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

MRCOOL®
Signature Series
Split System Heat Pump
INSTALLATION & OWNER'S MANUAL

MODELS:

MCAESAS4T*21AA



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

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

Version Date: August 26, 2025
Please visit www.mrcool.com/documentation to ensure you have the latest version of this manual.

MRCOOL®
COMFORT MADE SIMPLE

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Safety Precautions

Read Before Using

Incorrect usage may cause serious damage or injury.

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

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

WARNING FOR PRODUCT INSTALLATION

1. The appliance should be installed in accordance with national wiring regulations.
2. This information is intended for use by individuals with sufficient electrical and mechanical experience. Attempting to repair central air conditioning products may result in personal injury and/or property damage.
3. An indoor unit is required and is to be equipped with a piston or TXV. The model of piston or TXV is selected by the manufacturer and is not designed to be changed by yourself.
4. When opening the liquid pipeline service valve, be extra careful. Turn the valve stem counterclockwise until the valve stem touches the bead. Failure to observe this warning will result in sudden discharge, which may result in personal injury and/or property damage.
5. Brazing is 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.
6. The unit should be stored in a well-ventilated room without continuously operating flames or other potential ignition.
7. Disconnect all remote electric power supplies before servicing. Failure to do so increases the risk of electric shock, injury, or death.
8. The unit utilizes flammable refrigerant with a risk of fire. Do not puncture the refrigerant tubing. Repairs should only be completed by trained service personnel.
9. Disposal should be in accordance with federal or local regulations.
10. Consult all included documentation before attempting to service this product. All safety precautions must be followed.
11. Do not install auxiliary devices which may be ignition sources in the ductwork, other than auxiliary devices listed for use with the specific appliance.

ELECTRICAL WARNINGS

1. Failure to observe these warnings may result in property damage, serious personal injury, or death.
2. Disconnect all power before maintenance, including remote disconnection. Follow proper locking/tagging procedures to ensure that the power supply will not be accidentally energized.
3. Grounding is 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.
4. High current leakage is a possibility if grounding is not completed before connecting the power supply. Failure to observe this warning may result in property damage, serious personal injury, or death.

1 SAFETY

WARNING FOR PRODUCT USE

1. This unit 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.
2. Do not touch the top of the compressor. The hot surface may cause mild to severe burns. Failure to observe this caution may result in property damage or personal injury.
3. 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
4. Children should be supervised to ensure that they do not play with the appliance.

CAUTION

1. In order to avoid electric shock, make sure that the unit is grounded and that the ground wire is not connected to a gas or water pipe, lightning conductor, or telephone ground wire.
2. Do not operate the air conditioner with wet hands. An electric shock may happen.
3. Do not operate the air conditioner when using a room fumigation-type insecticide. Failure to observe this precaution could cause the chemicals to become deposited in the unit, which could endanger the health of those who are hypersensitive to chemicals. It may also cause the refrigerant sensor to alarm.
4. To avoid oxygen deficiency, ventilate the room sufficiently if equipment with a burner is used together with the air conditioner.
5. Arrange the drain hose to ensure smooth drainage. Incomplete drainage may cause damage to the building, furniture, etc.
6. Never touch the internal parts of the controller. Do not remove the front panel. Some parts inside are dangerous to touch, and machine troubles could occur.
7. Attention is drawn to the fact that additional transportation regulations may exist with respect to 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.
8. Signs for similar appliances used in a work area are generally addressed by local regulations and give the minimum requirements for the provision of safety and/or health signs for a work location.
9. Storage package protection should be constructed in such a way that mechanical damage to the equipment inside the package will not cause a refrigerant leak.
10. The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.
11. All required signs are to be maintained and employers should ensure that employees receive suitable and sufficient instruction and training on the meaning of appropriate safety signs and the actions that need to be taken in connection with these signs.
12. The effectiveness of signs should not be diminished by too many signs being placed together.
13. Any pictograms used should be as simple as possible to contain only essential details.
14. The storage of the appliance should be in accordance with the applicable regulations or instructions, whichever is more stringent.
15. 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.
16. Do not install the unit in a location where flammable gas may leak out. If the gas leaks out and stays around the unit, a fire may break out.

FLAMMABLE REFRIGERANT WARNINGS

- This unit uses R-454B refrigerant, which has a safety level of A2L. Attempting to repair central air-conditioning products may result in property damage, serious personal injury, or death. Use only the service equipment approved for use with R-454B. 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.
- Before opening the system, recover the refrigerant to release the pressure. Failure to follow the correct procedures will lead to personal illness or injury or serious equipment damage.
- Do not use means to accelerate the defrosting process or to clean, other than those recommended by MRCOOL®.
- The unit should be stored in a room that does not have continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater)
- Do not pierce/puncture refrigerant lines or burn the unit.
- Be aware that refrigerants may not contain an odor.
- Any person who is involved with working on or opening a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorizes their competence to handle refrigerants safely in accordance with an industry-recognized assessment credential.
- Servicing should only be performed as recommended by MRCOOL®.
- Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of a person competent in the use of flammable refrigerants.
- Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to minimize the risk of ignition.
- When repairing the refrigerating system, comply with the following precautions prior to conducting work on the system:
  - Work should be undertaken according to controlled procedures so as to minimize the risk of the presence of flammable gases or vapors while the work is being performed.
  - All maintenance staff and others working in the local area should be instructed on the nature of work being carried out. Work in confined spaces should be avoided.
  - The area should be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of a potentially toxic or flammable environment.
- 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.
  - If any brazing/welding is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment should be available and easily accessible. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.
  - When carrying out work in relation to a refrigerating system that involves exposing any pipe work, no sources of ignition should be used 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, repair, removal, and disposal of the unit, during which refrigerant can possibly be released into the surrounding space. Prior to beginning work, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs should be clearly displayed.
- Ensure that the area is in the open or that it is adequately ventilated before opening the system or conducting any hot work. A degree of ventilation should 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 surroundings.
- Where electrical components are being changed, they should be fit according to their purpose and to the correct specification. At all times the MRCOOL®'s maintenance and service guidelines should be followed. If in doubt, consult MRCOOL®'s technical department for assistance. The following checks should be applied to installations using flammable refrigerants:
  - The actual refrigerant charge is in accordance with the room size within which the refrigerant-containing parts are installed.

FLAMMABLE REFRIGERANT WARNINGS

  - The ventilation machinery and outlets are operating adequately and are not obstructed.
  - If an indirect refrigerating circuit is being used, the secondary circuit should be checked for the presence of refrigerant.
  - Equipment marking must remain visible and legible. Markings and signs that are illegible should be corrected.
- 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.
- Repair and maintenance of electrical components should include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply should be connected to the circuit until the fault has been dealt with satisfactorily.
- If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution should be used. This should be reported to the owner of the equipment so that all parties are advised. Initial safety checks should include:
  - That capacitors are discharged; this should be done in a safe manner to avoid the possibility of sparking.
  - That no live electrical components and wiring are exposed while charging, recovering, or purging the system.
  - That there is continuity of proper grounding.
- Sealed electrical components should be replaced.
- Intrinsically safe components must be replaced.
- 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.
- Under no circumstances should potential sources of ignition be used while searching for or in detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) should not be used.
- 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 should 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 should be set at a percentage of the LFL of the refrigerant and should be calibrated for the refrigerant employed, and the appropriate percentage of gas (25% minimum) is confirmed.
- If a leak is suspected, all naked flamed should be removed/extinguished.
- If a leakage of refrigerant which requires brazing is found, all of the refrigerant should be recovered from the system, or isolated (by means of shut-off valves) in a part of the system remote from the leak.
- Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine should be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. Examples of leak detection fluids include the bubble method.
- When breaking into the refrigerant circuit to make repairs or for any other purpose, conventional procedures should be used. However, for flammable refrigerants it is important that best practices be followed, since flammability is a consideration. The following procedure should be adhered to:
  - safely remove refrigerant following local and national regulations
  - evacuate
  - purge the circuit with inert gas
  - evacuate
  - continuously flush or purge with inert gas when using flame to open circuit
  - open the circuit
- The refrigerant charge should be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system should be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen should not be used for purging refrigerant systems.

FLAMMABLE REFRIGERANT WARNINGS

- For appliances containing flammable refrigerants, refrigerant purging should be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process should be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system should be vented down to atmospheric pressure to enable work to take place.
- The outlet for the vacuum pump should not be close to any potential ignition sources, and ventilation should be available.
- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines should be as short as possible to minimize the amount of refrigerant they contain.
- When using a refrigerant tank with a siphon to add refrigerant, the tank should be placed upright. When using a refrigerant tank without a 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.
- In general, R-454B refrigerant doesn't have a siphon tube or dip tube into the tank. For this situation, they must be charged in liquid form to prevent fractionation of the blended refrigerant and that requires the jug to be inverted during charging.
- Label the system when charging is complete (if it is not already labeled).
- Take extreme care not to overfill the refrigeration system.
- Prior to recharging the system, it should be pressure-tested with the appropriate purging gas. The system should be leak-tested on completion of charging but prior to commissioning. A follow-up leak test should be carried out prior to leaving the site.
- Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample should be taken in case analysis is required prior to re-use of reclaimed refrigerant. Is is essential that electrical power is available before the task is commenced.
  - Become familiar with the equipment and its operation
  - Isolate system electrically
  - Before attempting the procedure ensure that:
    - mechanical handling equipment is available
    - 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
  - Pump down refrigerant system, if possible.
  - If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
  - Make sure that the 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 no 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 have been completed, make sure that the cylinders and the equipment are closed off.
  - Recovered refrigerant should not be charged into another refrigeration system unless it has been cleaned and checked.
- Equipment should be labeled stating that it has been decommissioned and emptied of refrigerant. The label should be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.
- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended 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 labeled for that refrigerant (i.e. special cylinders for the recover of refrigerant). Cylinders should 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.

FLAMMABLE REFRIGERANT WARNINGS

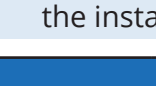
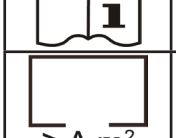
- The recovery equipment should be in good working order with a set of instructions concerning the equipment and should be suitable for the recovery of the flammable refrigerant. If in doubt, MRCOOL® should be consulted. In addition, a set of calibrated weighing scales should be available and in good working order. Hoses should be complete with leak-free couplings and in good condition.
- The recovered refrigerant should be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units, and especially not in cylinders.
- If compressors or compressor oils are to the removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body should not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it should be carried out safely.
- Do not use the air conditioner for other purposes.
- In order to avoid air quality deterioration, do not use the unit for the cooling of precision instruments, food, plants, animals or works of art.
- Before cleaning, be sure to stop the operation, turn the breaker off, or unplug the supply cord. Otherwise, electric shock and injury may occur.
- In order to avoid electric shock or fire, make sure that an earth ground detector is installed.
- Never touch the air outlet or the horizontal blades while the swing flap is in operation. Your fingers may become caught or the unit may break down.
- Never put any objects into the air inlet or outlet.
- Objects touching the fan at high speed can be dangerous.
- Never inspect or service the unit by yourself.
- Ask a qualified service person to perform this task.
- Do not dispose of electrical appliances as unsorted municipal waste. This waste should be collected separately for special treatment. 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.
- To prevent refrigerant leaks, contact your dealer.
- When the system is installed and operates in a small room, it is required to maintain the concentration of the refrigerant below the limit, in case a leak occurs. Otherwise, oxygen in the room may be affected, resulting in a serious accident.
- The refrigerant in the unit is safe and normally does not leak.
- If the refrigerant leaks into the room and comes into contact with the fire of a burner, a heater or a cooker, a harmful gas could be released.
- Turn off any combustible heating devices, ventilate the room, and contact the dealer where you purchased the unit.
- Do not use the unit until a service person confirms that the refrigerant leak is repaired.
- Keep any required ventilation openings clear of obstruction.
- That pipe-work including piping material, pipe routing, and installation should include protection from physical damage in operation and service, and be in compliance with national and local codes and standards.
- That after completion of field piping for split systems, the field pipework should be pressure-tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements.
- The minimum test pressure for the low side of the system should be the low side design pressure, and the minimum test pressure for the high side of the system shall be 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 for the low design pressure.
- Ducts connected to an appliance should not contain a potential ignition source.
- Precautions should be taken to avoid excessive vibration or pulsation to refrigeration piping.
- The protection devices, piping, and fittings should be protected as far 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.

FLAMMABLE REFRIGERANT WARNINGS

- Piping in refrigerating systems should be so designed and installed as to minimize the likelihood of hydraulic shock damaging the system.
- The solenoid valves should be correctly positioned in the piping to avoid hydraulic shock and should not block in liquid refrigerant unless adequate relief is provided.
- Steel pipes and components should be protected against corrosion with a rustproof coating before applying any insulation.

GENERAL WARNINGS

- The outdoor unit must be combined with an indoor unit with a refrigerant leak detection device.
- These instructions are exclusively intended for qualified contractors or authorized installers.
- Work on the refrigerant circuit with mild flammable refrigerant in safety group A2L may only be carried out by authorized heating contractors. These heating contractors must be trained in accordance with UL 60335-2-40, Section HH. The certificate of competence from an industry-accredited body is required.
- Work on electrical equipment may only be carried out by a qualified electrician.
- Before initial commissioning, all safety-related points must be checked by the particular certified heating contractors. The system must be commissioned by the system installer or a qualified person authorized by the installer.

Symbols Displayed on Indoor & Outdoor Unit		
	**DANGER**	This symbol shows that this appliance uses a flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	**CAUTION**	This symbol shows that the operation manual should be read carefully.
	**CAUTION**	This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
	**CAUTION**	
	**CAUTION**	This symbol shows that information is available such as the operating manual or installation manual.
	**CAUTION**	This symbol shows that when MRCOOL® requires additional charge, record the resulting total refrigerant charge for each refrigerating system.
	**WARNING**	This symbol shows that the appliance should be installed, operated, and stored in a room with a floor area not less than the minimum room area.

2.1 Nomenclature

MCAE S A S 3 T 06 1 1 A A

Brand
MCAE+ MRCOOL Air Equipment

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+

Revision
A

Series
A

Electrical
1 = 208/230 V, 1 Phase, 60 Hz

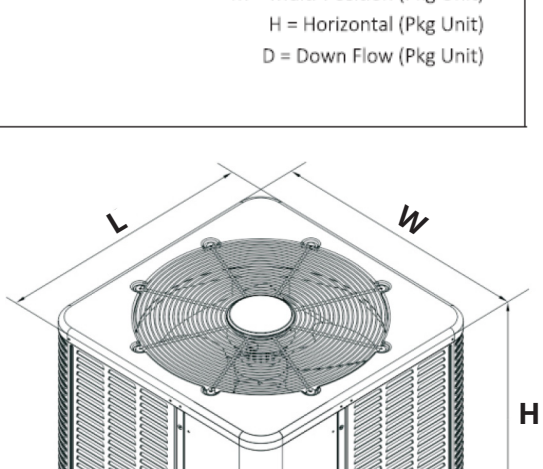
Refrigerant
1 = R410a
2 = R454b
3 = R32

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

Air Flow
T = Top Discharge (Condenser)
S = Side Discharge (Condenser)
M = Multi-Position (Pkg Unit)
H = Horizontal (Pkg Unit)
D = Down Flow (Pkg Unit)

2.2 Unit Size

Unit Size	H x W x L in (cm)
18K / 24K / 30K	25 x 23.6 x 23.6 (63.5 x 58.42 x 58.42)
36K	25 x 29.14 x 29.14 (63.5 x 73.66 x 73.66)
42K / 48K / 60K	32.88 x 29.14 x 29.14 (81.28 x 73.66 x 73.66)



The weight of the unit is attached to the carton.

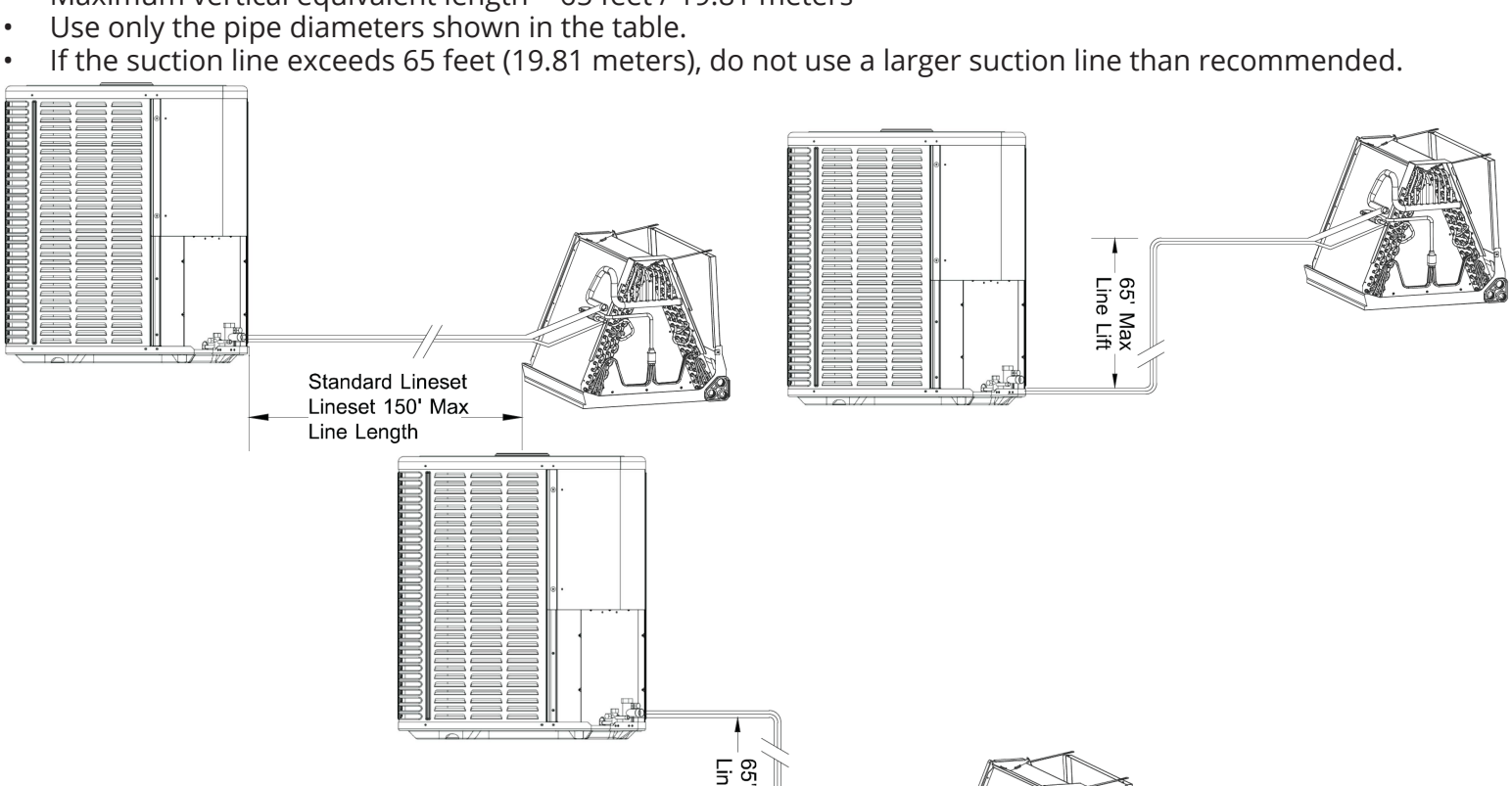
When installing the outdoor unit on the roof, make sure that the roof can support the weight of the outdoor unit. It is recommended to choose appropriate isolation to prevent sound or vibration from being transmitted to the building structure.

2.3 Refrigerant Pipeline Restriction

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 (M)	100 (30.48)			150 (45.72)			
Max Elevation Vertical Lift**	Ft (M)	32 (9.76)			65 (19.81)			

* It is recommended to adopt standard pipeline size; See the Refrigerant Charge section of this manual.

- Maximum equivalent length of pipeline = 150 feet / 45.72 meters
- Maximum vertical equivalent length = 65 feet / 19.81 meters
- Use only the pipe diameters shown in the table.
- If the suction line exceeds 65 feet (19.81 meters), do not use a larger suction line than recommended.

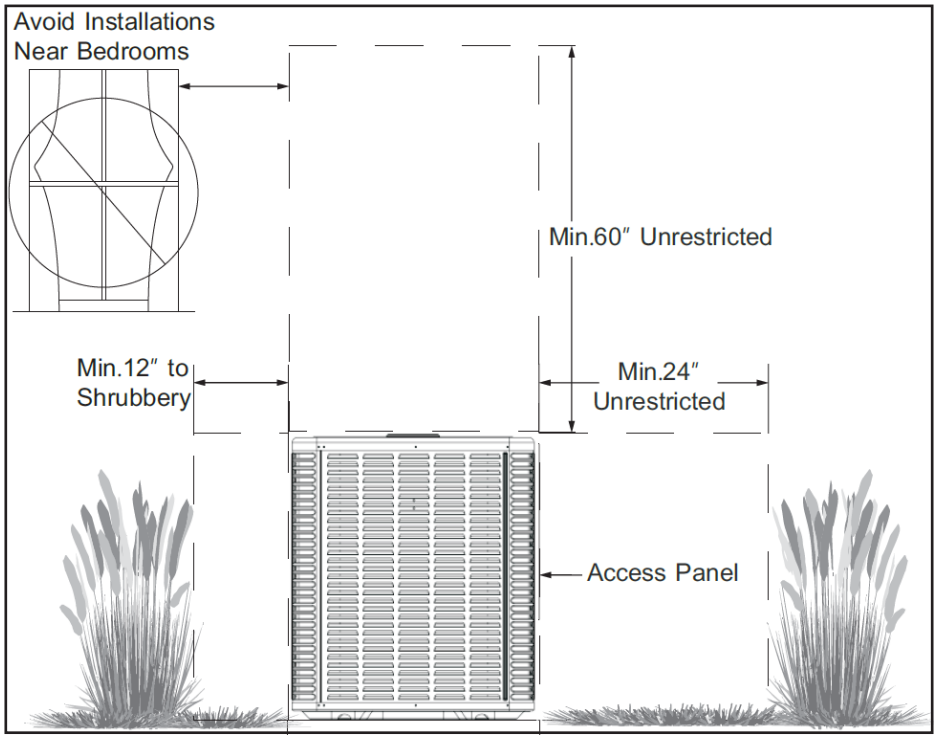


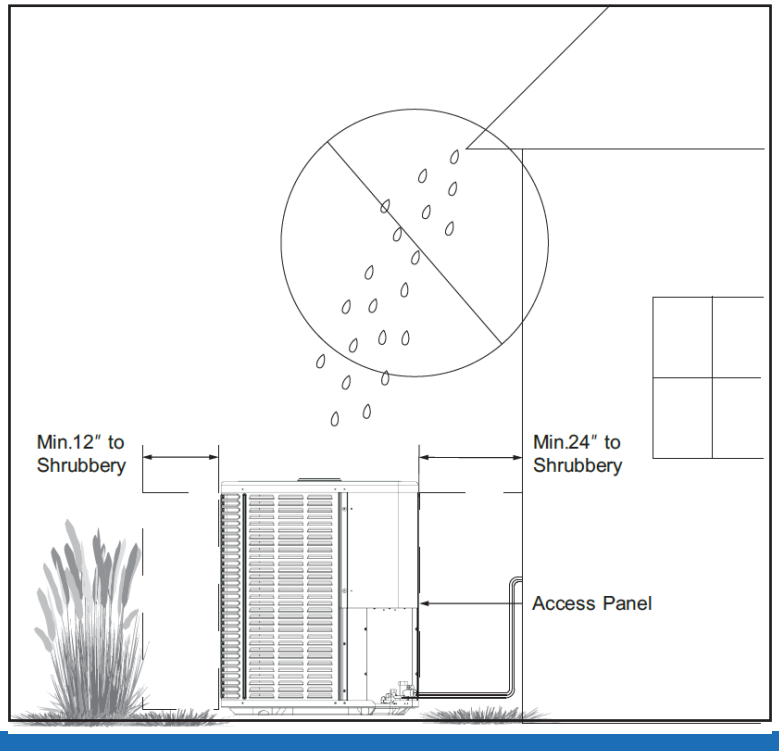
2.4 Heating Valve Core Information

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/100							

2.5 Position Restriction

- Ensure the discharge area (at least 60 inches above the top of the unit) is unrestricted.
- Don't put the outdoor unit near a bedroom, as the normal operating sound may be offensive.
- Position the unit, leaving enough space for smooth airflow, wiring, refrigerant lines, and maintainability.
- 12 inches minimum is allowed. The clearance from one side of the access panel to the wall should be at least 24 inches, next to the control panel near the 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.

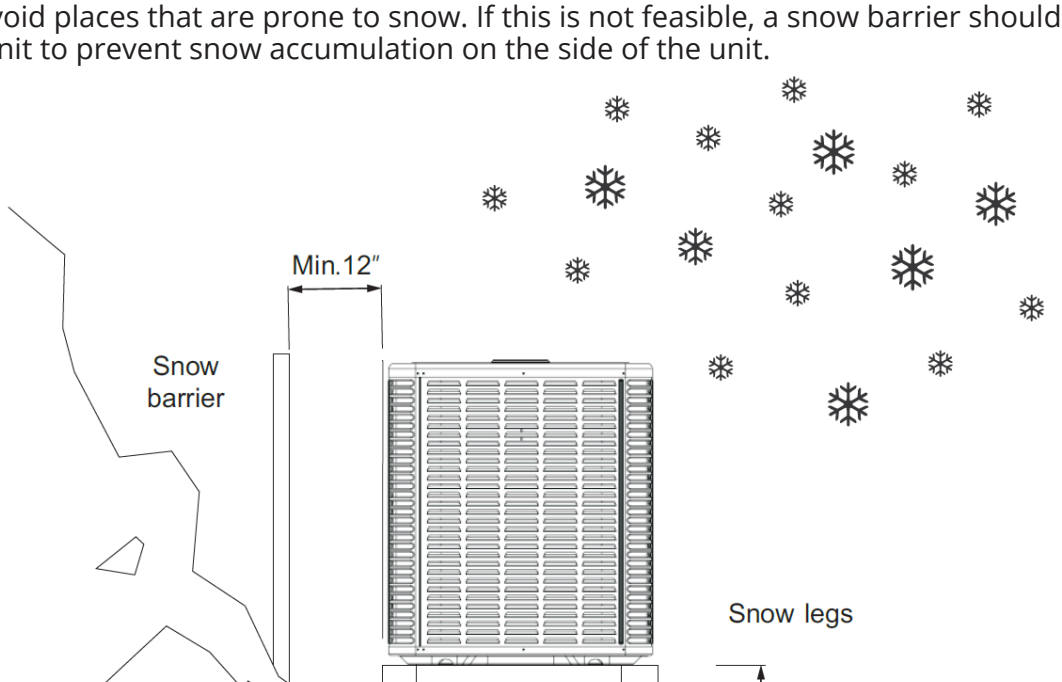




CAUTION

Precautions must be taken for units installed in areas with snow and long-term temperatures below the 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.
- 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 environments may shorten the service life of the unit, corrode metal parts, and/or negatively affect the performance of the 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 environments, 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 services about every three months.

2.6 Refrigerant Charge & Room Area Limitations

- In UL/CSA 60335-2-40, R454B refrigerant is classified as class A2L, which is mildly flammable. Therefore, R454B refrigerant will limit the area of the rooms being served by the system.
- Similarly, the total amount of refrigerant in the system should 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.

NOTE:
The abbreviations in this section are explained as follows:
Mc - the actual refrigerant charge in the system
A - the actual room area where the appliance is installed
Amin - the required minimum room area
Mmax - the allowable maximum refrigerant charge in a room
Qmin - the minimum circulation airflow
Anvmin - the minimum opening area for connected rooms
TAmin - the required minimum total area of the conditioned space (for units serving two or more rooms with an air duct system)
TA - the total area of the conditioned space connected by air ducts (for units serving two or more rooms with an air duct system)

Room Area Calculation Requirements

! CAUTION

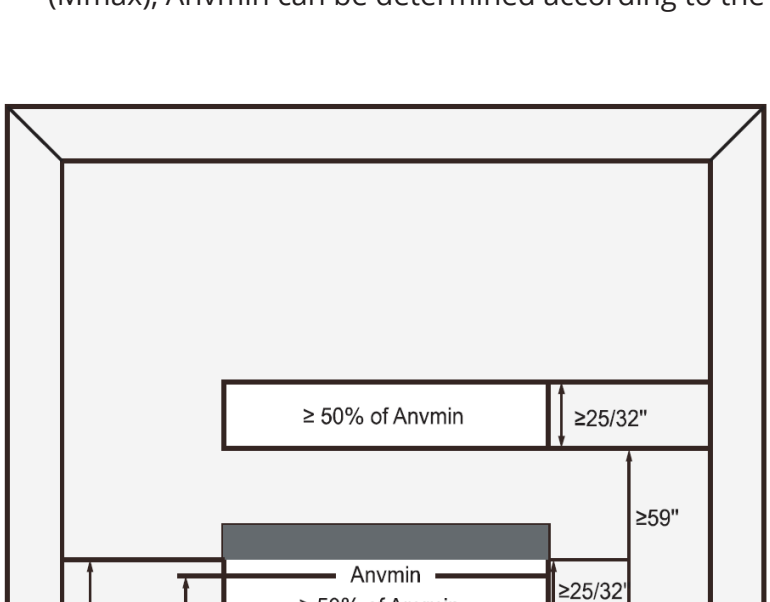
The space considered should be any space which contains refrigerant-containing parts or into which refrigerant could be released. The room area (A) of the smallest, enclosed, occupied space should be used in the determination of the refrigerant quantity limits.

- For determination of room area (A), when used to calculate the refrigerant charge limit, the following shall apply:
  - The room area (A) shall be 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. Spaced connected by only drop ceilings, ductwork, or similar connections should not be considered a single space.
- Units mounted higher than 70.86 in (1.79m) and spaces divided by partition walls that are no higher than 62.98 in (1.59m) shall be 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 compliance to Amin, 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 floor,connected by permanent opening in the walls and/or doors between occupied spaces, including gaps between the wall and the floor, can be considered a single room when determining compliance to Amin, provided all of the following conditions are met as those in the figure.
- **<u>Low Level Opening</u>**
  - The opening shall not be less than Anvmin in the following table.
  - The area of any openings above 11.81 in (30cm) from the floor shall not be considered in determining compliance with Anvmin.
  - At least 50% of the opening area of Anvmin shall be below 7.88 in (20cm) from the floor.
  - The bottom of the opening is not more than 3.94 in (10cm) from the floor.
  - The opening is a permanent opening that cannot be closed.
  - For openings extending to the floor the height shall not be less than 0.78 in (1.98cm) above the surface of the floor covering.

- **High Level Opening**
  - The opening shall not be less than 50% of Anvmin in the following table.
  - The opening is a permanent opening that cannot be closed.
  - The opening shall be at least 59 in (1.49m) above the floor.
  - The height of the opening is not less than 0.78 in (1.98m).
- **Room Size Requirement**
  - The room into which refrigerant can leak, plus the connected adjacent room(s) shall have a total area no less than Amin. Amin is shown in the following table
  - The room area in which the unit is installed shall be no less than 20% Amin. Amin is shown in the following table.

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.

- The minimum opening for natural ventilation (Anvmin) in connected rooms is related to the room area (A), the actual ventilation (Anvmin) 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 (Mmax), Anvmin can be determined according to the following table.



A		Mc		Mmax		Anvmin	
ft²	m²	lb-oz	kg	lb-oz	kg	ft²	m²
100	11	17-3	7.8	6-10	3.0	1.3	0.14
110	12	17-3	7.8	7-5	3.3	1.2	0.13
120	13	17-3	7.8	8-0	3.6	1.1	0.12
130	14	17-3	7.8	8-10	3.9	1.0	0.11
140	16	17-3	7.8	9-5	4.2	1.0	0.11
150	17	17-3	7.8	10-0	4.5	0.9	0.10
160	18	17-3	7.8	10-10	4.8	0.8	0.09
170	19	17-3	7.8	11-5	5.1	0.7	0.08
180	20	17-3	7.8	12-0	5.4	0.6	0.07
190	21	17-3	7.8	12-10	5.7	0.5	0.06
200	22	17-3	7.8	13-5	6.0	0.5	0.06
210	23	17-3	7.8	14-0	6.4	0.4	0.04
220	24	17-3	7.8	14-10	6.6	0.3	0.03
230	26	17-3	7.8	15-5	6.9	0.2	0.02
240	27	17-3	7.8	16-0	7.3	0.1	0.01
250	28	17-3	7.8	16-10	7.5	0.1	0.01
260	29	17-3	7.8	17-5	7.9	0.0	0.00

- For appliances serving two or more rooms with an air duct system, the room area calculation shall be 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.

Allowed Maximum Refrigerant Charge & Required Minimum Room Area

- If the fan incorporated to an appliance is continuously operated or operation is initiated by a refrigerant detection system with a sufficient circulation airflow rate, the allowable maximum refrigerant charge (Mmax) and the required minimum room area (Amin/TAmin) is shown in the following tables.

Allowable Maximum Refrigerant Charge

A/TA		Mmax		A/TA		Mmax	
ft²	m²	lb-oz	kg	ft²	m²	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

Minimum Circulation Airflow

Mc		Qmin		Mc		Qmin	
lb-oz	kg	CFM	m³/h	lb-oz	kg	CFM	m³/h
2-2	1.0	59	100	10-2	4.6	275	467
2-9	1.2	71	121	10-9	4.8	287	488
3-0	1.4	83	141	11-0	5.0	298	506
3-7	1.6	95	161	11-7	5.2	310	527
3-15	1.8	107	182	11-14	5.4	322	547
4-6	2.0	119	202	12-5	5.6	334	567
4-13	2.2	131	223	12-12	5.8	346	588
5-4	2.4	143	243	13-3	6.0	358	608
5-11	2.6	155	263	13-10	6.2	370	629
6-2	2.8	167	284	14-1	6.4	382	649
6-9	3.0	179	304	14-8	6.6	394	669
7-0	3.2	191	325	14-15	6.8	406	690
7-7	3.4	203	345	15-6	7.0	418	710
7-15	3.6	215	365	15-14	7.2	430	731
8-6	3.8	227	386	16-5	7.4	442	751
8-13	4.0	239	406	16-12	7.6	454	771
9-4	4.2	251	426	17-3	7.8	466	792
9-11	4.4	263	447				

Required Minimum Room Area

Mc		Amin/TAmin		Mc		Amin/TAmin	
lb-oz	kg	ft²	m²	lb-oz	kg	ft²	m²
2-2	1.0	33.1	3.1	10-2	4.6	152.1	14.1
2-9	1.2	39.7	3.7	10-9	4.8	158.7	14.7
3-0	1.4	46.3	4.3	11-0	5.0	165.3	15.4
3-7	1.6	52.9	4.9	11-7	5.2	171.9	16.0
3-15	1.8	59.5	5.5	11-14	5.4	178.5	16.6
4-6	2.0	66.1	6.1	12-5	5.6	185.1	17.2
4-13	2.2	72.7	6.8	12-12	5.8	191.7	17.8
5-4	2.4	79.3	7.4	13-3	6.0	198.4	18.4
5-11	2.6	86.0	8.0	13-10	6.2	205.0	19.0
6-2	2.8	92.6	8.6	14-1	6.4	211.6	19.7
6-9	3.0	99.2	9.2	14-8	6.6	218.2	20.3
7-0	3.2	105.8	9.8	14-15	6.8	224.8	20.9
7-7	3.4	112.4	10.4	15-6	7.0	231.4	21.5
7-15	3.6	119.0	11.1	15-14	7.2	238.0	22.1
8-6	3.8	125.6	11.7	16-5	7.4	244.6	22.7
8-13	4.0	132.2	12.3	16-12	7.6	251.2	23.3
9-4	4.2	138.8	12.9	17-3	7.8	257.9	24.0
9-11	4.4	145.5	13.5				

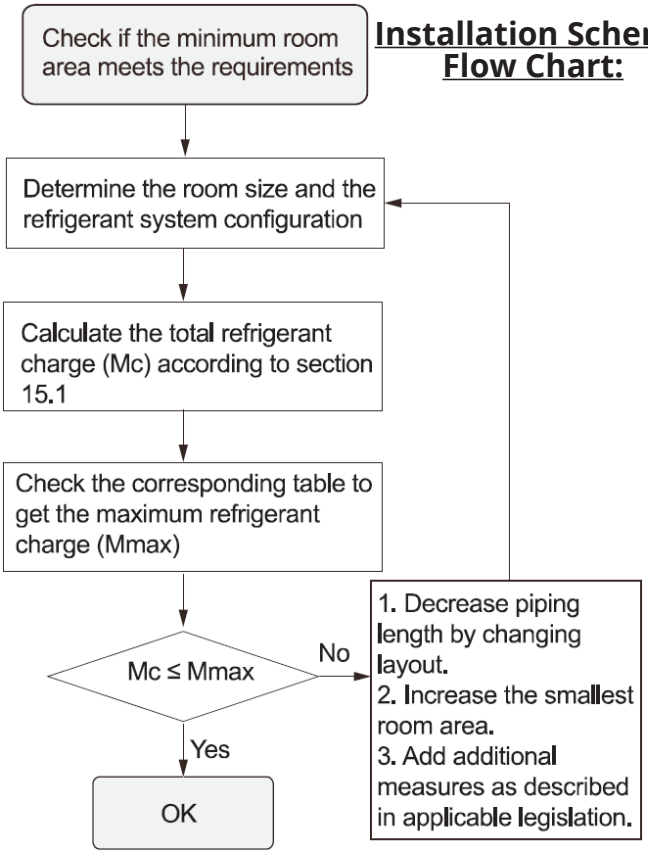
Required Minimum Room Area (If Installation Altitude >200m)

Charge (lb)	Altitude (m)							
	201-400	401-600	601-800	801-1000	1001-1200	1201-1400	1401-1600	above 1600
	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	24.4
16	22.3	23.7	24.2	24.9	25.3	26.1	26.5	27.2
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

! CAUTION

- The allowable maximum refrigerant charge or the required minimum room area from the previous tables is only available if the following conditions are met: minimum velocity of 3.28ft/s (1m/s) which is calculated as the indoor unit airflow divided by the nominal face area of the outlet. The grill area should not be deducted. Minimum airflow rate must meet the corresponding values in the table, which is related to the actual refrigerant charge of the system (Mc).
- The maximum refrigerant limit described 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 the previous tables.
- If the actual room area, air outlet height, and refrigerant charge amount are not reflected in the above table, more severe cases need to be considered according to the data in the tables.

Installation Scheme Flow Chart:



3 INSTALLATION

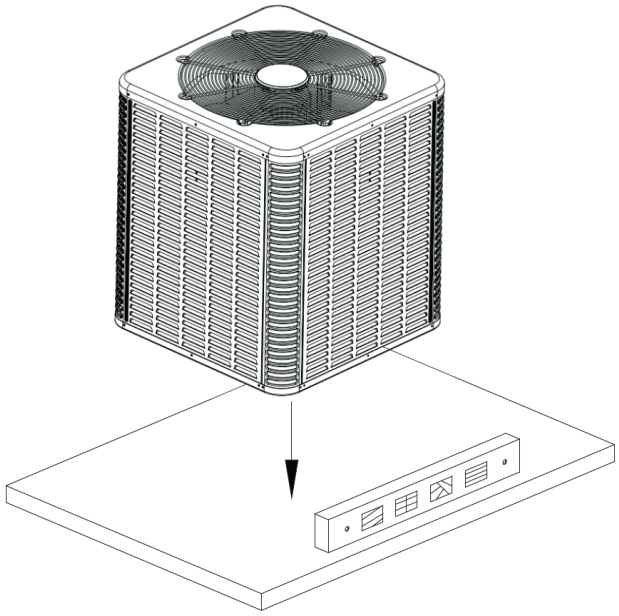
3.1 Installation Preparation

- Check whether there is any damage and report any damage to the unit to MRCOOL®.
- The filler can be used to ensure that the refrigerant charge is maintained during shipment.

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 (2.5-5cm) 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.

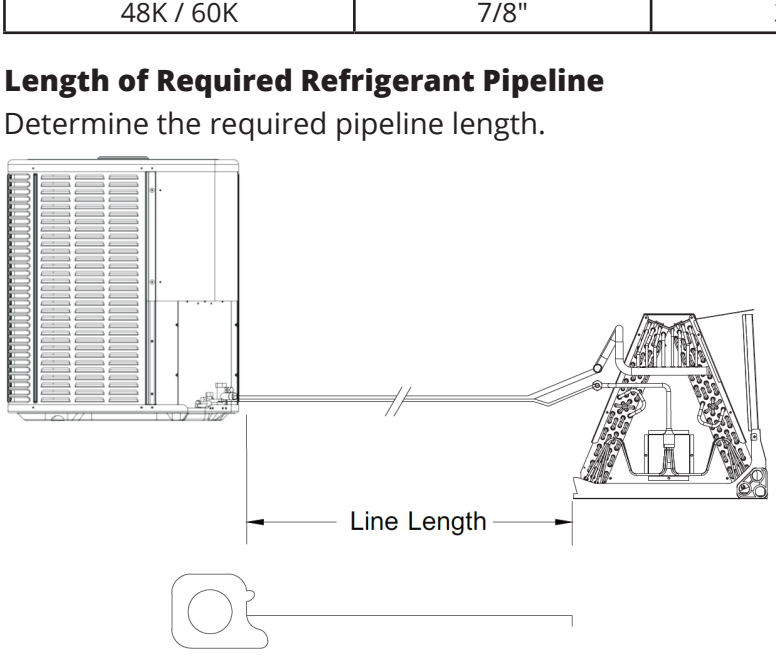
3.2 Refrigerant Line Precautions

Connecting Dimensions for Refrigerant Lines & Service Valves

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"

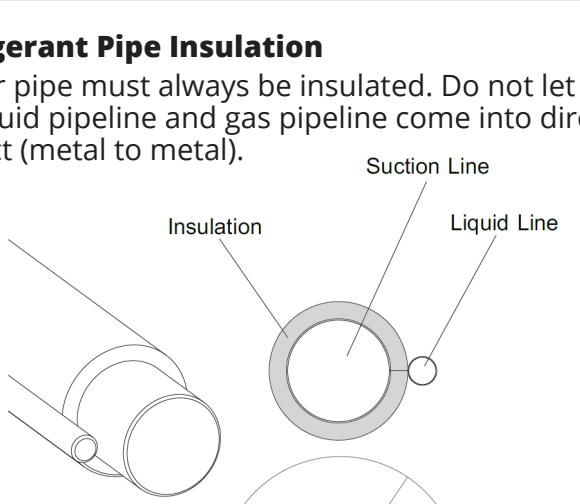
Length of Required Refrigerant Pipeline

Determine the required pipeline length.



Refrigerant Pipe Insulation

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



Reuse Existing Refrigerant Lines

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

Note:
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.
- 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 are certified by AHRI, the indoor unit is equipped with piston or TXV, and the model of piston and TXV is selected by manufacturer; 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.

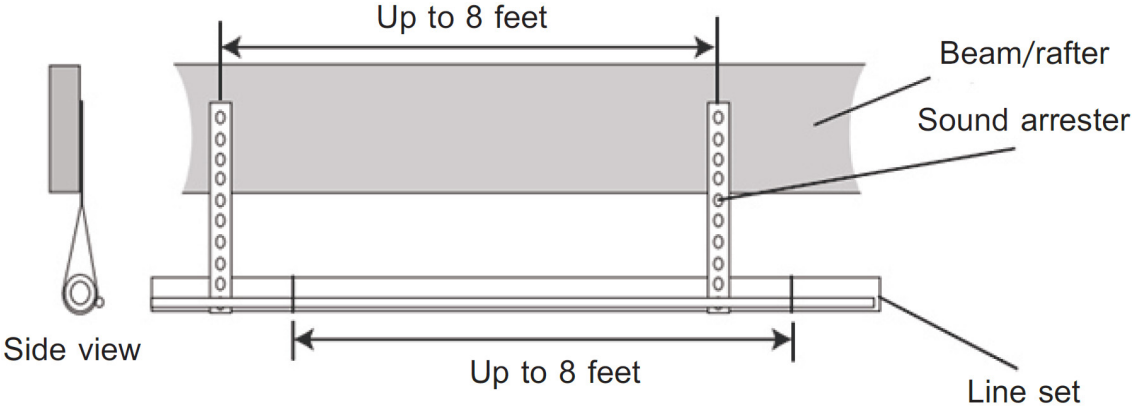
3.3 Refrigerant Pipeline Routing

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

- When the refrigerant pipeline must be fixed on floor joists or other frames in the structure, use isolated hangers.
- When the refrigerant pipeline 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 pipeline from all piping systems.
- Try to reduce the number of 90° laps.

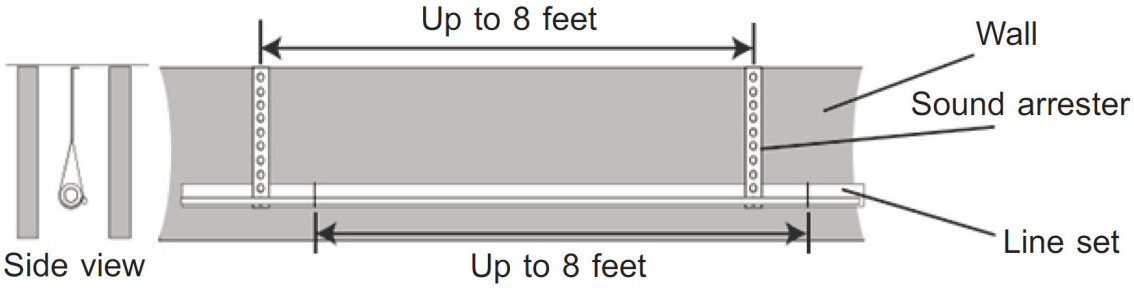
Comply with national, state, and local regulations when isolating the wire group from joists, rafters, walls, or other structural elements.

Isolated from beam/rafter:

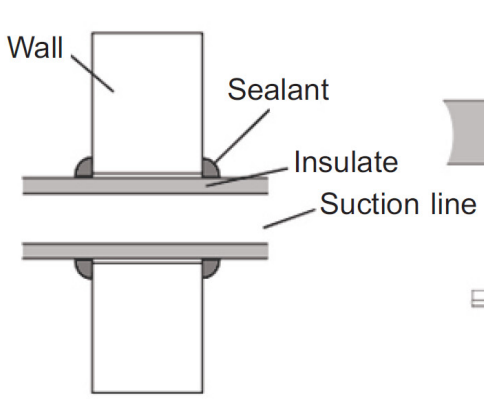


Use isolators to fix the air pipes on the beams every 8 feet (2.44m). Every 8 feet (2.44m), tape, wire, or other suitable methods are used to fix the liquid line directly to the suction line.

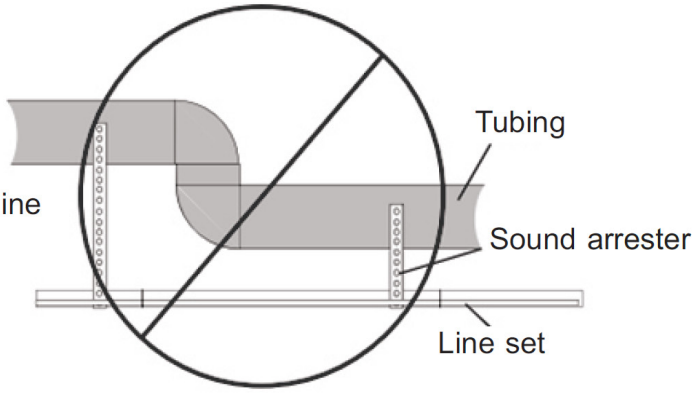
Isolated on the wall:



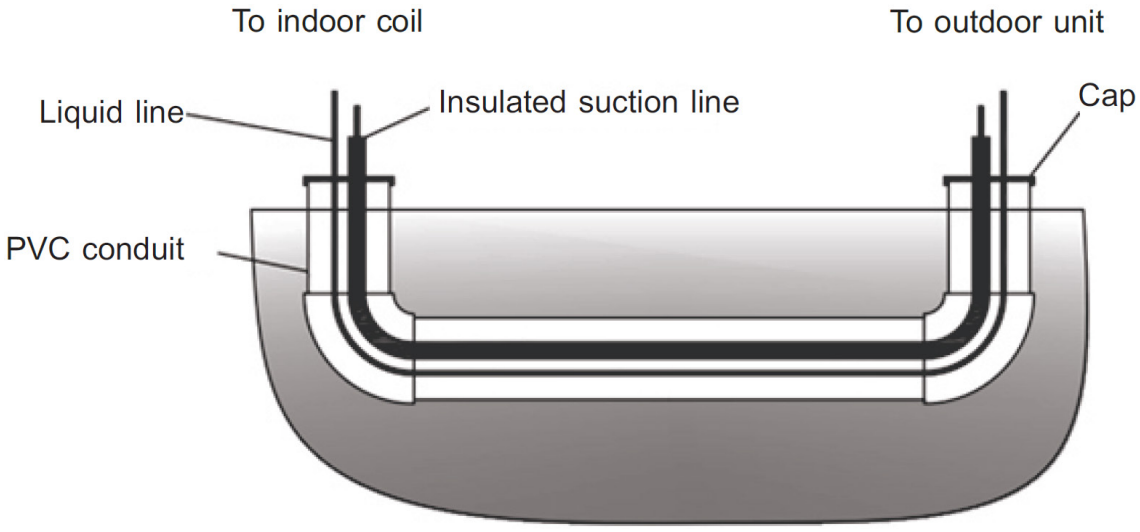
Use isolators to fix the suction line every 8 feet (2.44m). Every 8 feet (2.44m), tape, wire, or other suitable methods are used to fix the liquid line directly to the suction line.



Wall isolation



Do not hang the pipeline on the duct work.



3.4 Refrigerant Line Connection

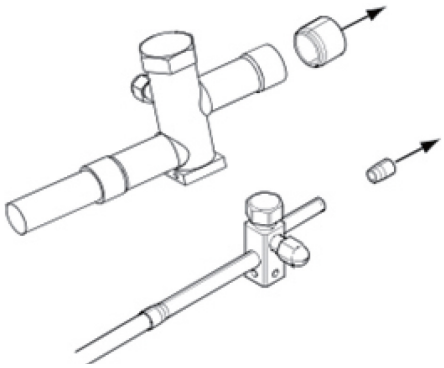
WARNING

- Pipe work and installation should be in compliance with national codes ASHRAE15.
- The installation of pipe-work should be kept to a minimum.
- It is recommended to install a filter dryer. The dryer 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 be compatible with R454B refrigerant.
- All joints made in the installation between parts of the refrigerating system, with at least one part charged, shall be made in accordance with the following:
  - A brazed, welded, or mechanical connection should be made before opening the valves to permit refrigerant to flow between the refrigerating system parts. A vacuum valve shall be p0rovided to evacuate the interconnecting pipe or any uncharged refrigerating system part.
  - Mechanical connectors used indoors shall comply with ISO 14903. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be re-fabricated.
  - Refrigerant tubing shall 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 shall be protected against mechanical damage.

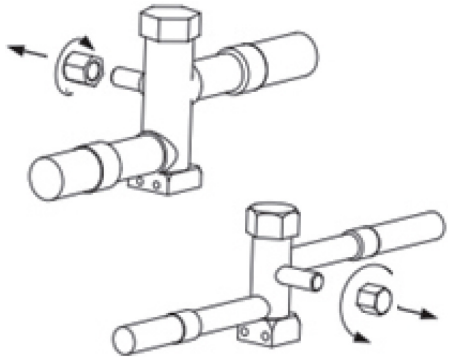
- Compliance is checked according to the installation instructions and a trial installation, if necessary.
- Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected.
- For installations with field applied joints that are exposed in the occupied space,these joints shall 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.
- Compliance is checked by inspections and tests.

3.5 Refrigerant Pipeline Brazing

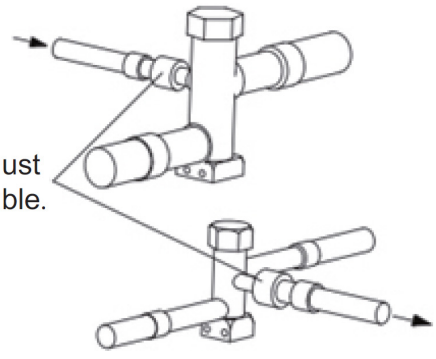
1. Remove the cover or plug. Use the deburring tool to deburr the pipe end. Clean the inner and outer surfaces of the pipeline with emery cloth.



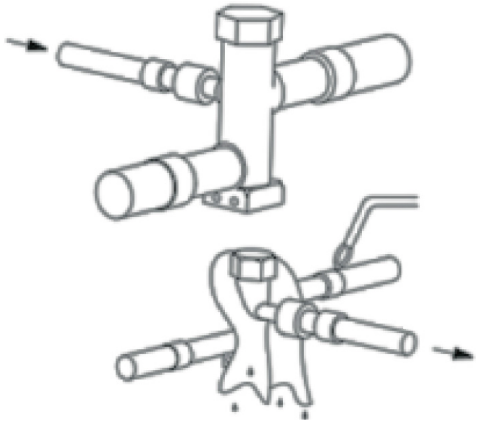
2. Remove the pressure taps from the two service valves.



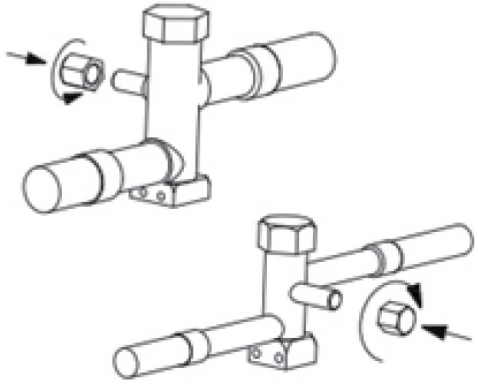
3. Purge refrigerant lines and indoor coils with dry nitrogen.



4. Wrap the valve body with a wet rag to avoid thermal damage, and continue the dry nitrogen purging. 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.



5. After the service valve cools down, replace the pressure tap.

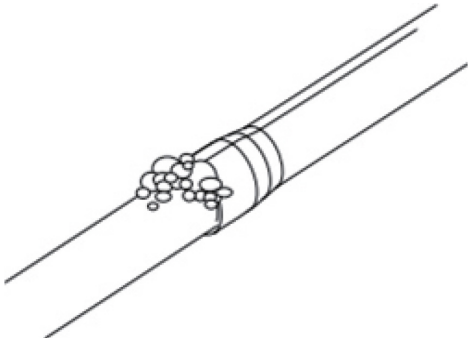


3.6 Leakage Check

1. Use dry nitrogen to pressurize the refrigerant line and evaporator coil to 150 PSIG.



2. Use soapy water or foam at each soldering position to check for leaks.



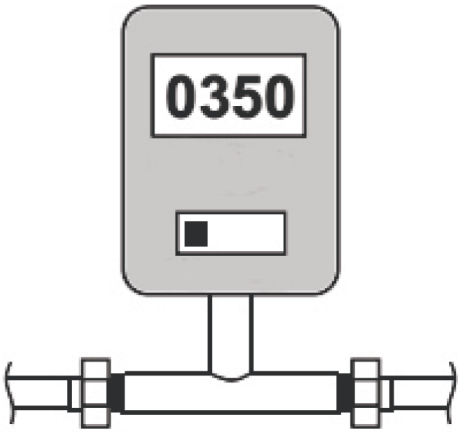
WARNING

- After completion of field piping for split systems, the field pipework should be pressure tested with an inert gas and then vacuum tested 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 should be tightness-tested. The test method should 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. No leak should be detected.

3.7 Emptying Pipeline & Coil

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

1. Evacuate until the micrometer reading is not higher than 350 micrometers, and then close the valve of the vacuum pump.



2. Observe micrometer gauge. If the meter does not rise above 500 micrometers within (1) minute, the evacuation is completed. After the evacuation, turn off the vacuum pump and micrometer, and close the valve on the manifold instrument cluster.

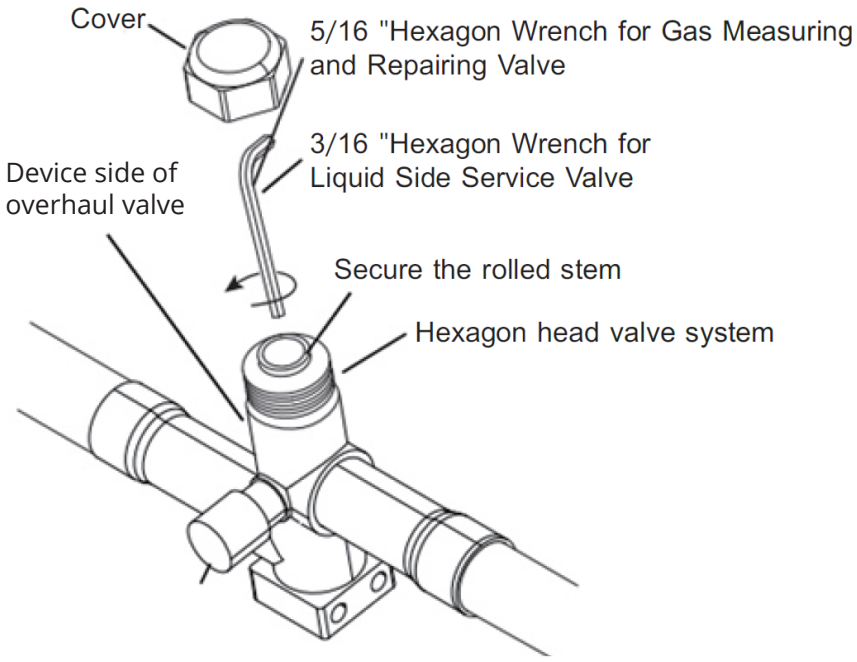


3.8 Open the Service Valve

WARNING

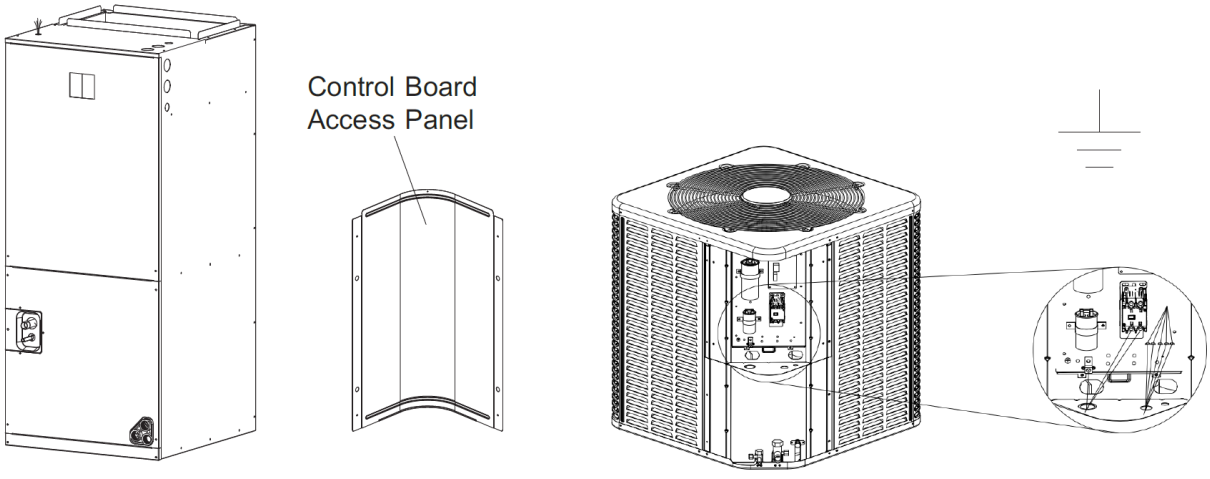
- When opening the liquid side service valve, be extra careful. Turn counterclockwise until the valve stem just touches the hem. No torque is required. Failure to observe this warning will result in sudden release of system pressure, and may result in personal injury and/or property damage.
- Before 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.
- 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 1/6 turn.
4. Repeat steps 1-3 for the liquid side service valve.



3.9 Low Voltage Electrical Connections

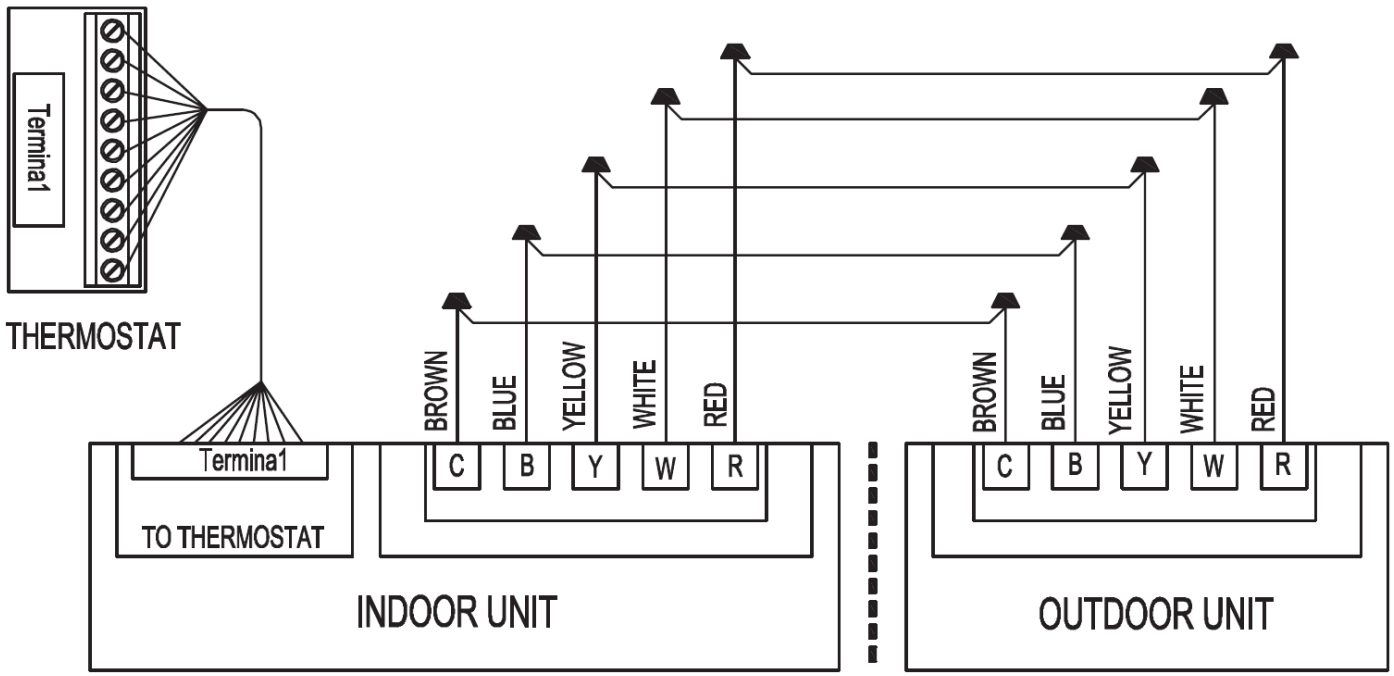
Low Voltage Connection Diagram



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. 22AWG.
- "-----" 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 auxiliary heat.

NOTE: The dotted line in the following thermostat wiring diagram indicates optional wiring (electric heating). For the wiring of the thermostat, please refer to the user manual of the thermostat. Terminal B will be connected with the thermostat (O/B) wiring. The reversing valve is energized during heating.



3.10 High Voltage Electrical Connections

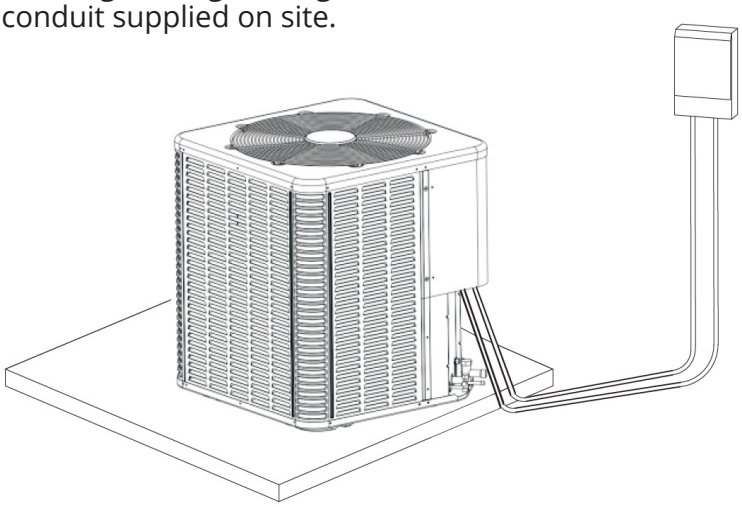
WARNING

- 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 inside the access panel of the control box, and refer to the wiring diagram in this manual.

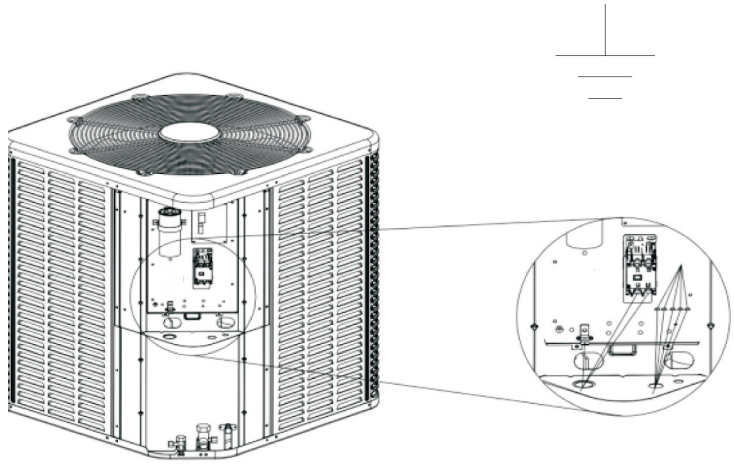
High Voltage Isolating Switch

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



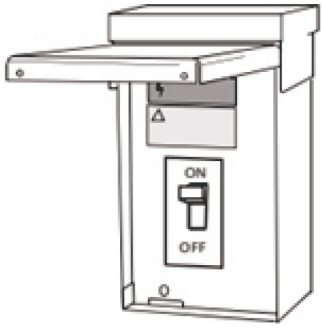
High Voltage Grounding

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



3.11 System Startup

1. Make sure that all previous installation steps have been completed.
2. Set the thermostat to off.
3. Turn on the disconnect switch and turn on the power of the indoor and outdoor unit.
4. Set the thermostat to on.



3.12 System Refrigerant Charging Regulation

Charging: Weighing Method

During the initial installation, or when the refrigerant quantity of the updated system is charged, the weighing method is used. 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 sub-cooling charging method. All models have a charge factor of 0.69oz/ft for refrigerant pipe length.

For a 25-foot 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) = _____ (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 in "forced cooling mode". The outdoor temperature must be between 55°F and 120°F and the indoor temperature should be between 70°F and 80°F.

Subcooling Charging & Refrigerant Quantity Adjustment in Cooling Mode

1. Check the outdoor ambient temperature.

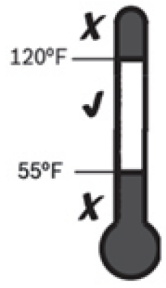
Subcooling (cooling mode) is the only recommended charging method when the outdoor ambient temperature is higher than 55°F (12°C).

For outdoor ambient temperature below 55°F (12°C), 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.

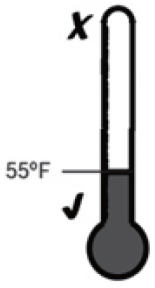
For best results, the indoor temperature should be kept between 70°F (21°C) and 80°F (26°C) during installation.

Outdoor temperature is higher than 55°F.



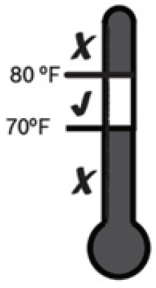
Outdoor temperature 1

Outdoor temperature is below 55 °F.



Outdoor temperature 2

Outdoor temperature is higher than 55°F.



Indoor temperature

2. Ensure that all installation steps have been completed.

4.1 System Operation

Control Logic Description

The system uses universal 24V control.

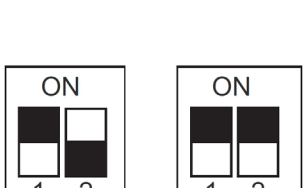
Sensors

- T3 - Outdoor unit coil temperature
- T4 - Ambient temperature
- T5 - Compressor exhaust temperature
- LP - Low pressure switch

Description of Defrosting

- Outdoor unit W terminal will output 24V signal during defrost mode.
- Unit will run defrost mode in the following conditions:

1. Unit run in heating mode
2. Compressor is running
3. Defrost mode and cycle time is related with SW1-2 and SW1-3 dial switch



SW1 SW2

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

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

- Condition 1: When the compressor starts, the unit will record minimum T3 which named T30, and minimum T4 which named T40 during compress start 10-15mins. When outdoor unit meets the following condition, the unit will run defrost mode:

  a) When T3<0, and compressor runs for 40 minutes

  b) Unit calculate ΔT4=T4-T40 (If ΔT4≤2, unit will result ΔT4=0), and T3 + 2 < (T30+ ΔT4) keep 30s.

- Condition 2: When T3<0, and compressor runs for 40 minutes, and T3<-4°F(-20°C), unit will defrost.

II. When SW1-2 is off, the unit will run defrost mode 1 when it meets any of the following conditions:

- Condition 1:

  a) SW1-3 is on, and compressor is running, when T3<30°F (-1°C) and keep 30 minutes, unit will run defrost.

  b) SW1-3 is off, and compressor is running when T3<30°F (-1°C) and keep 60 minutes, unit will run defrost.

- Condition 2: When unit power is on, and compressor starts for the first time, and T3 <28°F (-2°C), unit will run defrost.
- Condition 3: When unit standby for 2 hours, and T3<28°F (-2°C), unit will defrost.

4. Quit defrost condition:

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

- Condition 1: Defrost time is last 10 minutes
- Condition 2: T3 ≥ 59°F (15°C)

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

- Condition 1: Defrost time is last 10 minutes
- Condition 2: T4 ≥ 28°F (-2°C), T3 ≥ 77°F (25°C)
- Condition 3: Compressor stop
- Condition 4: T4 <28°F (-2°C), T3 ≥ 77°F (25°C) and keep 60 seconds.

Compressor Crankshaft Heater Control Function

The crankshaft heater logic is below:

1. Crankshaft heater on condition:

   When unit meets any of the below conditions, crankshaft heater will be on:

   Condition 1: Meet 3 conditions at the same time below

   - T5 < 73°F (23°C) or T5 sensor is abnormal
   - Outdoor unit is in standby mode, and T4 was lower 50°F (10°C) before.
   - Outdoor unit stop time ≥ 4 hours.

   Condition 2:

   - Outdoor unit power on, and T5 < 23°C
   - Outdoor unit is in defrost mode, and T5 <73°F (23°C).

2. Crankshaft heater off condition

   T5 ≥ 82°F (28°C) and no T5 error

Four-Way Valve Operating Condition

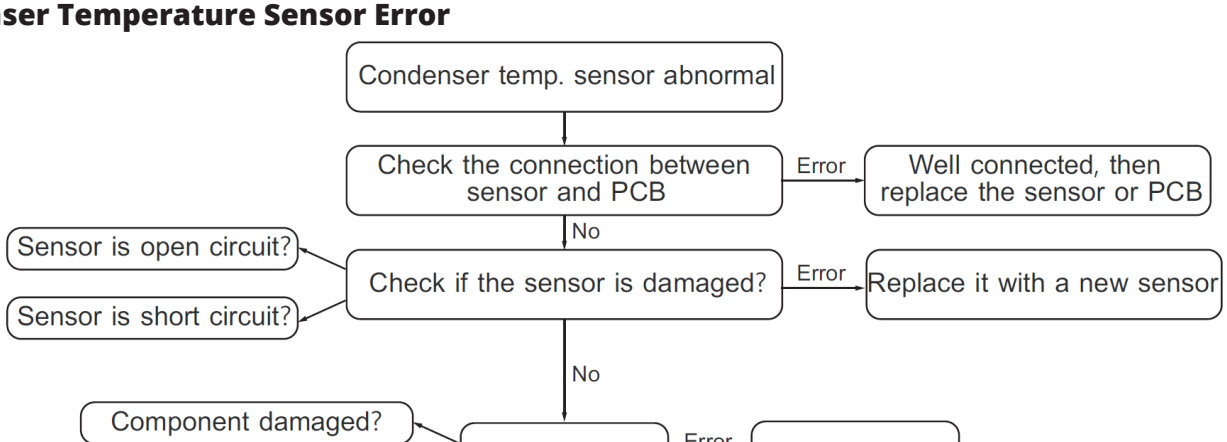
Four-way valve will power on in heating mode, and power off in cooling mode.

Outdoor Unit Main PCB LED Display & Fault Table

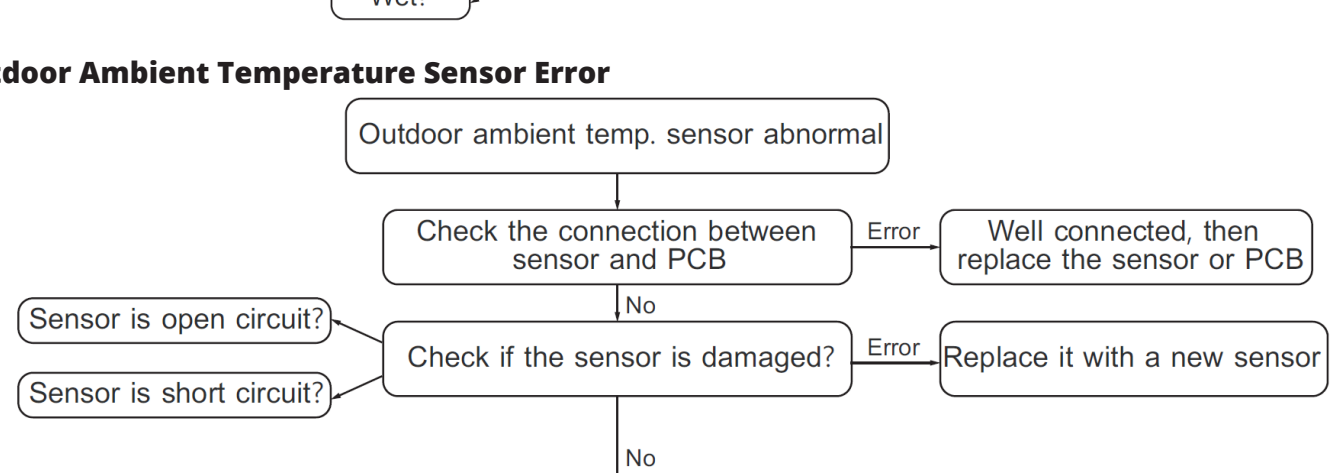
Display Content		State Description
No alarm: Green light flashes Red light off	Green light slow flashes	Normal standby
	Green light normally on	Normal operation
System alarm: Red light on Green light flashes	High pressure alarm	Green light flashes 1 time every 8 seconds
	(T3) Temperature sensor fault	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, then 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	

4.2 Troubleshooting of Fault Codes

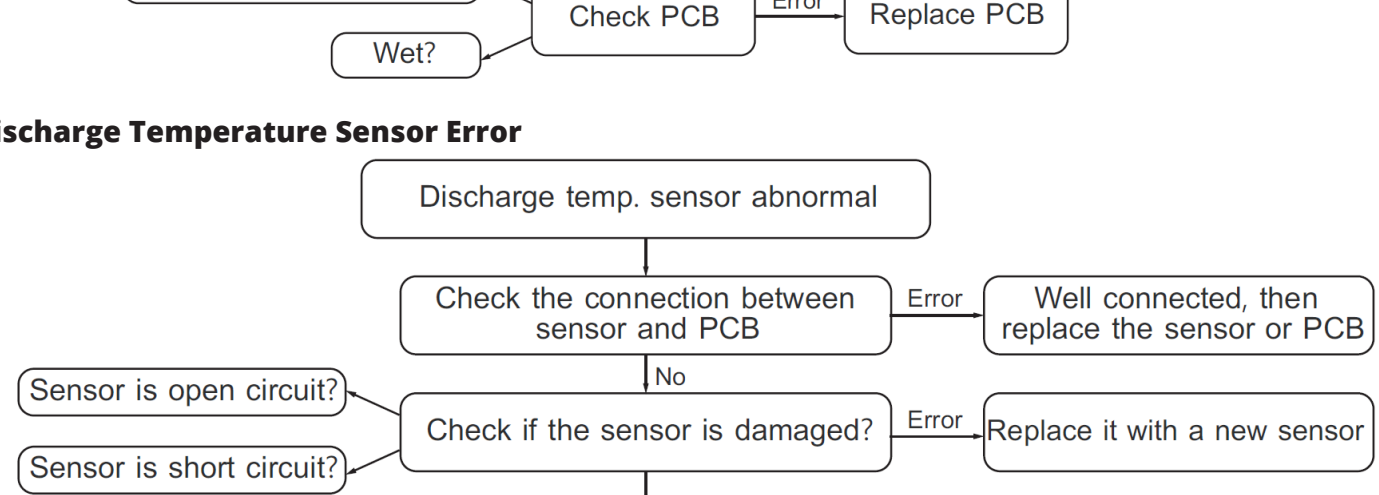
T3 Condenser Temperature Sensor Error



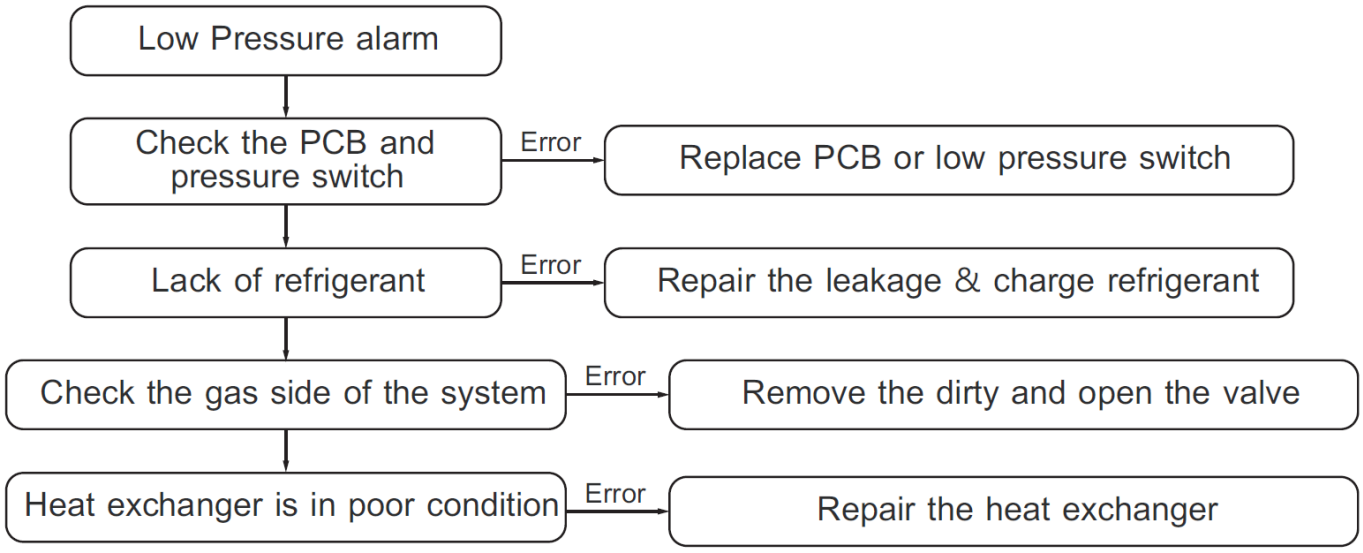
T4 Outdoor Ambient Temperature Sensor Error



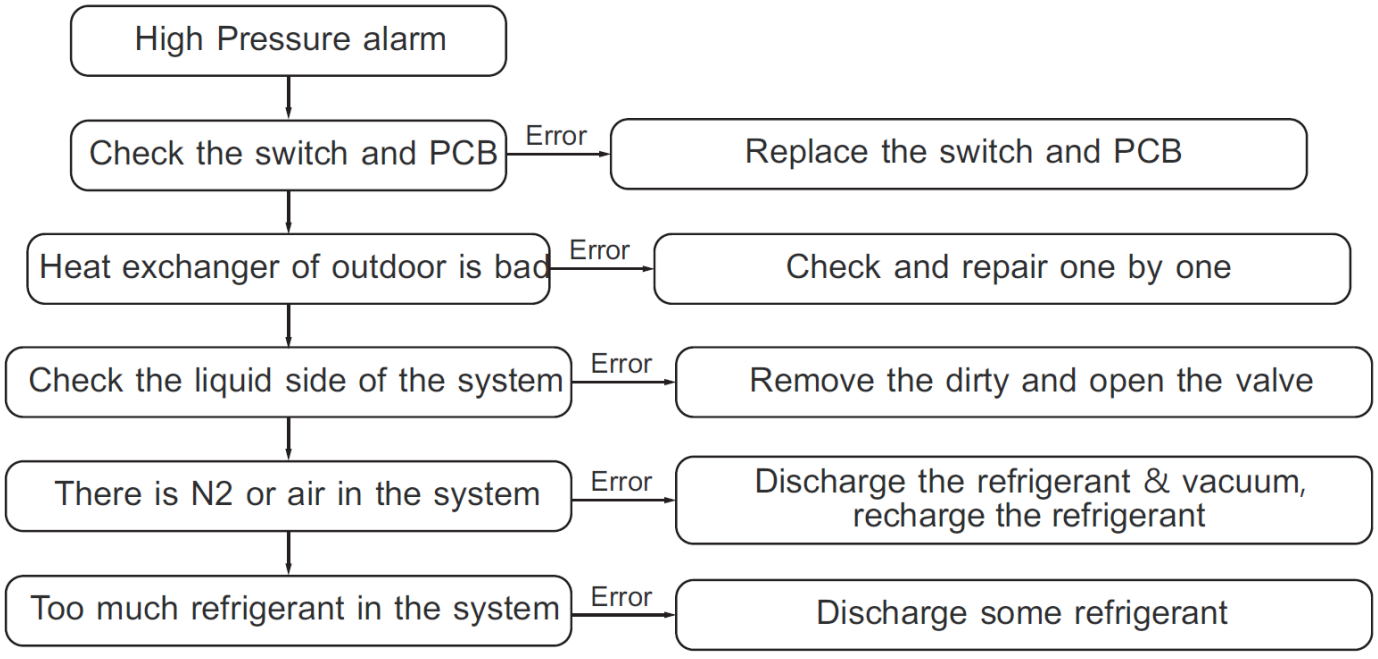
T5 Discharge Temperature Sensor Error



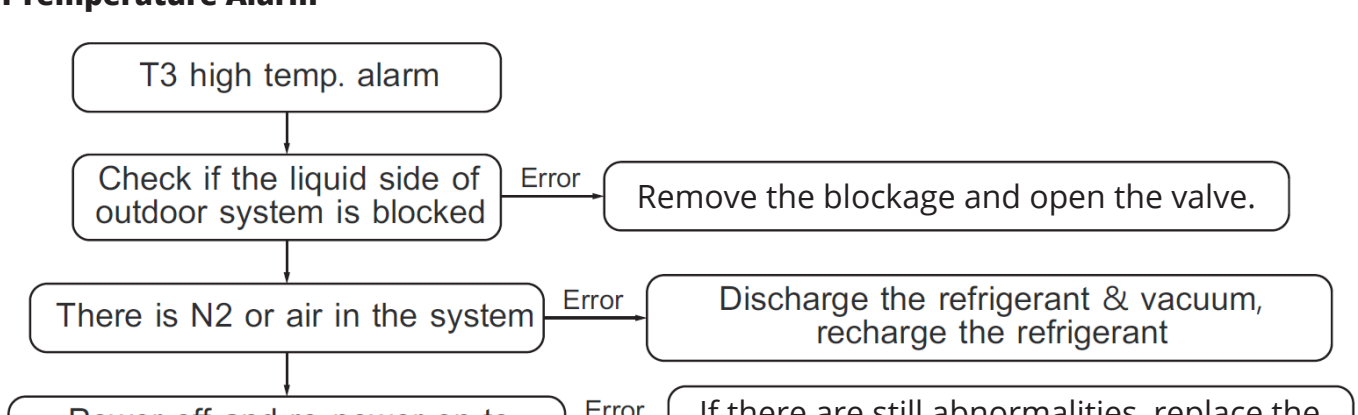
Low Pressure Alarm



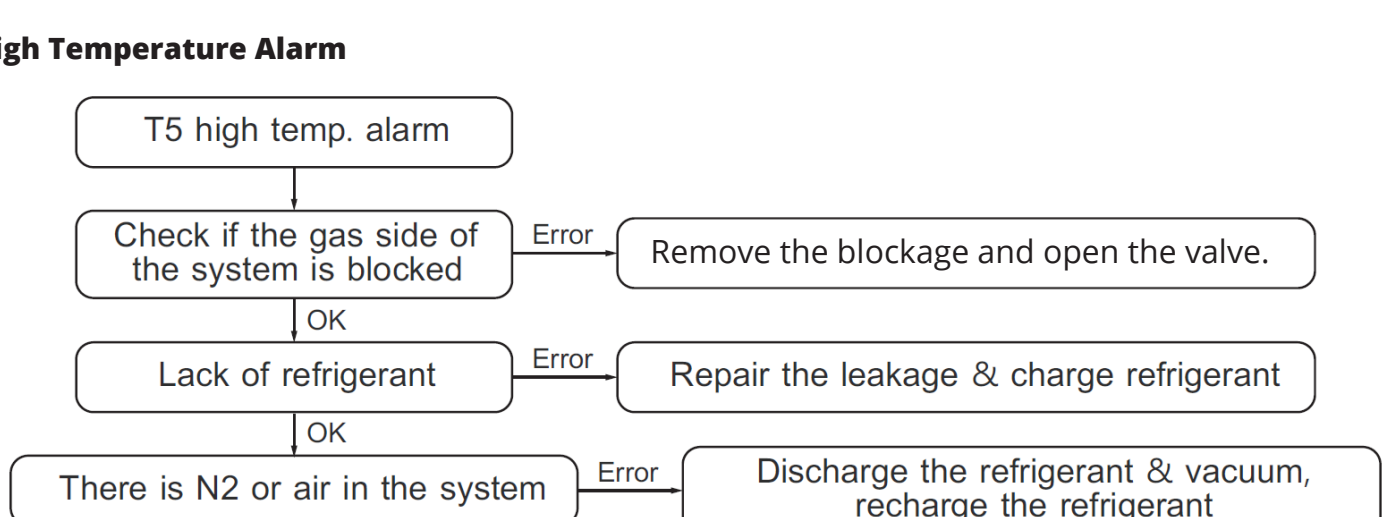
High Pressure Alarm



T3 High Temperature Alarm



T5 High Temperature Alarm

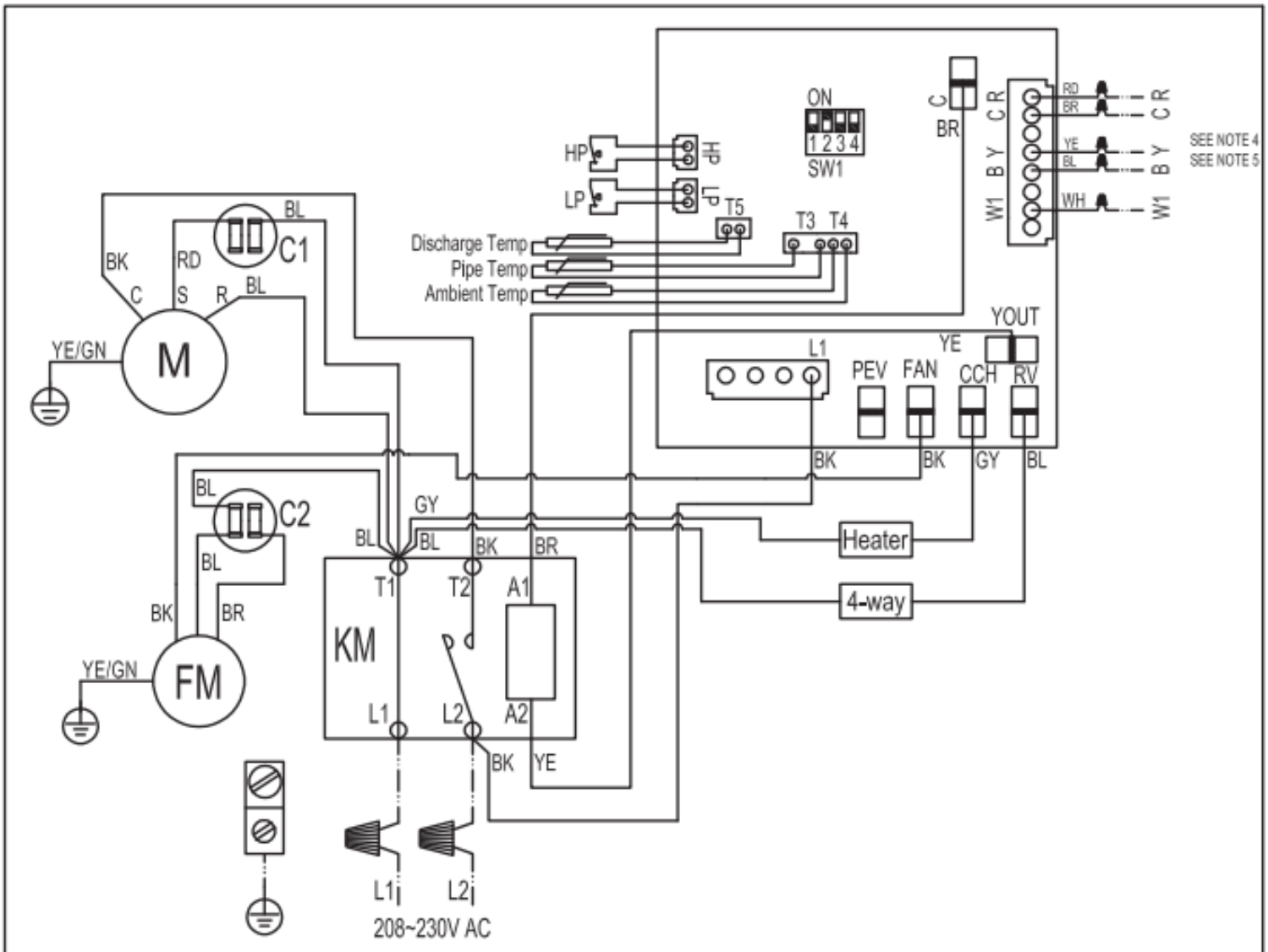


4.3 Operation Limits

Mode/Temperature	Cooling Operation	Heating Operation
Room Temperature	63°F~86°F (17°C~30°C)	63°F~86°F (17°C~30°C)
Outdoor Temperature	59°F~113°F (15°C~45°C)	5°F~90°F (-15°C~32°C)

NOTICE: Ton=5°F, Toff=2°F

4.4 Wiring Diagram



LINEAR ANNOTATION	COMPONENT ANNOTATION		DIAL SWITCH DESCRIPTION			FACTORY SETTING
—— FACTORY DEFAULT	KM CONTACTOR	HP High pressure switch	SW1-1	ON	MANUAL DEFROST	
-·-·- FIELD INSTALLED	M COMPRESSOR	LP Low pressure switch		OFF	AUTOMATIC DEFROST	√
– – – FACTORY OPTION	FM FAN MOTOR		SW1-2	ON	DEFROST MODE 1	√
Please refer to the actual wiring diagram	HEATER CRANKSHAFT HEATING BAND			OFF	DEFROST MODE 2	
			SW1-3	ON	DEFROST CYCLE:30MIN	
				OFF	DEFROST CYCLE:60MIN	√
			SW1-4	ON	PHASE SEQUENCE TEST ON	
				OFF	PHASE SEQUENCE TEST OFF	√

NOTES
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 STATED-CROSS-SECTION EARTH WIRE AND KEEP IT GROUNDING UNFAILINGLY.
4.TO INDOOR UNIT LOW VOLTAGE TERMINAL BLOCK & INDOOR THERMOSTAT. USE N.E.C. CLASS 2 WIRE.
5.USE COPPER CONDUCTOR ONLY.

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

4.5 Cleaning Precautions

WARNING

- Any 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

- Be sure to turn off the unit and disconnect the power supply before cleaning or maintenance.
- 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.
- When removing the filter, do not touch the metal parts in the unit. Sharp metal edges can cut you.

4.6 Pre-Season Inspection & 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.



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