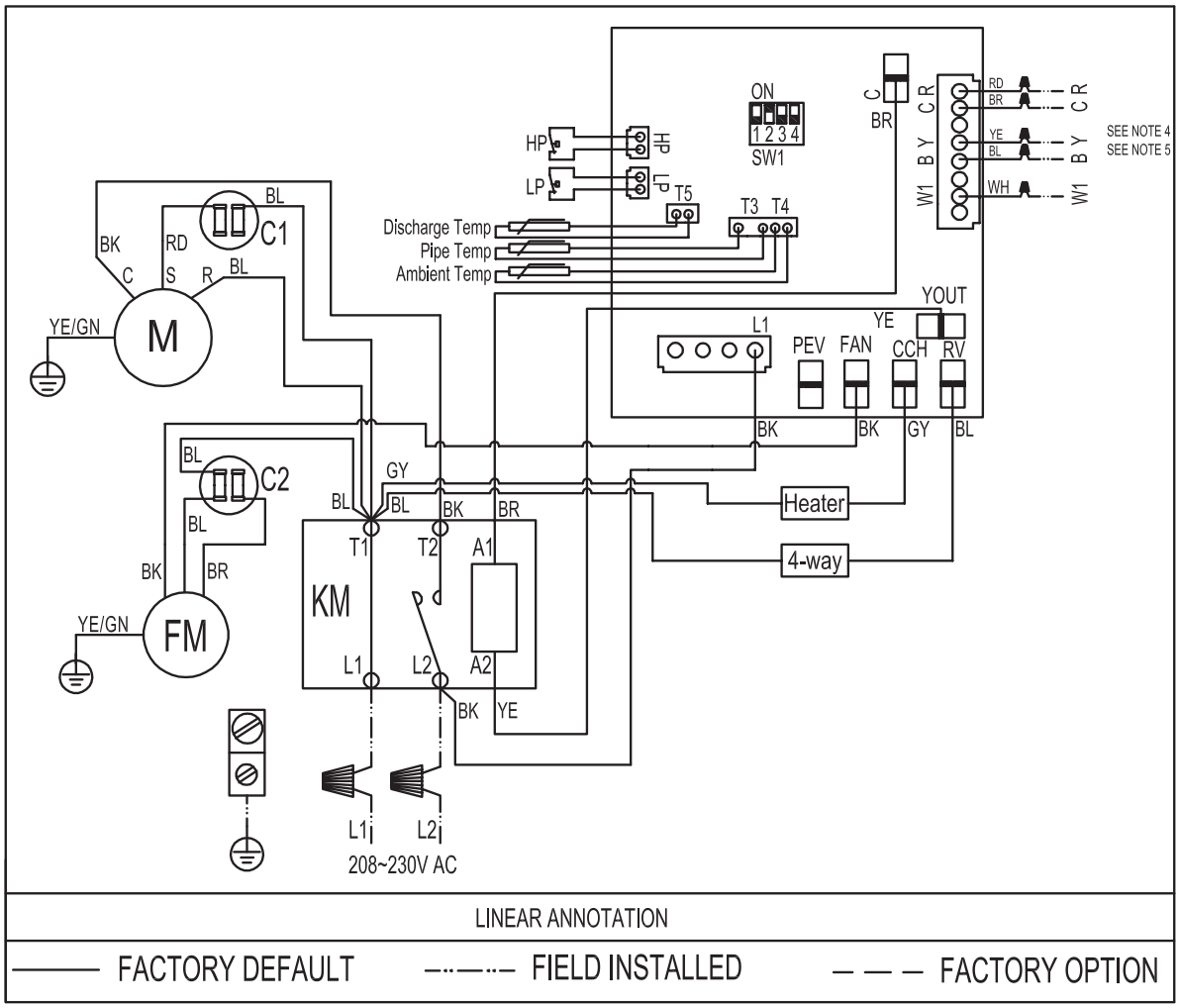
NOTE

1. Grounded and all wiring to conform to I. E. C.
2. Replacement wire must be the same gauge and insulation type as original wire.
3. The units should connect the state cross-section earth wire and keep it grounded unfailingly.
4. To indoor unit low voltage terminal block & indoor thermostat. Use N. E. C. Class 2 wire.
5. Use copper conductor only.

Component Annotation	
LP	Low Pressure Switch
FT	Exhaust Temperature Switch
KM	Contactor
M	Compressor
FM	Fan Motor

6. 5 Wiring Diagram for Heat Pump Systems

Fig. 6-7 Wiring Diagram for Heat Pump Systems



Applicable for 18K,24K,30K,36K,42K,48K,60K cooling & heating type.

For reference only. Default to the actual diagram.

NOTE
1. Grounded and all wiring to conform to I. E. C. 2. Replacement wire must be the same gauge and insulation type as original wire. 3. The units should connect the state cross-section earth wire and keep it grounded unfailingly. 4. To indoor unit low voltage terminal block & indoor thermostat. Use N. E. C. Class 2 wire. 5. Use copper conductor only.

Component Annotation			
LP	Low Pressure Switch	M	Compressor
FT	Exhaust Temperature Switch	FM	Fan Motor
KM	Contactor	HEATER	Crankshaft Heating Band

Dial Switch Description			Factory Setting
SW1-1	ON	Manual Defrost	
	OFF	Automatic Defrost	√
SW1-2	ON	Defrost Mode 1	√
	OFF	Defrost Mode 2	
SW1-3	ON	Defrost Cycle: 30 Min	
	OFF	Defrost Cycle: 60 Min	√
SW1-4	ON	Phase Sequence Test On	
	OFF	Phase Sequence Test Off	√

1. Make sure that all previous steps have been completed.

2. Set the system thermostat to off, as in **Fig. 7-1**.

3. Turn on the disconnect switch and turn on the power of the indoor unit and outdoor unit, as in Fig. **7-2**.

4. Set the system thermostat to ON, as in Fig. **7-3**.

Fig. 7-1 Thermostat Off



Fig. 7-2 Disconnect Switch



Fig. 7-3 Thermostat On



The system uses universal 24V control.

8. 1 Sensors

- **T3**- Outdoor unit coil temperature(Table 16.3)
- **T4**- Ambient temperature(Table 16.3)
- **T5**- Compressor exhaust temperature(Table 16.4)
- **HP**- High pressure switch(Only for heat pump systems)
- **LP**- Low pressure switch

8. 2 Defrost

- Outdoor unit W terminal will output 24V signal during defrost mode.
- Unit will run defrost mode in the following conditions:
  1. Unit runs in heating mode.
  2. Compressor is running.
  3. Defrost mode and cycle time are relayed with SW1-2 and SW1-3 dial switches.

Fig. 8-1 Defrost Switches

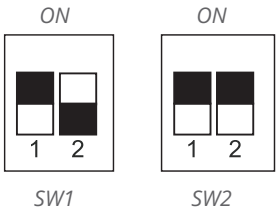


Table 8-1 Defrost Switches

Dial Switch	SW1-2	SW1-3
OFF	Defrost Mode 2	Cycle Time: 60 min
ON	Defrost Mode 1	Cycle Time: 30 min

When SW1-2 is ON, unit will run defrost mode 1 when it meets any of the below conditions:

Condition 1

- When compressor starts, unit will record minimum T3, named T30, and minimum T4, named T40, during compress start (10-15mins).
- When outdoor unit meets below condition, unit will run defrost mode:
  1. When T3<0, and compressor run for 40mins
  2. Unit calculate ΔT4=T4-T40(If ΔT4≤2, unit will resultΔT4=0), and T3 + 2 < (T30+ΔT4) keep 30s.

Condition 2

- When T3<0, and compressor run for 40mins, and T3<-20°C, unit will defrost.

When SW1-2 is OFF, unit will run defrost mode 1 when it meets any below conditions:

Condition 1

- SW1-3 is ON, and compressor is running, when T3<-1°C and keep 30 mins, unit will run defrost.
- SW1-3 is OFF, and compressor is running, when T3<-1°C and keep 60 mins, unit will run defrost.

Condition 2

- When unit power on, and compressor first time start, and T3<-2°C, unit will run defrost.

Condition 3

- When unit standby for 2 hours, and T3< -2°C, unit will run defrost.

4. Quit defrost condition

When SW1-2 is ON, unit will quit defrost when it meets any of the below conditions:

- **Condition 1**: Defrost time lasts 10 minutes
- **Condition 2**: T3≥15°C

When SW1-2 is OFF, unit will quit defrost when it meets any below condition:

- **Condition 1:** Defrost time lasts 10 minutes.
- **Condition 2**: T4≥-2°C and T3≥25°C
- **Condition 3**: Compressor stops
- **Condition 4**: T4<-2°C, T3≥25°C, and keep 60s

8. 3 Compressor Crankshaft Heater Control Function

Crankshaft heater ON condition. When unit meet any below condition, crankshaft heater will ON:

Condition 1 (Meet 3 of the below conditions at same time)

- T5<23°C or T5 sensor is abnormal.
- Outdoor unit is in standby mode, and T4 was lower than 10°C before.
- Outdoor unit stop time ≥ 4h.

Condition 2

- Outdoor unit power on, and T5<23°C
- b) Outdoor unit is in defrost mode , and T5<23°C

When SW1-2 is OFF, unit will run defrost mode 1 when it meets any below conditions:

Condition 1

- SW1-3 is ON, and compressor is running, when T3<-1°C and keep 30 mins, unit will run defrost.
- SW1-3 is OFF, and compressor is running, when T3<-1°C and keep 60 mins, unit will run defrost.

Crankshaft heater OFF condition:

- T5≥28°C and no T5 error

8. 4 LED Display Function of the Outdoor Unit Main PCB and Fault Table

Table 8-2 LED Display Function of the Outdoor Unit Main PCB and Fault Table

Display Content		State Description
No alarm: Green light flashes Red light off	Green light slow flashes	Normal standby
	Green light normally on	Normal operation
System alarm: Red light on Green light flashes	High pressure alarm	Green light flashes 1 times every 8 seconds
	(T3)Temperature sensor fault	Green light flashes 2 times every 8 seconds
	Outdoor low-temperature protection function (CUT-OUT/CUT-IN)	Green light flashes 3 times every 8 seconds
	Phase sequence detection fault	Green light flashes 4 times every 8 seconds
	High exhaust temperature protection	Green light flashes 5 times every 8 seconds
	Low pressure alarm	Green light flashes 6 times every 8 seconds (If the compressor is turned on, there will be a 60-second delay.)
	(T5)Temperature sensor fault	Green light flashes 8 times every 8 seconds
	(T4)Temperature sensor fault	Green light flashes 9 times every 8 seconds
	(T3)High temperature protection	Green light flashes 10 times every 8 seconds
System has locked up: Green light off Red light flashes	Three high/low pressure alarm within 20 minutes	The machine can only operate when it is powered on again.
	Three instances of excessively high exhaust temperature within 20 minutes	
	Three instances of T3 high-temperature protection within 20 minutes	

8. 5 Four-Way Valve Operating Condition

The four-way valve will power on in heating mode, and power off in cooling mode.

8. 6 Troubleshooting 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.

Fig. 8-2 T3 Condenser Temperature Sensor Error

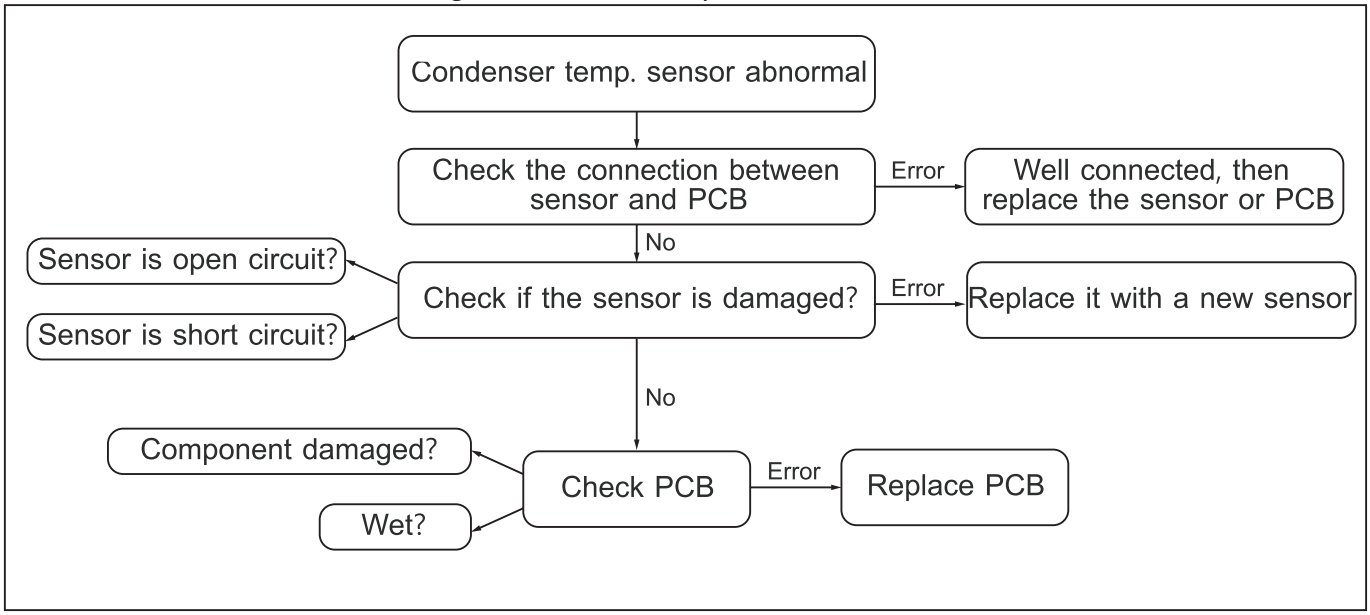


Fig. 8-3 T4 Outdoor Ambient Temperature Sensor Error

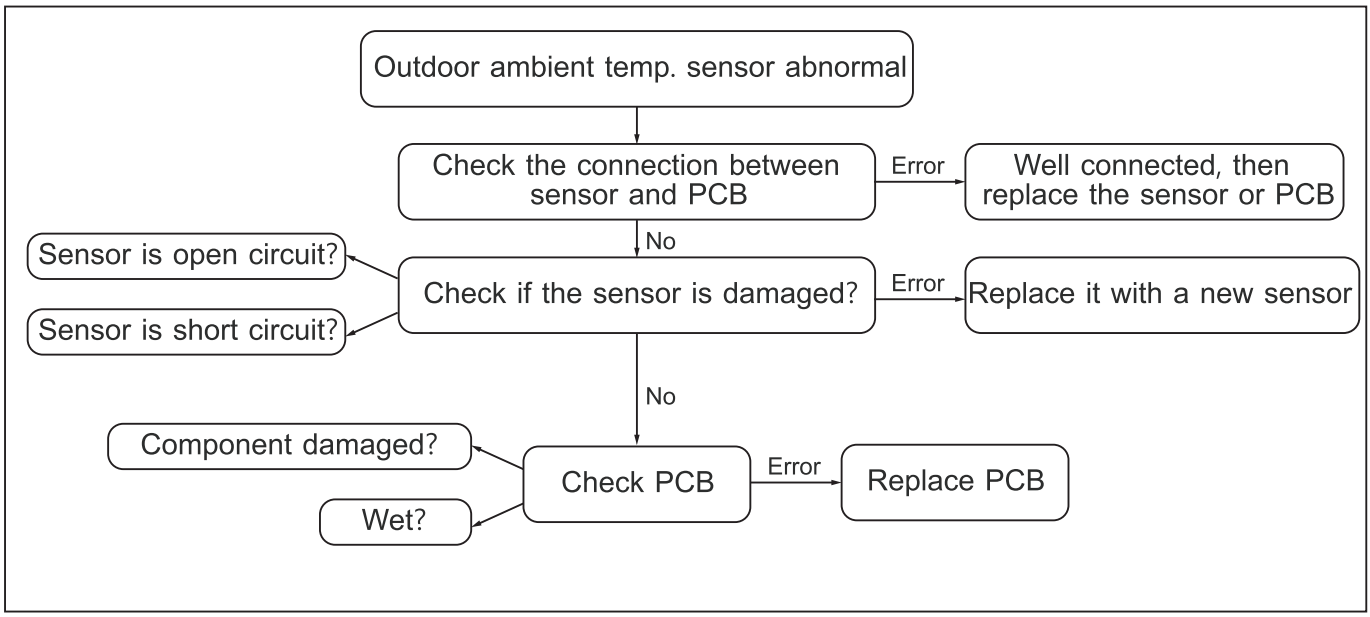


Fig. 8-4 T5 Discharge Temperature Sensor Error

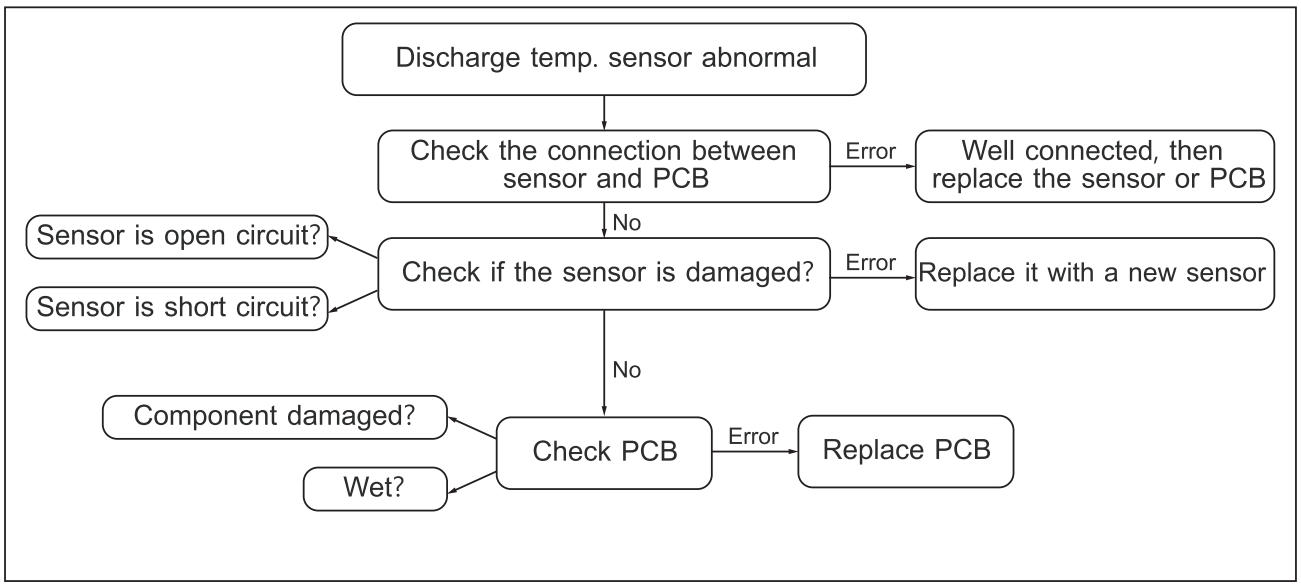


Fig. 8-5 Low Pressure Alarm

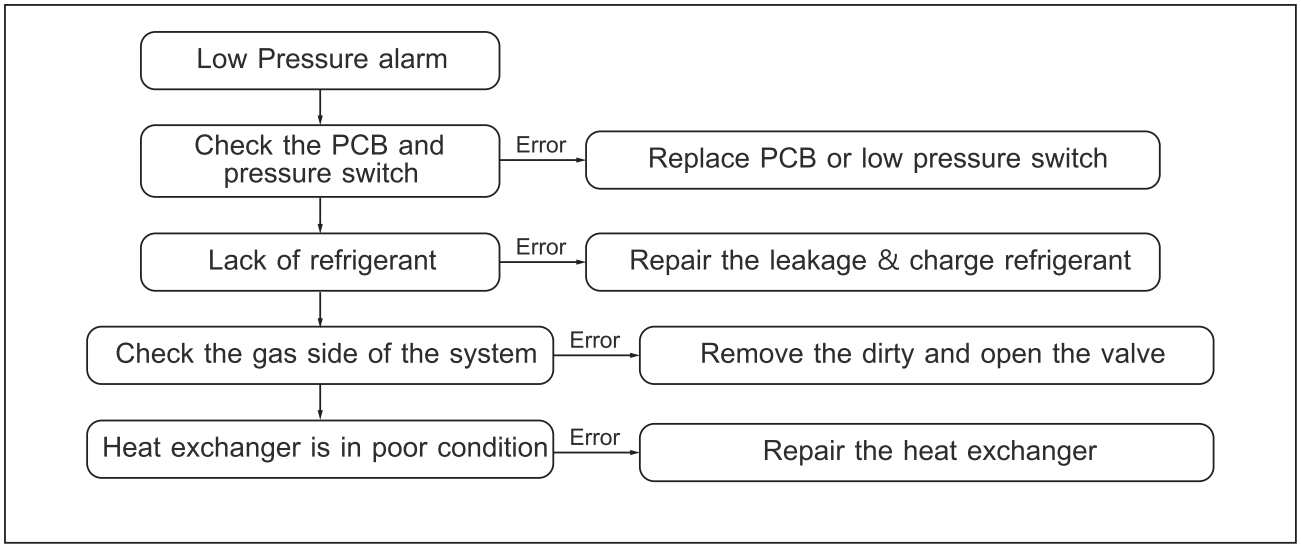


Fig. 8-6 High Pressure Alarm

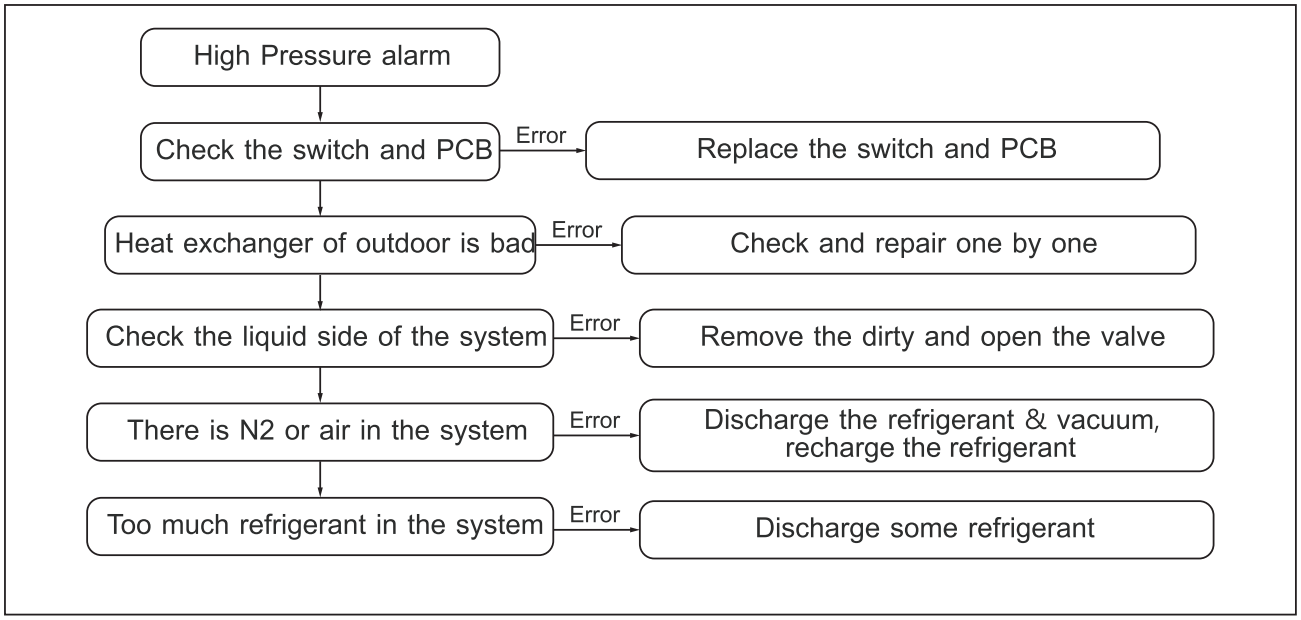


Fig. 8-7 T3 High Temperature Alarm

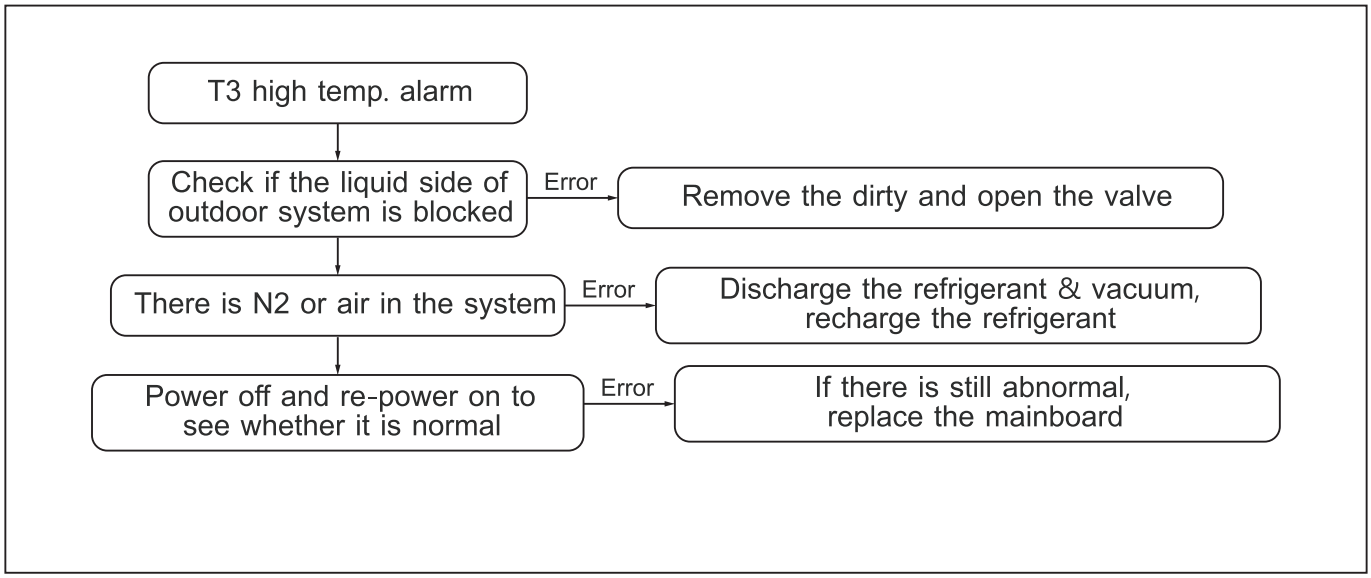
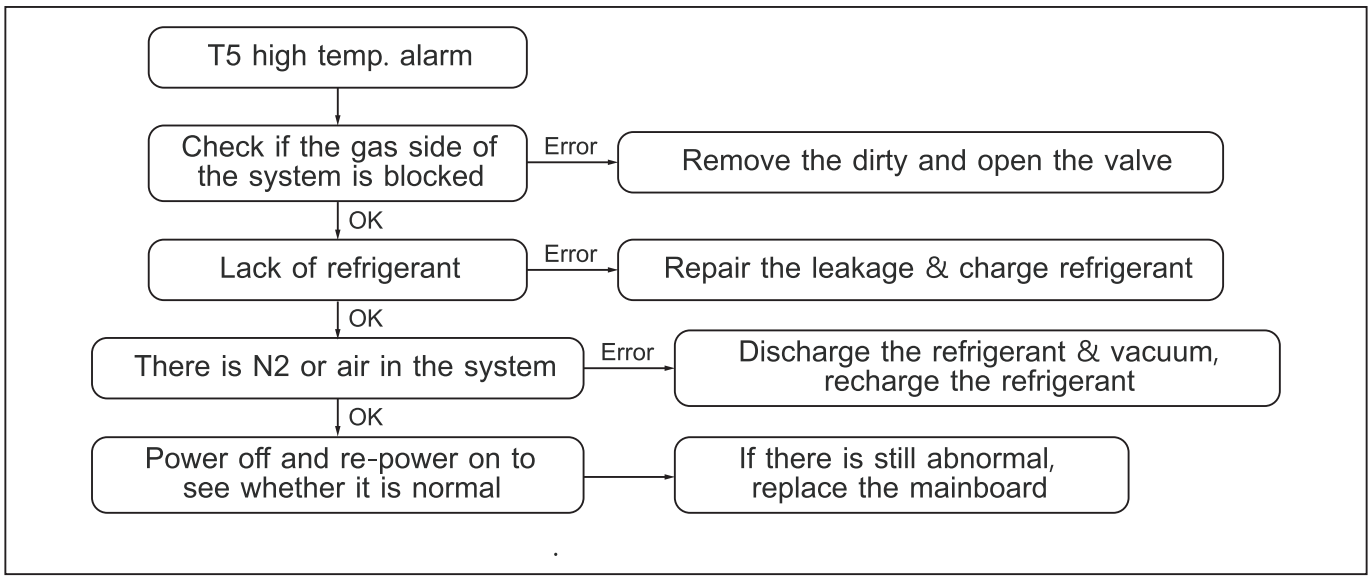


Fig. 8-8 T5 High Temperature Alarm



8. 7 Operation Limits

Table 8-3 Operation Limits by Mode & Temperature

	Cooling Operation	Heating Operation
Room Temperature	63°F ~ 86°F	63°F ~ 86°F
Outdoor Temperature	59°F ~ 113°F	5°F ~ 90°F

Ton=5°F, Toff=2°F

9. 1 Heat Pump Condenser Specifications

14 SEER2 Heat Pump

			**AESH-S4T1821AA	**AESH-S4T2421AA	**AESH-S4T3021AA	**AESH-S4T3621AA	**AESH-S4T4221AA	**AESH-S4T4821AA	**AESH-S4T6021AA
Power Supply			208-230V/1N/60Hz	208-230V/1N/60Hz	208-230V/1N/60Hz	208-230V/1N/60Hz	208-230V/1N/60Hz	208-230V/1N/60Hz	208-230V/1N/60Hz
Min. CircuitA mp.		A	12.2	15.21	8	22.22	63	03	7
Max. Overcurrent ProtectionA			20	20	30	30	45	50	60
Cooling	Capacity	Btu/h	17000	22000	27500	33000	39000	45000	55000
	SEER2 / EER2B	tu/h.W	14.3 / 11.7	14.3 / 11.7	14.3 / 11.7	14.3 / 11.7	14.3 / 11.7	14.3 / 11.2	14.3 / 11.2
Heating	Capacity	Btu/h	17000	22000	27500	33000	39000	45000	55000
	HSPF2	Btu/h.W7	.507	.507	.507	.507	.507	.507	.50
Compressor Type / Brand			Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Fan Motor	Type		PSC	PSC	PSC	PSC	PSC	PSC	PSC
	Rated HP		1/91	/9	1/51	/7	1/71	/3	1/3
Outdoor Coil			Φ7 inner grooved copper tube and hydrophilic aluminum fin						
Air Flow		CFM	1950	1950	2200	2750	2950	4000	4000
Sound Pressure Level		dB(A)	60	60	63	63	65	65	65
Dimension	Unit (WxHxD)	inch	23-3/5x25x23-3/5	23-3/5x25x23-3/5	23-3/5x25x23-3/5	29-1/7x25x29-1/7	29-1/7x32-7/8x29-1/7	29-1/7x32-7/8x29-1/7	29-1/7x32-7/8x29-1/7
	Packing(WxHxD)	inch	24-4/5x26-1/5x24-4/5	24-4/5x26-1/5x24-4/5	24-4/5x26-1/5x24-4/5	30-3/10x26-1/5x30-3/10	30-3/10x34-4/5x30-3/10	30-3/10x34-4/5x30-3/10	30-3/10x34-4/5x30-3/10
Net / Gross weight		lbs	144/150	144/151	146/152	173/182	202/212	223/232	225/235
Refrigerant Connection Valve	Liquid Side	inch	3/83	/8	3/83	/8	3/83	/8	3/8
	Gas Side	inch	3/43	/4	3/43	/4	3/43	/4	7/8
Shipping per SDT40HQ			228	228	228	180	135	135	135

9. 2 A/C Only Condenser Specifications

14 SEER2 Cooling Only

			**AESAS-4T1821AA	**AESAS-4T2421AA	**AESAS-4T3021AA	**AESAS-4T3621AA	**AESAS-4T4221AA	**AESAS-4T4821AA	**AESAS-4T6021AA
Power Supply			208-230V/1N/60 Hz	208-230V/1N/60 Hz	208-230V/1N/60 Hz	208-230V/1N/60 Hz	208-230V/1N/60 Hz	208-230V/1N/60 Hz	208-230V/1N/60 Hz
Min. Circuit Amp.		A	12.2	15.21	8	22.22	63	03	7
Max. Overcurrent ProtectionA			20	20	30	30	45	50	60
Cooling	Capacity	Btu/h	17000	22000	27500	33000	39000	45000	55000
	SEER2 / EER2	Btu/h.W	14.3 / 11.7	14.3 / 11.7	14.3 / 11.7	14.3 / 11.7	14.3 / 11.7	13.8 / 11.2	13.8 / 11.2
Heating	Capacity	Btu/h/		/	//		///		
	HSPF2B	tu/h.W	//		//		///		
Compressor Type / Brand			Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Fan Motor	Type		PSC	PSC	PSC	PSC	PSC	PSC	PSC
	Rated HP		1/91	/9	1/51	/7	1/71	/3	1/3
Outdoor Coil			Φ7 inner grooved copper tube and hydrophilic aluminum fin						
Air Flow		CFM	1950	1950	2200	2750	2950	4000	4000
Sound Pressure Level		dB(A)	60	60	63	63	65	65	65
Dimension	Unit (WxHxD)	inch	23-3/5x25 x23-3/5	23-3/5x25 x23-3/5	23-3/5x25 x23-3/5	29-1/7x25 x29-1/7	29-1/7x32-7/8x29-1/7	29-1/7x32-7/8x29-1/7	29-1/7x32-7/8x29-1/7
	Packing(WxHxD)	inch	24-4/5x26-1/5x24-4/5	24-4/5x26-1/5x24-4/5	24-4/5x26-1/5x24-4/5	30-3/10x26-1/5x30-3/10	30-3/10x34-4/5x30-3/10	30-3/10x34-4/5x30-3/10	30-3/10x34-4/5x30-3/10
Net / Gross Weight		lbs	132/139	133/139	134/141	152/160	185/195	204/214	206/216
Refrigerant Connection Valve	Liquid Side	inch	3/83	/8	3/83	/8	3/83	/8	3/8
	Gas Side	inch	3/43	/4	3/43	/4	3/47	/8	7/8
Shipping per SDT40HQ			228	228	228	180	135	135	135

A-SERIES CONDENSER

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The design and specifications of this product and/or manual are subject to change without prior notice. Consult with the manufacturer for details.