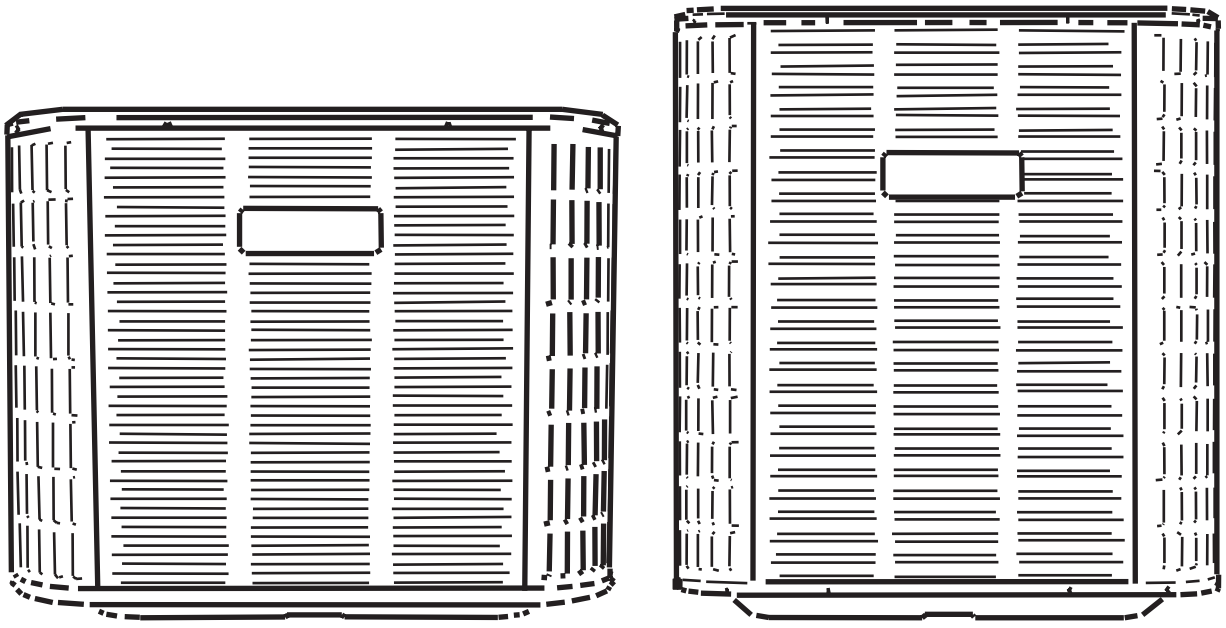
TRUINVERTER TOP DISCHARGE CONDENSER

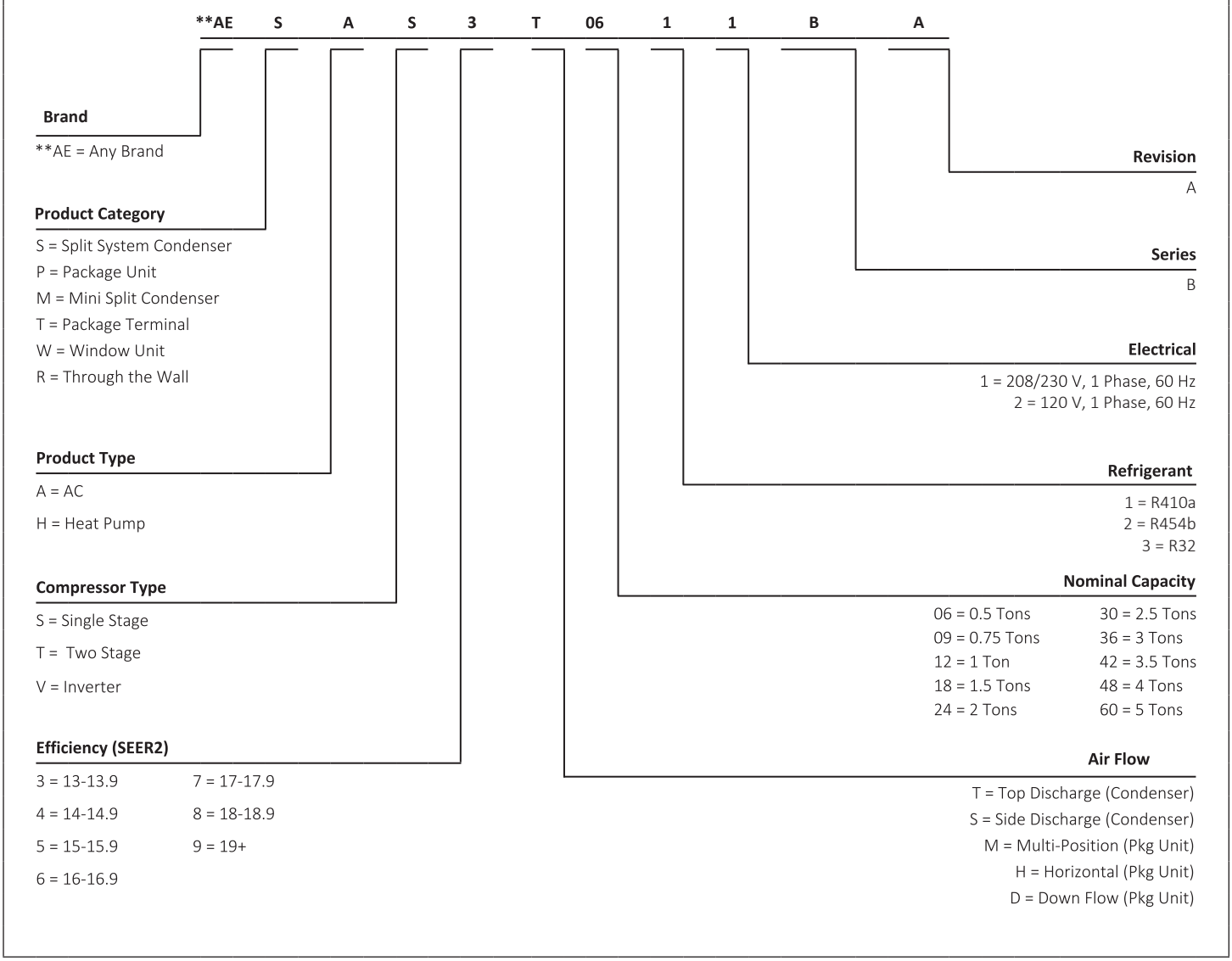


Installation Manual

Outdoor Split System Unit 2, 3, 4, & 5 Ton R454B	*Split System Heat Pump*	*Version Date:* *9 / 15 / 26*

Initial Release ..... 2 / 12 / 26
Revision A ..... 9 / 15 / 26

Nomenclature – Condenser



Thank you for purchasing our condenser. To ensure prolonged, consistent operation, ***read this Owner's & Installation Manual carefully before servicing your condenser***. After reading the manual thoroughly, store it in a safe place for future reference. Consult this manual if you have questions about your heat pump's regular operation or irregularities.

This condenser is intended for residential use ONLY.

⚠ 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.

Keep the following points in mind as you work with this appliance:

1. Use a flammable gas detector to check for gas leaks before unloading and opening the container.
2. Do not place near a fire source. Do not smoke near this unit.
3. Protect the pipework from physical damage, and in the case of using **FLAMMABLE REFRIGERANTS**, do not install in an unventilated space if that space is smaller than A_{min} in **Table 2-3**. In case of a field charge, the effect on **REFRIGERANT CHARGE** caused by the different pipe length has to be quantified.
4. You must comply with national gas regulations.
5. Mechanical connections made in accordance with 22.118 must be accessible for maintenance purposes.
6. The pipework, including piping material, pipe routing, and installation, must be protected from physical damage during operation and service. Pipework must also be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints must be accessible for inspection prior to being covered or enclosed.
7. After completion of 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.
8. This appliance must be stored in a way to prevent mechanical damage from occurring.
9. Every working procedure that affects safety may only be carried out by competent persons according to Annex HH, such as working personnel for maintenance, service, and repair operations. Examples include:
    - Breaking into the refrigerating circuit
    - Opening sealed components
    - Opening ventilated enclosures

i. SAFETY RULES AND RECOMMENDATIONS FOR INSTALLERS

1. Read this guide **before** installing and using the appliance.
2. During the installation of the indoor and outdoor units, **do not allow children access** to the working area. Serious accidents may occur.
3. Make sure that the base of the unit is firmly fixed.
4. Check that air cannot enter the refrigeration system and for refrigerant leaks before turning on the appliance.
5. Carry out a test cycle after installing the air conditioner and record the operating data.
6. Protect the unit with a fuse of suitable capacity for the maximum input current or with another overload protection device.
7. Ensure that the mains voltage corresponds to the voltage on the rating plate. Keep the switch or power terminal clean. Connect the power terminal correctly and firmly into the socket to avoid the risk of electric shock or fire due to insufficient contact.

8. Check that the socket is suitable for the plug. If it is unsuitable, have the socket changed.
9. The appliance must be equipped with devices capable of disconnection from the mains power supply, and have a contact separation in all poles to provide full disconnection under "over voltage category III conditions." These devices must also be incorporated into the fixed wiring in accordance with the wiring rules.
10. Do not try to install this appliance by yourself. Contact specialized technical personnel. Installation may only be performed by licensed or certified HVAC professionals authorized to work with flammable refrigerants. **Installation by unqualified persons may result in fire, electric shock, serious injury, or death, and will void the warranty**.
11. Do not install the appliance less than 20 inches from flammable substances (alcohol, etc.) or pressurized containers (e.g. spray cans).
12. If the appliance is used in areas without the possibility of ventilation, precautions must be taken to prevent refrigerant gas leaks from remaining in the environment and creating a fire hazard.
13. The packaging materials are recyclable and should be disposed of appropriately. When no longer usable, dispose of the appliance at a specialized waste collection center.
14. Only use the appliance as instructed in this manual. These instructions are not intended to cover every possible condition and situation. As with any electrical household appliance, **common sense and caution are recommended** for installation, operation, and maintenance.
15. The installer is solely responsible for ensuring that installation complies with all applicable national, state, and local electrical, mechanical, fire, and building codes. **The manufacturer assumes no responsibility for damage, malfunction, or injury resulting from non-compliant installation**.
16. Before accessing the terminals, all power circuits must be disconnected from the power supply. Do not pull out the power terminal to switch off the appliance when it is in operation, as this could create a spark and cause a fire.
17. Cleaning and maintenance must be carried out by specialized technical personnel. Disconnect the appliance from the mains electricity supply before carrying out any cleaning or maintenance.
18. Do not pull out the plug to turn off the appliance when it is in operation. This could cause a spark and start a fire.
19. This appliance is made for heating and cooling residential environments and must not be used for any other purposes, such as for drying clothes, cooling, food, etc.
20. Always use this appliance with the air filter mounted. Using this appliance without an air filter could cause an excessive accumulation of dust and/or lead to inner parts function failure.
21. The user is responsible for having the appliance installed by a qualified technician, who must check that earthing/grounding is done in accordance with current legislation and insert a thermal magnetic circuit breaker.
22. The batteries in the remote controller must be recycled or disposed of properly. For disposal of scrap batteries, follow any and all local regulations.
23. If the appliance creates smoke or there is a burning smell, immediately cut off the power supply and contact the Service Center. Prolonged use in such conditions could cause fire or electric shock.
24. Have repairs carried out only by an authorized Service Center of the manufacturer. Incorrect repair could expose the user to the risk of electric shock, etc.
25. Unhook the automatic switch if you will not use the device for an extended time. The airflow direction must be properly adjusted.
26. The flaps must be directed downwards in the heating mode and upwards in the cooling mode.
27. Ensure that the appliance is disconnected from the power supply when it will be inoperative for an extended period and before cleaning or maintenance.
28. Select the most suitable temperature to prevent damage to the appliance.
29. Do not remain directly exposed to cold air flow for a long time as it could be dangerous for your health. Take particular care in rooms where there are children, elderly, or sick people.
30. This appliance may be used by children over 8 years old and persons with reduced physical, sensory, or mental capacities **ONLY** under continuous supervision and after receiving instruction on safe use. **DO NOT** let children play with the appliance or perform cleaning, maintenance, or inspection of the appliance.
31. For minimum installation height and minimum room area (operating or storage), refer to installation manual.
32. Mount with the lowest moving parts at least 8.25 ft (2.5 m) above floor or grade level.

ii. SAFETY RULES AND PROHIBITIONS

1. Do not bend, tug, or compress the power cord. This could cause damage. Damaged power cords are often the cause of electrical shock and fire. Only specialized technical personnel should inspect damaged power cords.
2. Do not use extensions or gang modules.
3. Do not touch the appliance when barefoot, or if parts of your body are wet or damp.
4. Do not obstruct the air inlet or outlet of the indoor or outdoor units. The obstruction of these openings causes a reduction in the operating efficiency of the air conditioner with possible consequent failures or damages.
5. Do not alter the characteristics of the appliance in any way.
6. Do not install appliance in environments where air could contain flammable gas, oil, or sulfur, or near heat sources.
7. This appliance may be used by children over 8 years old and persons with reduced physical, sensory, or mental capacities **ONLY** under continuous supervision and after receiving instruction on safe use. **DO NOT** let children play with the appliance or perform cleaning, maintenance, or inspection of the appliance.
8. Do not climb or place any heavy or hot objects on top of the appliance.
9. Do not leave windows or doors open for an extended when the mini split is operating.
10. Do not remain directly exposed to the flow of cold air for a long time. Do not direct the airflow onto plants or animals. The direct and prolonged exposure to cold air could be dangerous for your health. Particular care should be taken in the rooms where children, elderly, and sick people are.
11. Do not put the appliance in contact with water as it could damage the electrical insulation and cause electrocution.
12. Do not climb onto or place any objects on the outdoor unit.
13. Do not insert sticks or similar objects into the appliance as it could cause injury.
14. This unit is equipped with a refrigerant leak sensor for safety. To be effective, the unit must be electrically powered at all times after installation, other than during servicing. This sensor can only be replaced with a manufacturer approved sensor. If it is replaced as part of the component assembly, the component should be labeled.
15. This appliance must be installed according to the manufacturer's instructions, and the ventilation pipe must not exceed the maximum length and number of turns specified by the manufacturer.
16. Appliances that can be installed in different locations should be tested in all locations permitted by the manufacturer. The intake or exhaust openings should not be covered and the manufacturer's recommended air filter should be installed according to the instructions.
17. Leak detection system installed. Unit must be powered except for service.
18. **Risk of fire**. Auxiliary devices that may be ignition sources must not be installed in the ductwork, other than the auxiliary devices listed for use with the specific appliance. See instructions.
19. **Risk of electric shock.** Can cause injury or death. Disconnect all remote electric power supplies before servicing.
20. **Risk of fire due to flammable refrigerant used.**
    - Follow handling instructions carefully in compliance with all applicable federal, state, and local regulations
    - Consult repair manual/owner's guide **before** attempting to service this product. Follow all safety precautions.
    - To be repaired only by trained service personnel. Do not puncture refrigerant tubing.

NOTICE
The manufacturer is not liable for malfunction, damage, or injury caused by abnormal environmental conditions, including but not limited to flooding, lightning, power surges, earthquakes, corrosive atmospheres, or unstable power supply.

iii. DISPOSAL GUIDELINES



Risk of fire. This appliance contains flammable refrigerant and electronic components that must be disposed of in accordance with all applicable federal, state, and local regulations. Improper disposal may result in environmental harm, fire risk, and legal penalties.

1. Servicing Instructions 1
1. 1 Servicing Information 1
1. 2 Cabling 2
1. 3 Detection of Flammable Refrigerants 3
1. 4 Leak Detection Methods 3
1. 5 Removal and Evacuation 3
1. 6 Decommissioning 3
1. 7 Labeling 4
1. 8 Recovery 4
1. 9 Safety Instructions for Transportation and Storage 4
2. Installation Precautions 5
2. 1 Refrigerant Charge and Room Area Limitations 5
2. 2 Room Calculation Requirements 5
2. 3 Allowed Max. Refrigerant Charge and Required Min. Room Area 7
2. 4 Installation Safety Principles 10
3. Unit Location 12
3. 1 Inspect Units 12
3. 2 Unit Dimensions 12
3. 3 Location Restrictions 12
3. 4 Position the Unit 13
4. Refrigerant Lines 14
4. 1 Refrigerant Line Limits 14
4. 2 Refrigerant Line Insulation 16
4. 3 Reuse Existing Refrigerant Lines 16
4. 4 Refrigerant Line Routing 17
5. Flare Line Set Installation 18
5. 1 Cut Pipes 18
5. 2 Remove Burrs 18
5. 3 Flaring Work 18
5. 4 Check 19
5. 5 Pipe Connection 19
5. 6 Pipe Bending 20
5. 7 System Leak Check 21
5. 8 Evacuation 21
5. 9 Service Valves 22

6. No-Vac® Quick Connect® Line Set Installation 23

7. Electrical 25

7. 1 Servicing Information 25

7. 2 Low Voltage Hook-Up Diagrams 25

7. 3 High Voltage Power Supply 26

7. 4 High Voltage Disconnect Switch 27

7. 5 High Voltage Ground 27

7. 6 Electrical Diagram 28

8. Start Up 30

9. System Operation 31

9. 1 Default Display 31

9. 2 Field Setting 33

9. 3 Major Components Function 34

10. Troubleshooting 35

10. 1 Common Problems 35

10. 2 Troubleshooting Advice 36

11. Specifications 37

2. Installation Precautions

2-1 Minimum Opening Area for Connected Rooms 6
2-2 The Allowable Maximum Refrigerant Charge 8
2-3 The Required Minimum Room Area 9
2-4 The Minimum Circulation Airflow 9
2-5 Suggested Tools 11
2-6 Dedicated Distribution Device and Wire for Air Conditioner 11

3. Unit Location

3-1 Unit Dimensions 12

4. Refrigerant Lines

4-1 Refrigerant Line Limits 14
4-2 Pipe Length & Additional Refrigerant 15
4-3 Total Refrigerant Capacity (lbs) 15
4-4 Minimum Room Area (ft2) 15

5. Flare Line Set Installation

5-1 Flaring Work Dimension 19
5-2 Torque Values 19

6. No-Vac® Quick Connect® Line Set Installation

6-1 Pipe & Wrench Sizing 24
6-2 Allen/Hex Sizing 24

7. Electrical

7-1 Control Wiring 25
7-2 Power Supply 27
7-3 Minimum Cross-Sectional Area of Power and Signal Cables 28

8. Start Up

8-1 Temperature 30
8-2 Heating 30

9. System Operation

9-1 Error Codes 31
9-2 DSP1-3 Descriptions 32
9-3 Dip Switches 33
9-4 Major Components Function 34

10. Troubleshooting

10-1 Common Problems 35
10-2 Problems, Causes, Solutions 36

2. Installation Precautions

2-1 Opening Conditions for Connected Rooms 7

3. Unit Location

3-1 Check Damage 12
3-2 External Dimensions 12
3-3 Clearance Requirement 13
3-4 Unit Location 13
3-5 Cold Climate Consideration 13

4. Refrigerant Lines

4-1 Max. Line Length & Elevation Difference 14
4-2 Refrigerant Charge 15
4-3 Line Insulation 16
4-4 Using Existing Refrigerant Lines 16
4-5 Isolation from Joist/Rafter 17
4-6 Isolation in Wall Spaces 17
4-7 Isolation Through Wall 17
4-8 DO NOT Hang Line Sets From Ductwork 17

5. Flare Line Set Installation

5-1 Cut Pipes 18
5-2 Remove Burrs 18
5-3 Flaring Work 18
5-4 Check Pipe 19
5-5 Pipe Connection 19
5-6 Pipe Unwinding 20
5-7 Pipe Cutting 21
5-8 Charge Dry Nitrogen to the System 21
5-9 Leak Charge 21
5-10 Evacuation of the Refrigeration System 21
5-11 Open the Service Valves 22

6. No-Vac® Quick Connect® Line Set Installation

6-1 Complete System Replacement Using the No-Vac Quick Connect Line Sets 24

7. Electrical

7-1 Sealing Requirement 25
7-2 Low-Voltage Hook-Up 25
7-3 Schematic Diagram for Control Wiring Connection 26
7-4 Read the Warning Label 27
7-5 Install an Independent Switch 27
7-6 Unit Grounding 27
7-7 Electrical Diagram 29

9. System Operation

9-1 Display 31
9-2 Setting by Dip Switches 33
9-3 Major Components 34

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}	Total area of conditioned space for appliances serving one or more rooms with an air duct system
TA	Total area of the conditioned space connected by air ducts



Caution: Risk of Fire



Caution: Risk of Fire



Read the operator's manual



Read operating instructions



Read technical manual

1. Check this manual for the space needed for proper installation, including the minimum distances allowed between adjacent structures
2. The appliance must be installed, operated, and stored in a room with a floor area larger than 13ft^2 (4m^2)
3. The installation of pipework must be kept to a minimum
4. Pipework must be protected from physical damage and must not be installed in an unventilated space if the space is smaller than 13ft^2 (4m^2)
5. The compliance with national gas regulations must be observed
6. The mechanical connections must be accessible for maintenance purposes
7. Follow instructions in this manual for the handling, installing, cleaning, maintaining, and disposing of refrigerant
8. Make sure the ventilation openings are clear of obstructions
9. **Notice:** The servicing must be performed only as recommended by the manufacturer
10. **Warning:** You must store the appliance in a well-ventilated area corresponding to the size specified for operation
11. **Warning:** The appliance must be stored in a room without continuously operating open flames (e.g. an operating gas appliance) and ignition sources (e.g. an operating electric heater)
12. The appliance must be stored to prevent mechanical damage from occurring
13. Anyone called to work on a refrigerant circuit must hold a valid and up-to-date certificate from an assessment authority accredited by the industry and recognizing their competence to handle refrigerants, in accordance with the assessment specification recognized in the industrial sector concerned. Service operations should only be carried out according to the recommendations of the equipment manufacturer. Maintenance and repair operations that require the assistance of other qualified persons must be conducted under the supervision of the person competent for the use of flammable refrigerants
14. Every working procedure that affects safety means may only be carried out by competent persons
15. **Repairs to Seal Components**: Sealed electrical components must be replaced
16. **Repairs to Intrinsically Safe Components**: Intrinsically safe components must be replaced

⚠ 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. 1 Servicing Information

I. Check the Area

Before working on systems with flammable refrigerants, perform safety checks to minimize the risk of ignition. Before repairing the refrigerating system, take these precautions.

II. Work Procedure

Perform work in a controlled procedure to reduce the risk of flammable gas or vapor being present.

III. General Work Area

Instruct all maintenance staff and others working in the local area on the nature of the work being carried out. Avoid work in confined spaces. Section off the area around the workspace. Ensure that the conditions within the area have been made safe by the control of flammable material.

IV. Checking for the Presence of Refrigerant

Check the area with an appropriate refrigerant detector before and during work, to alert the technician to potential flammable atmospheres. Leak detection equipment must be **suitable for use with flammable refrigerants** (i.e. non-sparking, adequately sealed, or intrinsically safe).

V. Presence of a Fire Extinguisher

If any hot work is to be conducted on the refrigeration equipment or any associated parts, keep appropriate fire extinguishing equipment, like a dry powder or CO_2 fire extinguished, adjacent to the charging area.

VI. Ignition Source

No person carrying out work in relation to a refrigeration system involving exposing pipework may use any sources of ignition in a way that may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, must be kept sufficiently away from the site of installation, repairing, removing, and disposal, during which refrigerant could be released to the surrounding space. The area around the equipment must be surveyed for flammable hazards or ignition risks before work takes place. You must display "No Smoking" signs.

VII. Ventilated Area

Ensure that the area is in the open or adequately ventilated before opening the system or conducting any work that will produce heat. Ensure ventilation continues while work is carried out. Ventilation should safely disperse any released refrigerant and expel it into the atmosphere.

VIII. Checks to the Refrigerant Equipment

Any electrical components changed must be the correct specification and fit for the intended purpose. At all times, the manufacturer's maintenance and service guidelines **must be followed**. If in doubt, consult the manufacturer's technical department for assistance.

You must complete the following checks on installations using flammable refrigerant:

- The charge size is in accordance with the room size where the refrigerant containing parts are installed
- The ventilation machinery and outlets are operating adequately and are not obstructed
- If an indirect refrigerating circuit is used, you **must check** the secondary circuit for refrigerant
- Marking on the equipment must be **visible and legible**. You must correct markings and signs that are illegible
- Refrigeration pipe or components are installed where they are unlikely to be exposed to any substance that may corrode refrigerant containing components, unless the components are constructed of materials that are inherently resistant or are suitably protected against corrosion

IX. Checks to Electrical Devices

Repair and maintenance to electrical components must include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, do not connect electrical supply to the circuit until it is dealt with satisfactorily. If the fault cannot be corrected immediately but it is necessary to continue operation, use an adequate temporary solution. Report this to the owner of the equipment so all parties are properly advised.

Initial safety checks **must** include:

- That capacitors are discharged. This must 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 earth bonding

1. 2 Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects. You must also take into account the effects of aging or continual vibration from sources such as compressors or fans.

1. 3 Detection of Flammable Refrigerants

Under no circumstances may potential sources of ignition be used to searching for or detect refrigerant leaks. **Do not** use a halide torch (or any other detector using a naked flame).

1. 4 Leak Detection Methods

The following leak detection methods are acceptable for systems containing flammable refrigerants:

- Use electronic leak detectors to detect flammable refrigerants. The sensitivity may not be adequate, or may need re-calibration in a **refrigerant-free area**. Calibrate it to the refrigerant employed. Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Set leak detection equipment at a percentage of the LFL of the refrigerant. Confirm the appropriate percentage of gas (25% maximum). Leak detection fluids are suitable for use with most refrigerants, but a**void detergents containing chlorine** as the chlorine may react with the refrigerant and corrode the copper pipework. If a leak is suspected, remove or extinguish all naked flames. If a refrigerant leak is found that requires brazing, recover all refrigerant from the system, or isolate it (by shut off valves) in a part of the system remote from the leak. Purge oxygen free nitrogen (OFN) through the system both before and during the brazing process.

1. 5 Removal and Evacuation

When breaking into the refrigerant circuit to make repairs, or for any other purpose, use conventional procedures. Due to flammability, you must follow best practice. You **must** adhere to the following process:

1. Remove refrigerant
2. Purge the circuit with inert gas
3. Evacuate
4. Purge again with inert gas
5. Open the circuit by cutting or brazing

The refrigerant charge must be recovered into the correct recovery cylinders. The system must be flushed with OFN to render the unit safe. This process may need to be repeated several times.

DO NOT use compressed air or oxygen for this task.

Achieve flushing by breaking the vacuum in the system with OFN, continuing to fill until working pressure is achieved, venting to the atmosphere, then pulling down to a vacuum. Repeat this process until no refrigerant is within the system. When the final OFN charge is used, the system must be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital for brazing operations on the pipework.

Ensure that the outlet for the vacuum pump is not close to any ignition sources and ventilation is available.

1. 6 Decommissioning

Before decommissioning, the technician must be completely familiarized with the equipment and all its details. It is recommended good practice that all refrigerants are recovered safely. Prior to starting this task, take an oil and refrigerant sample in case analysis is required before re-using the reclaimed refrigerant. Electrical power must be available before beginning the task.

1. Become familiar with the equipment and its operation
2. Isolate the system electrically
3. Before attempting the procedure, ensure that:
   - Mechanical handling equipment is available, if required, for handling refrigerant cylinders
   - All personal protective equipment is available and being used correctly
   - The recovery process is supervised at all times by a competent person
   - Recovery equipment and cylinders conform to the appropriate standards

4. Pump down refrigerant system, if possible
5. If a vacuum is not possible, make a manifold so refrigerant can be removed from parts of the system
6. Make sure that the cylinder is situated on the scales before recovery takes place
7. Start the recovery machine and operate in accordance with the manufacturer's instructions
8. Do not overfill cylinders (No more than 80% volume liquid charge)
9. Do not exceed the maximum working pressure of the cylinder, even temporarily
10. When the cylinders have been filled correctly and the process is complete, make sure that the cylinders and the equipment are removed from the site promptly and all isolation valves on the equipment are closed off
11. Recovered refrigerant must not be charged into another refrigeration system unless cleaned and checked

1. 7 Labeling

Label equipment stating that it has been de-commissioned and emptied of refrigerant. The label must be dated and signed. Ensure that labels are on the equipment stating the equipment contains flammable refrigerant.

1. 8 Recovery

When removing refrigerant from a system, for servicing or decommissioning, follow these safety principles:

- When transferring refrigerant into cylinders, only employ appropriate refrigerant recovery cylinders. Ensure that the correct number of cylinders for holding the total system charge are available. Designate all cylinders to be used for the recovered refrigerant and label for that refrigerant (i.e. special cylinders for refrigerant recovery). Cylinders must be complete with pressure-relief valves and associated shut-off valves in good working order.
- Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
- The recovery equipment must be in good working order with instructions for the equipment on hand, and must be suitable for the recovery of all appropriate refrigerants, including, when applicable, flammable refrigerants. In addition, 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. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained, and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. If in doubt, consult the manufacturer.
- The recovered refrigerant must be returned to the refrigerant supplier in the correct recovery cylinder with the relevant waste note attached. Do not mix refrigerants in recovered units, especially not in the cylinders.
- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level so that flammable refrigerant does not remain within the lubricant.
- The evacuation process must be carried out before returning the compressor to the suppliers.
- Only electric heating to the compressor body can be employed to accelerate this process. When oil is drained from a system, it must be carried out safely.

1. 9 Safety Instructions for Transportation and Storage

1. Do not transport or store with any fire source. Do not smoke near the appliance
2. This appliance must be transported and stored in accordance with local rules and laws

⚠ IMPORTANT CONSIDERATIONS ⚠

1. The appliance must be installed by professional personnel and the installation manual is intended only for the professional installation personnel. The installation specifications are subject to our after-sale service regulations.
2. When filling the combustible refrigerant, rough handling operations may cause serious injury or injuries to people and objects.
3. A leak test must be done after the installation is completed.
4. You must complete a **safety inspection** before maintaining or repairing the appliance with combustible refrigerant to minimize fire risk.
5. Operate machine under controlled procedure to ensure any risk from combustible gas or vapor is at a minimum.
6. Follow requirements for the total weight of filled refrigerant and the area of the room to be equipped with an air conditioner (Tables GG.1 and GG.2)

2. 1 Refrigerant Charge and Room Area Limitations

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

The maximum charge and the required minimum floor area:
m_1 = (6 m^3) x LFL, m_2 = (52 m^3) x LFL, m_3 = (260 m^3) x LFL
Where LFL is the lower flammable limit in kg/m^3, R454B LFL is 0.296 kg/m^3

For the appliances with a charge amount m_1 < M = m_2:
The maximum charge in a room must be in accordance with the following equation:

M_{max} = 0.5 x LFL x 2.2 x A

The required minimum floor area A_{min} to install an appliance with refrigerant charge M(kg) must be in accordance with the following equation:

Q_{min} = 30 x Mc / LFL

2. 2 Room Calculation Requirements

CAUTION
Considered space is any space with refrigerant-containing parts or into which refrigerant could be released. **The room area (A) of the smallest, enclosed, occupied space** must be used to determine refrigerant quantity limits.

To determine the room area (A) when used to calculate 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 must not be considered a single space

Units mounted higher than 70 55⁄64 inches and spaces divided by partition walls no higher than 62 63⁄64 inches may 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 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 floor, connected by permanent openings 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 the following conditions are met as in **Fig. 2-1**:

Low Level Opening

1. The opening must not be less than Anv_{min} in **Table 2-1**
2. **DO NOT** consider the area of openings above 11 13⁄16 inches from the floor to determine 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, the height must not be less than 25⁄32 inches above the floor covering surface

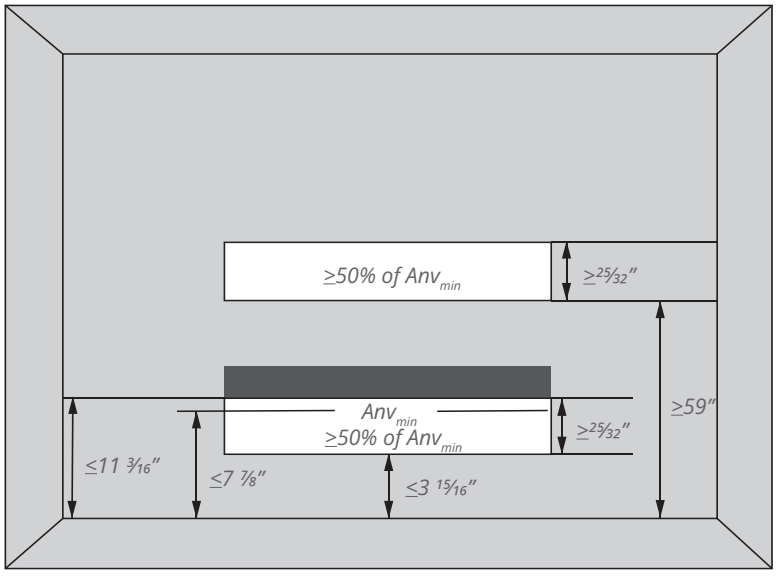
High Level Opening

1. The opening must not be less than 50% of Anv_{min} in **Table 2-2**
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 is not less than 25⁄32 inches

Room Size Requirement

1. Rooms refrigerant can leak into plus the connected adjacent room(s) must have a total area no less than A_{min}. A_{min} is shown in **Table 2-3**
2. The room area in which the unit is installed must not be less than 20% of A_{min}. A_{min} is shown in **Table 2-3**

Fig, 2-1 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 2-1**.

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.

Table 2-1: The Minimum Opening Area for Connected Rooms

A ($ft^{2)}$	Mc (lbs-oz)		M_{max} (lbs-oz)		Anv_{min} (ft^2)
	lbs	oz	lbs	oz	
40	9	9	2	10	0.9
50	9	9	3	5	0.8
60	9	9	4	0	0.7
70	9	9	4	10	0.6
80	9	9	5	5	0.6
90	9	9	6	0	0.5
100	9	9	6	10	0.4
110	9	9	7	5	0.3
120	9	9	8	0	0.2
130	9	9	8	10	0.2
140	9	9	9	5	0.1
150	9	9	10	0	0.0
160	9	9	10	10	0.0

NOTICE

Take Mc=9 lbs 9 oz as an example.
For appliances serving one or more rooms with an air duct system, calculate the room area 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

2. 3 Allowed Max. Refrigerant Charge and Required Min. Room Area

If the fan 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 2-2** and **Table 2-3**.

NOTICE

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, meets the incorporated circulation airflow requirements, the maximum refrigerant charge, or minimum room area can be determined according to **Table 2-2** or **Table 2-3**.

CAUTION

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

1. Minimum velocity of 3.28 ft/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.
2. Minimum airflow rate must meet the corresponding values in **Table 2-4**, related to the actual refrigerant charge of the system (Mc).
3. R454B refrigerant leakage sensor is configured.

CAUTION

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

Table 2-2 The Allowable Maximum Refrigerant Charge

A/TA (ft^2)	M_{max} (lbs-oz)		A/TA (ft^2)	M_{max} (lbs-oz)	
	lbs	oz		lbs	oz
40	2	10	160	10	10
50	3	5	170	11	5
60	4	0	180	12	0
70	4	10	190	12	10
80	5	5	200	13	5
90	6	0	210	14	0
100	6	10	220	14	10
110	7	5	230	15	5
120	8	0	240	16	0
130	8	10	250	16	10
140	9	5	260	17	5
150	10	0			

Table 2-3 The Required Minimum Room Area

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

Table 2-4 The Minimum Circulation Airflow

Mc (lbs-oz)		Q_{min} (CFM)	Mc (lbs-oz)		Q_{min} (CFM)
lbs	oz		lbs	oz	
4	6	119	11	0	298
4	13	131	11	7	310
5	4	143	11	14	322
5	11	155	12	5	334
6	2	167	12	12	346
6	9	179	13	3	358
7	0	191	13	10	370
7	7	203	14	1	382
7	15	215	14	8	394
8	6	227	14	15	405
8	13	239	15	6	418
9	4	251	15	14	430
9	11	263	16	5	442
10	2	275	16	12	454
10	9	287	17	3	466

2. 4 Installation Safety Principles

Site Safety	 *Open Flames Prohibited*  *Ventilation Necessary*
Operation Safety	 *Mind Static Electricity*  *Must Wear Protective Clothing and Anti-Static Gloves*  *Don't Use Mobile Phone*
Installation Safety	• Refrigerant Leak Detector • Appropriate Installation Location  *A schematic diagram of a refrigerant leak detector*

Note:

1. The installation site should be well-ventilated
2. The sites for installing and maintaining an air conditioner using Refrigerant R454B should be free from open fires or welding, smoking, drying ovens, or any other heat source higher than (396°C) that easily produces open fire
3. When installing an air conditioner, take appropriate anti-static measures like wearing anti-static clothes and gloves
4. Choose a site convenient for installation or maintenance where the air inlets and outlets of the indoor and outdoor units are not surrounded by obstacles or close to any heat source or combustible/explosive environments
5. If the indoor unit suffers a refrigerant leak during the installation, immediately turn off the valve of the outdoor unit. All personnel should go out until the refrigerant leaks completely for 15 minutes. If the product is damaged, you must take the damaged product back to the maintenance station. It is prohibited to weld the refrigerant pipe or conduct other operations on the user's site
6. Avoid places where the inlet and outlet air of the indoor unit is even
7. Avoid places where there are other electrical products, power switch plugs and sockets, kitchen cabinets, beds, sofas, and other valuables right under the lines on two sides of the indoor unit

Table 2-5 Suggested Tools

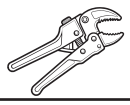
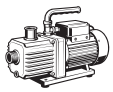
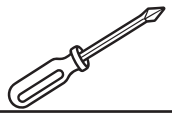
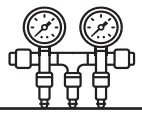
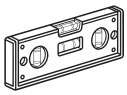
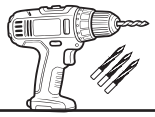
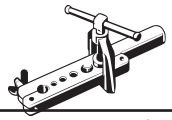
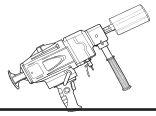
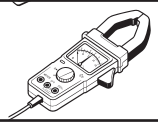
Tool	Picture	Tool	Picture	Tool	Picture
Standard Wrench		Pipe Cutter		Vacuum Pump	
Adjustable/ Crescent Wrench		Screwdrivers (Phillips & Flat Blade)		Safety Glasses	
Torque Wrench		Manifold & Gauges		Anti-Static Gloves	
Hex Keys or Allen Wrenches		Level		Refrigerant Scale	
Drill & Drill Bits		Flaring Tool		Micron Gauge	
Hole Saw		Clamp on Amp Meter		Welding Gun	

Table 2-6 Dedicated Distribution Device and Wire for Air Conditioner

Min. Circuit Ampacity of Air Conditioner (A)	Minimum Wire Cross-sectional Area (mm^2)	Specification of Socket or Switch (A)	Fuse Specification (A)
≤8	0.75	15	15
>8 and ≤10	1.0	15	15
>10 and ≤15	1.5	20	25
>15 and ≤24	2.5	25	40
>24 and ≤28	4.0	35	45
>28and ≤32	6.0	40	55

NOTICE

This table is only for reference. The installation must meet the requirements of local laws and regulations.

3. 1 Inspect Units

Units are packaged for shipment to avoid damage during normal transit and handling. It is the receiving party's responsibility to inspect the equipment upon arrival. Report any obvious damage to the carton box on the bill of lading, file a claim with the transportation company, and notify the factory.

All units should be stored in the factory shipping carton with internal packaging in a dry place until installation. Carefully remove packaging and inspect for hidden damage. Record any damage and notify the factory. The gauge port can be used to check that refrigerant charge was retained during shipment.

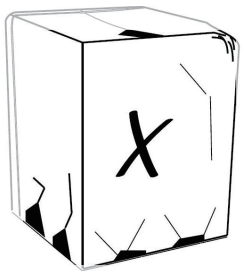


Fig. 3-1 Check Damage

3. 2 Unit Dimensions

- Two models sharing the same chassis are suited for most residential air conditioner and heat pump applications.
- When mounting the condensing unit on a roof or pad, be sure its dimensions are no less than 29" x 29"

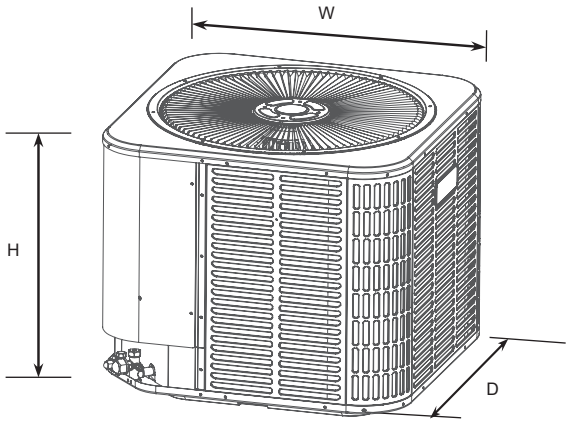


Fig 3-2 External Dimensions

Table 3-1 Unit Dimensions

Unit Dimensions	
Model	(Inches)
**AESHV8T2421BA	24 15⁄16 x 29 1⁄8 x 29 1⁄8
**AESHV9T3621BA	24 15⁄16 x 29 1⁄8 x 29 1⁄8
**AESHV8T4821BA	33 3⁄16 x 29 1⁄8 x 29 1⁄8
**AESHV7T6021BA	33 3⁄16 x 29 1⁄8 x 29 1⁄8

3. 3 Location Restrictions

Exposure to a corrosive environment may shorten the life of the equipment, 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 ocean water, sulfur, chlorine, fluorine, fertilizers, and various chemical contaminants from industry/manufacturing plants.

If installed in areas which may be exposed to corrosive environments, special attention should be given to the equipment placement and maintenance.

- Lawn sprinklers/waste water should not spray directly on the unit cabinet for prolonged periods
- In coastal areas: locate the unit on the side of the building away from the waterfront

3. 3. 1 Installation Clearance Requirement

1. Ensure the top discharge area is unrestricted for at least 60 inches above the unit. (Fig. 4-3
2. Do not put the condensing unit near bedrooms. Normal operational sounds may be annoying. Position the unit to allow adequate space for unobstructed airflow, wiring, refrigerant lines, and serviceability. (Fig. 4-3)
3. Allow a minimum of 12 inches clearance on one side of the access panel to a wall and a minimum of 24 inches on the adjacent side of the access panel. Fig. 4-3)
4. Maintain a distance of 24 inches between units. (Fig. 4-3)
5. Position unit so that water, snow, or ice from roof or overhang cannot fall directly on the unit. (Fig. 4-4)

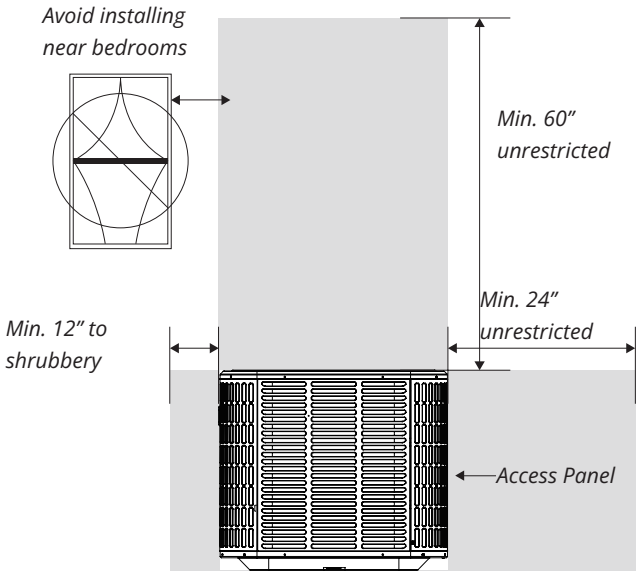


Fig. 3-3 Clearance Requirement

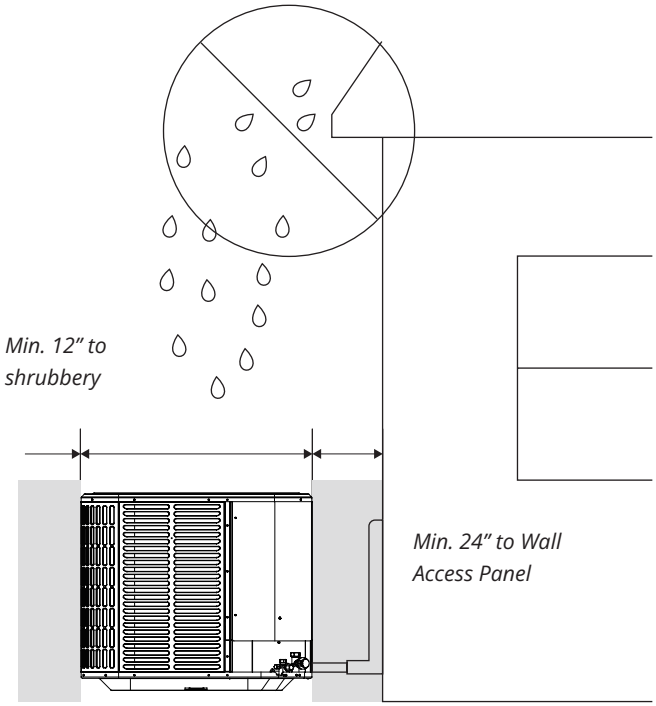


Fig. 3-4 Unit Location

3. 3. 2 Cold Climate Considerations

Take precautions for units being installed in areas where snow accumulation and prolonged below-freezing temperatures occur.

Elevate unit per local climate and code requirements.

This additional height will allow drainage of snow and ice melted during defrost cycle to flow out smoothly prior to its refreezing.

Install a snow drift barrier around the unit to prevent a build-up of snow on the unit sides.

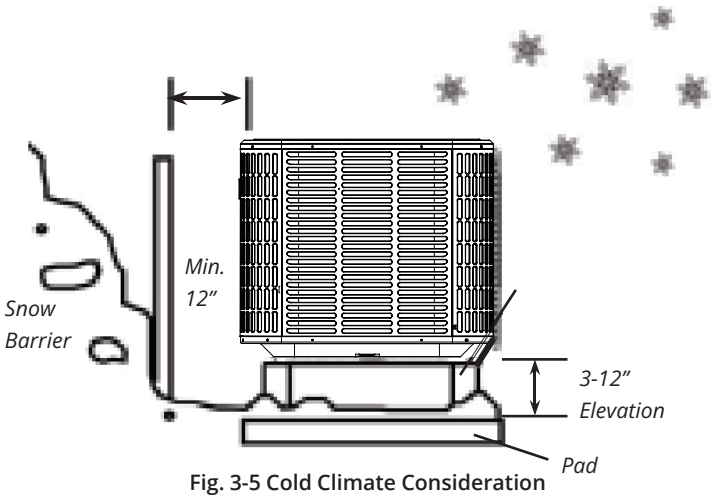


Fig. 3-5 Cold Climate Consideration

3. 4 Position the Unit

When mounting the unit on a roof, be sure the roof will support the unit's weight, stated on the nameplate.

Properly selected isolation is recommended to prevent sound or vibration transmission to the building structure.

4.1 Refrigerant Line Limits

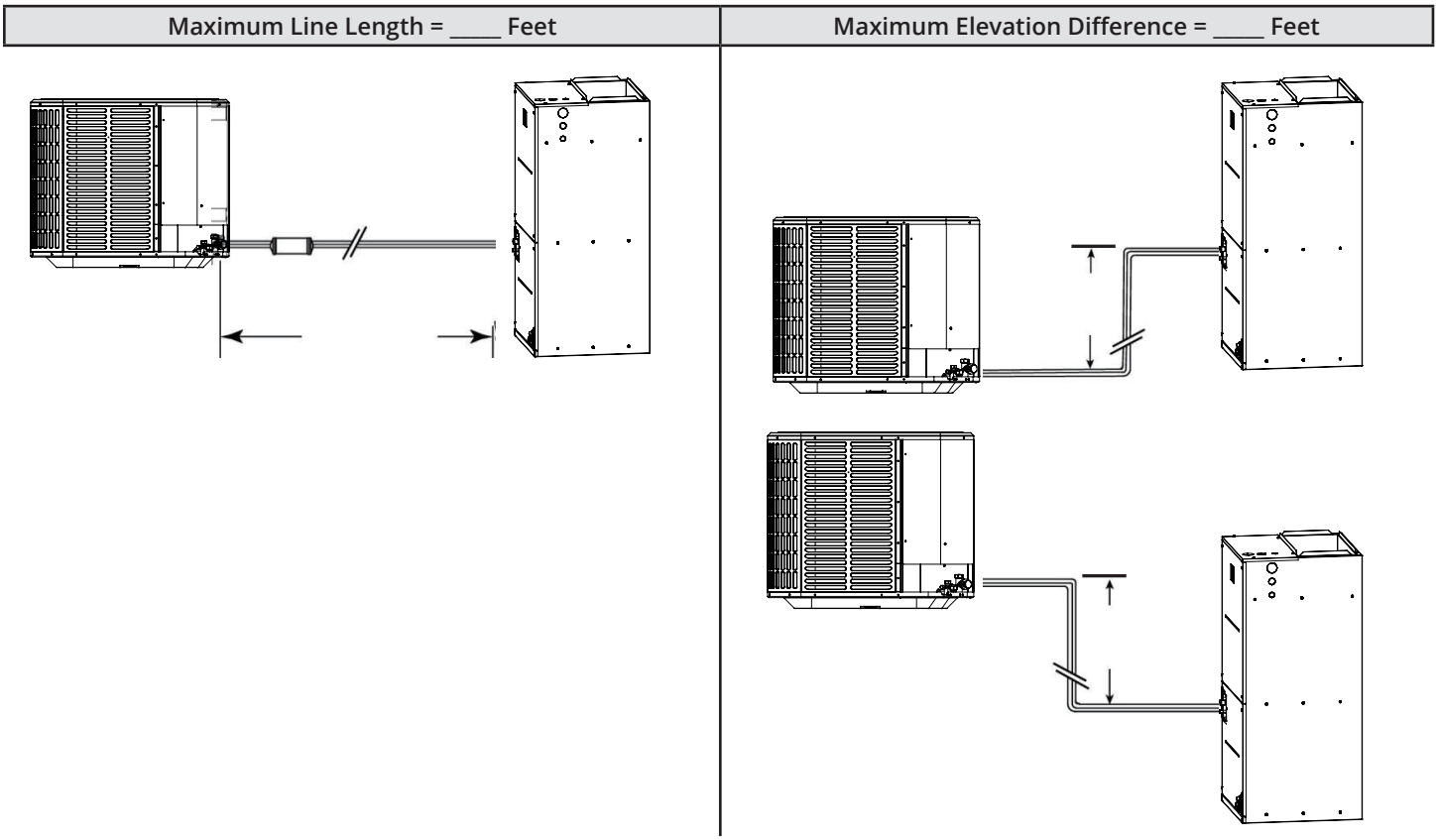
Use only the line sizes indicated in the table below to determine the required line length. If the suction line sets are greater than 50 ft, do not use a larger suction line than recommended.

Table 4-1 Refrigerant Line Limits

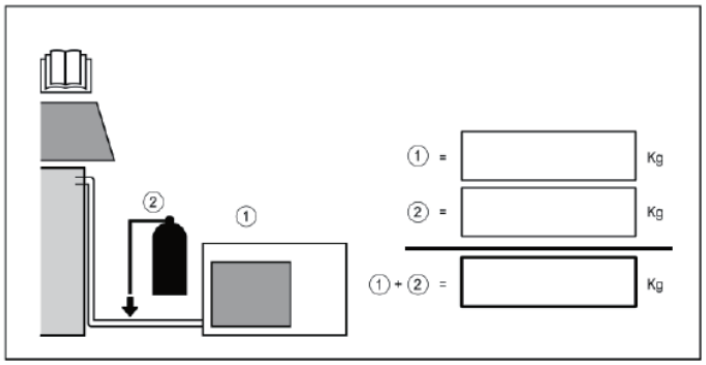
Capacity Model	Liquid Line	Suction Line	Total Equivalent Length (ft)				
			25	50	75	100	164
	Dimensions in Inches		Maximum Elevation Difference (ft)				
**AESHV8T2421BA	3/8 Std.	3/4 Std.	25	50	45	40	/
**AESHV9T3621BA	3/8 Std.	3/4 Std.	25	50	50	40	/
**AESHV8T4821BA	3/8 Std.	3/4 Std.	25	50	50	40	35
**AESHV7T6021BA	3/8 Std.	3/4 Std.	25	50	50	40	35

Std.: Standard Line Size

Fig. 4-1 Max. Line Length & Elevation Difference



4. 1. 1 Refriaerant Charae



① = Pre-charged Part (See Nameplate)

② = Added During Installation (See Manual)

① + ② = Total Amount

Fig. 4-2 Refrigerant Charge

4. 1. 2 Pipe Length and Additional Refrigerant

Table 4-2 Pipe Length & Additional Refrigerant

Model	H24TDH17XAC	H36TDH18XAC	H48TDH18XAC	H60TDH16XAC
Length of Pipe with Standard Charge (ft)	25	25	25	25
Refrigerant Capacity Standard Charge (lbs)	4.74	6.28	8.82	8.82
The Longest Pipe Length (ft)	100	100	165	165
Additional Refrigerant Charge (lbs/ft)	0.0335	0.0335	0.0335	0.0335
Max. Diff. in Level Between Indoor and Outdoor Unit (ft)	50	50	50	50

For example, for a 36K model, when the pipe is 100 ft., the additional refrigerant charging is (100-25) x 0.0335 = 2.51 lbs, and the refrigerant capacity of the whole model is 6.28 + 2.51 = 8.79 lbs.

Table 4-3 Total Refrigerant Capacity (lbs)

Model	Category	LFL (lbs/ft^3)	h_0 (ft)	Pipe Length (ft)				
				25	49	66	98	164
**AESHV8T2421BA	R454B	0.0185	7.2	4.74	5.57	6.12	7.22	/
**AESHV9T3621BA				6.28	7.11	7.66	8.76	/
**AESHV8T4821BA				8.82	9.65	10.2	11.3	13.5
**AESHV7T6021BA				8.82	9.65	10.2	11.3	13.5

Table 4-4 Minimum Room Area (ft2)

Model	Category	LFL (lbs/ft^3)	h_0 (ft)	Pipe Length (ft)				
				25	49	66	98	164
**AESHV8T2421BA	R454B	0.0185	7.2	71.0	26.0	28.0	33.0	/
**AESHV9T3621BA				95.0	32.0	35.0	40.0	/
**AESHV8T4821BA				40.0	44.0	47.0	52.0	62.0
**AESHV7T6021BA				40.0	44.0	47.0	52.0	62.0

4. 2 Refrigerant Line Insulation

The suction line must always be insulated. **DO NOT** allow the suction line and liquid line to come in direct (metal to metal) contact.

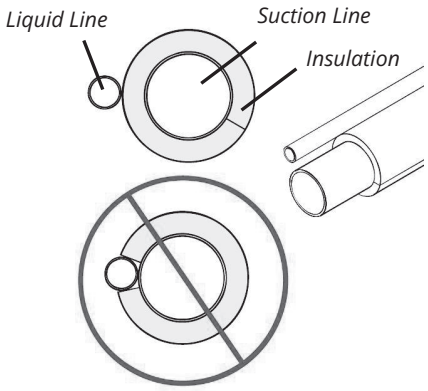


Fig. 4-3 Line Insulation

4. 3 Reuse Existing Refrigerant Lines

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

For retrofit applications where the existing refrigerant lines will be used, the following precautions should be taken:

- Ensure that the refrigerant lines are the correct size according to Table 4-1.
- It is not recommended to use suction lines bigger than the standard size, which will result in poor oil return for the inverter compressor.

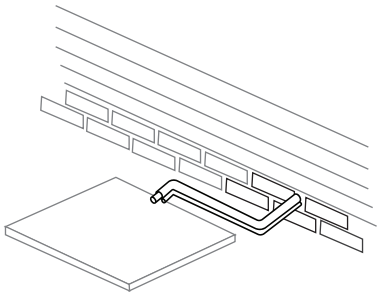


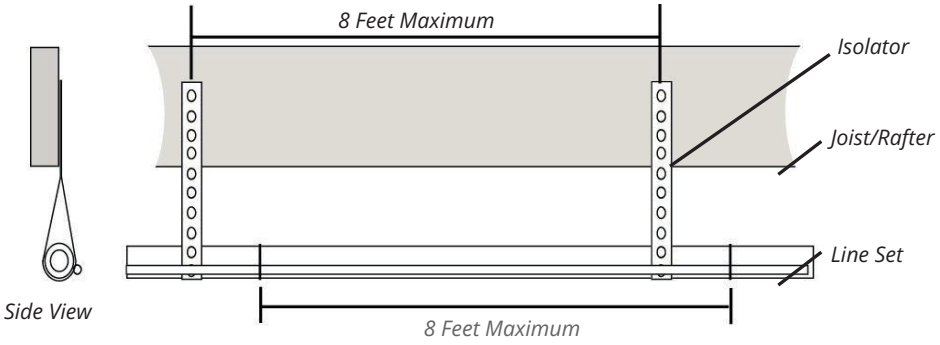
Fig. 4-4 Using Existing Refrigerant Lines

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

4. 4 Refrigerant Line Routing

Comply with national, state, and local codes when isolating line sets from joists, rafters, walls, or other structural elements. Take precautions to prevent noise in the building structure due to vibration transmission from the refrigerant lines. For example:

- Use isolation type hangers when the refrigerant lines have to be fastened to floor joists or other framing
- Isolation hangers should also be used when refrigerant lines traverse stud spaces or enclosed ceilings
- Where the refrigerant lines pass through a wall or sill, it should be insulated and isolated
- Isolate the lines from all ductwork
- Minimize the number of 90° turns



Secure suction line from joists using isolators every 8 ft. Secure liquid line directly to insulated suction line using tape, wire, or other appropriate methods every 8 ft.

Fig. 4-5 Isolation From Joist/Rafter

Secure suction line using isolators every 8 ft. Secure liquid line directly to insulated suction line using tape, wire, or other appropriate methods every 8 ft.

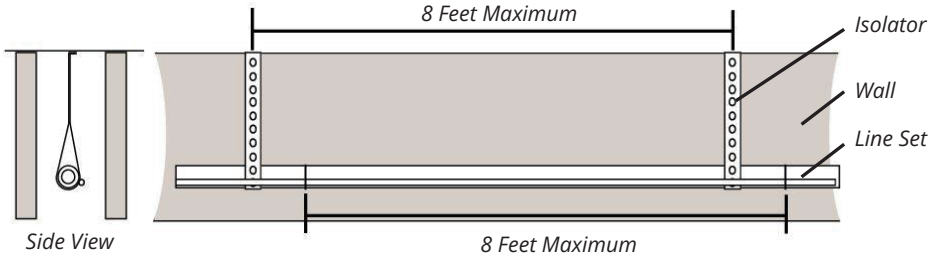


Fig. 4-6 Isolation in Wall Spaces

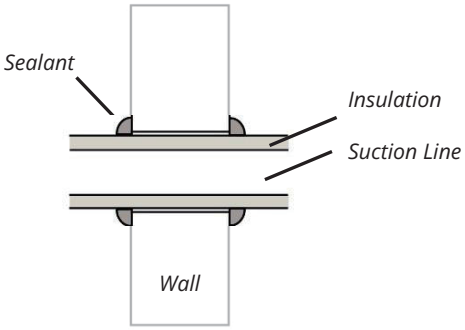


Fig. 4-7 Isolation Through Wall

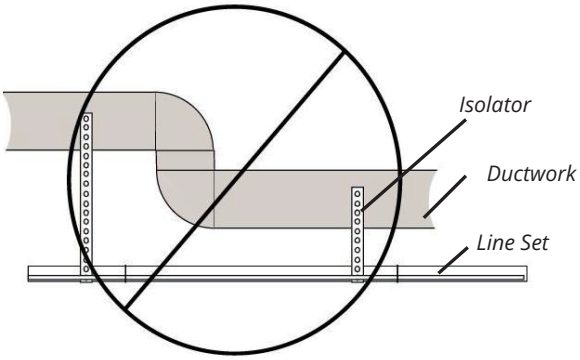


Fig. 4-8 DO NOT Hang Line Sets From Ductwork

The model has been pre-filled with refrigerant (check the machine nameplate for specific refrigerant amount).

DO NOT use the Allen wrench to open the stop valve before ensuring the pipes are connected and there is no air inside the connecting pipes.

CAUTION

- DO NOT install the connecting pipes until both indoor and outdoor units have been installed. Insulate both the gas and liquid piping to prevent water leakage.
- Be extra careful not to damage, dent, or deform the pipe while cutting. This will drastically reduce the heating efficiency of the unit.

1 Cut Pipes

When preparing refrigerant pipes, take extra care to cut and flare them properly. This will ensure efficient operation and minimize the need for future maintenance.

1. Use the piping kit accessory or pipes purchased locally
2. Measure the distance between the indoor and the outdoor unit
3. Cut the pipes a little longer than the measured distance

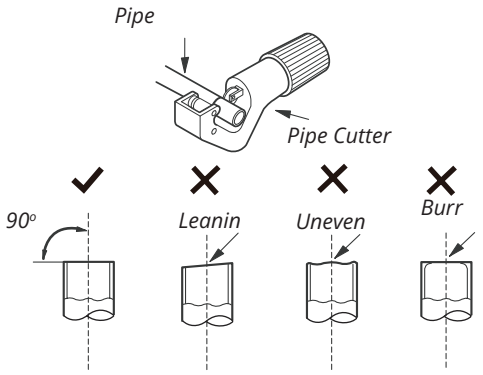


Fig. 5-1 Cut Pipes

2 Remove Burrs

Burrs can affect the air-tight seals of the refrigerant piping connection. They must be completely removed.

1. Completely remove all burrs from the cut section of pipe/tube
2. Put the end of the copper tube/pipe in a downward direction as you remove burrs in order to avoid dropping burrs into the tubing

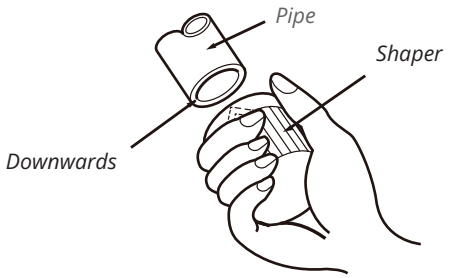


Fig. 5-2 Remove Burrs

3 Flaring Work

Carry out flaring work using flaring tool as shown in Table 7-3 & Figure 7-3.

Firmly hold the copper pipe in a die in the dimension show in Table 7-3.

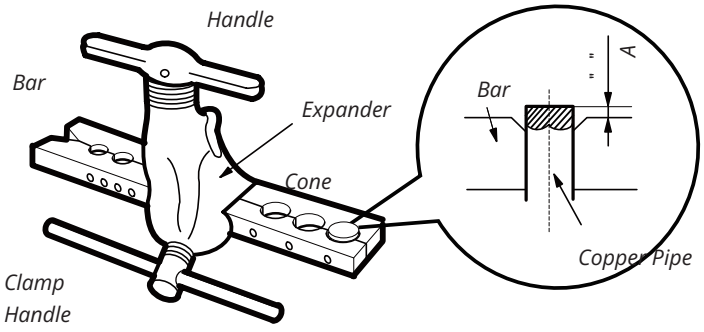


Fig. 5-3 Flaring Work

Table 5-1 Flaring Work Dimension

Outside Diameter	A
Inch	Inch
3/8″	0.03″~0.04″
3/4″	0.02″~ 0.03″
7/8″	0.02″~0.03″

4 Check

1. Compare the flared work with **Figure 7-4**
2. If the flare is defective, cut off the flared section and do the flaring work again

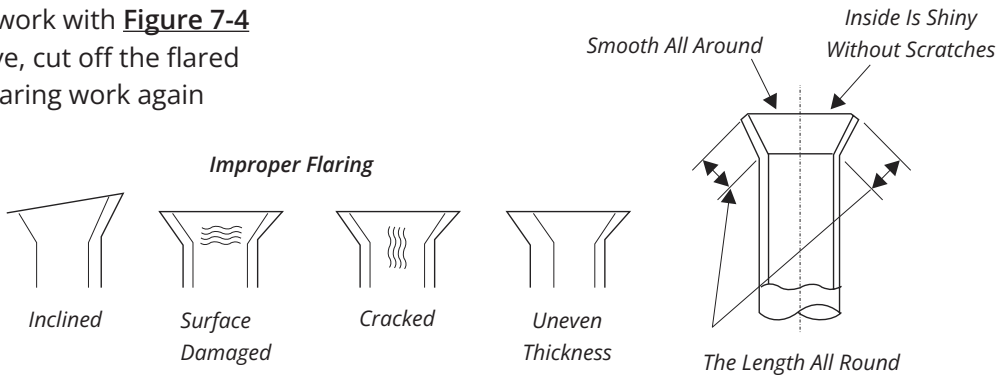


Fig. 5-4 Check Pipe

***NOTE**: Connect the copper pipes to the indoor unit first, then connect it to the outdoor unit.*

5 Pipe Connection

You should first connect the low-pressure pipe, then the high-pressure pipe.

1. Align the center of the two pipes that you will connect
2. Tighten the flare nut as tightly as possible by hand
3. Using a wrench, grip the nut on the unit tubing

***NOTE**: Use two wrenches to connect the pipe with the indoor/ outdoor pipes to avoid the copper pipe cracking.*

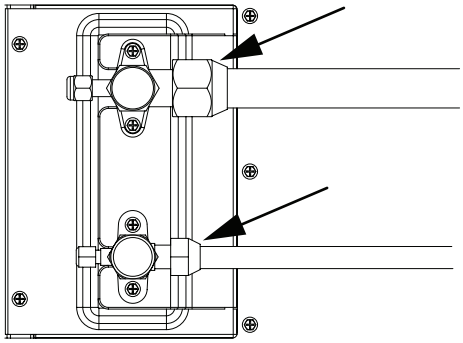


Fig. 5-5 Pipe Connection

4. While firmly gripping the nut, use a torque wrench to tighten the flare nut according to the torque values listed in **Table 5-2**.

Table 5-2 Torque Values

Connecting Pipe Size	Torque Values (lbf-in)
3/8″	327-372
3/4″	620-664
7/8″	690-735

5. Insert the connecting pipe of the indoor unit into the reamer transfer nozzle flaring of the outdoor unit, and braze the connecting port

CAUTION

- Wrap insulation around the piping. **Direct contact with the bare piping may result in burns or frostbite.**
- Make sure the pipe is properly connected. Over tightening may damage the bell mouth and under tightening may lead to leakage.

6. Insulate the piping, including the gas valve of the outdoor unit.

CAUTION

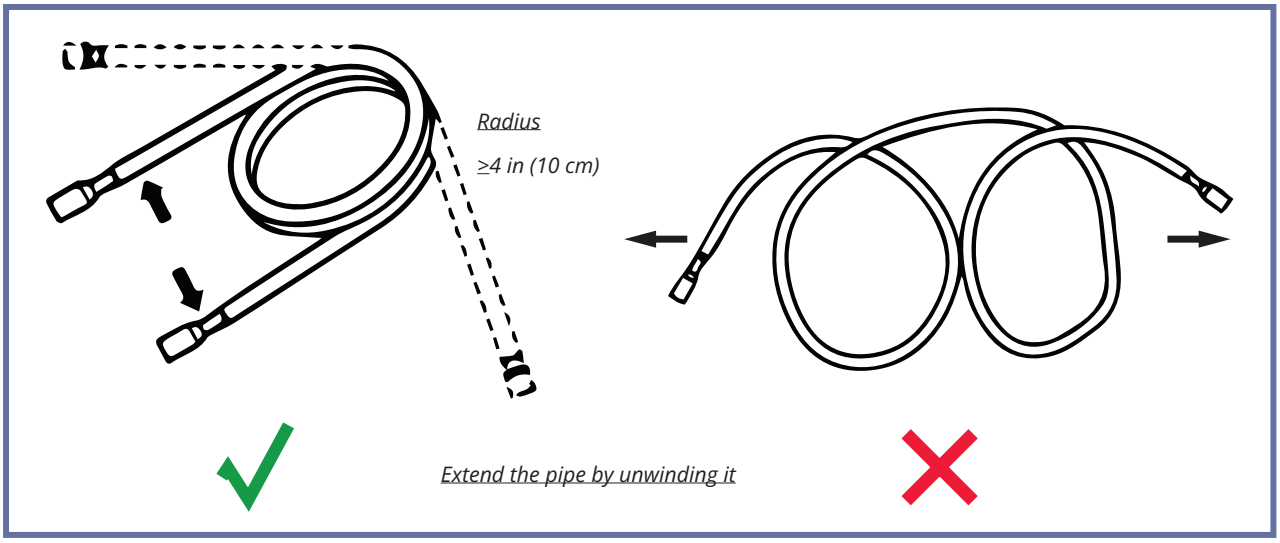
Check to make sure there is no refrigerant leak after completing the installation work. If there is a refrigerant leak, ventilate the area immediately and evacuate the system (refer to the **Air Evacuation** section of this manual)

6 Pipe Bending

1. Use your hands to bend the pipes. Work carefully not to collapse the pipes during bending.
2. If the pipe is repeatedly bent or extended, it will become hard and difficult to manipulate. Avoid bending or extending the pipe more than **3 times**.
   DO NOT bend the pipes in at an angle greater than 90°
   DO NOT bend the pipes excessively. Otherwise it will break.
   Refer to **Fig. 5-6.**

MINIMUM BEND RADIUS
When bending connective refrigerant piping, the minimum bending radius is 4 in (10 cm). **Refer to Fig. 5-6.**

Fig. 5-6 Pipe Unwinding



As shown in Fig. 5-7, use a sharp cutter to cut the pipe insulation and bend the pipe after it is exposed. After bending the pipe to the desired angle, place the insulation back on the pipe and secure it with adhesive tape.

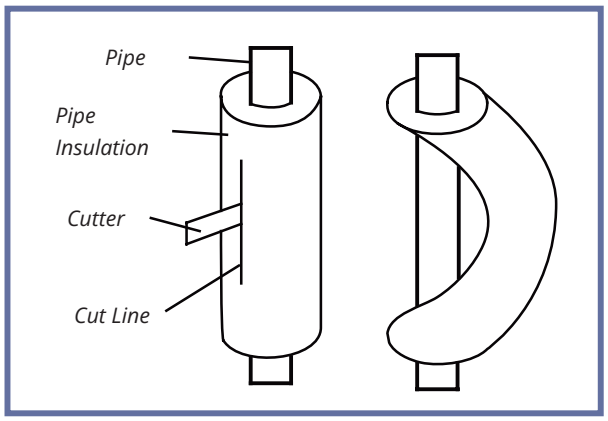


Fig. 5-7 Pipe Cutting

7 System Leak Check

Leak check is required for the brazed line connections.

1. Pressurize the brazed refrigerant lines and indoor coil to at least 150 PSIG using dry nitrogen
2. Check for leaks by using a soapy solution or bubbles at each brazed location

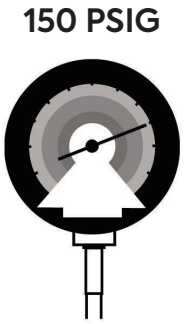


Fig. 5-8 Charge Dry Nitrogen to the System

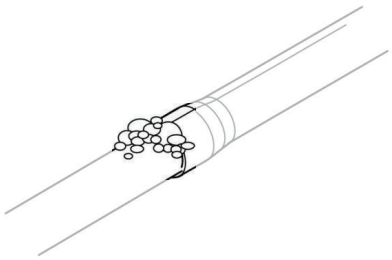


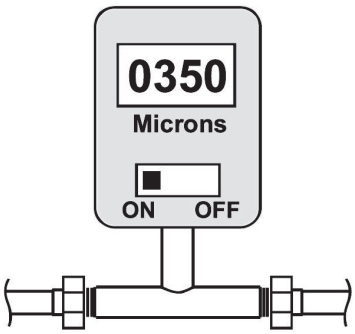
Fig. 5-9 Leak Check

8 Evacuation

Do not open the service valves until the leak check and evacuation are complete.

1. Evacuate until the micron gauge reads no higher than 350 microns, then close the valve to the vacuum pump.
2. Evacuation is complete if the micron gauge does not rise above 500 microns in one minute.

Fig. 5-10 Evacuation of the Refrigerant System





9 Service Valves

Leak check and evacuation must be completed before opening the service valves. **The Gas Service Valve must be opened BEFORE opening the Liquid Service Valve**

1. Remove service valve cap
2. Fully insert hex wrench into the stem and turn counterclockwise until the valve stem just touches the rolled edge (approximately five times)
3. Replace and tighten the valve stem cap to prevent leaks. Additional ⅙ turn may be required

Repeat steps 1-3 for the **Liquid Service Valve**.

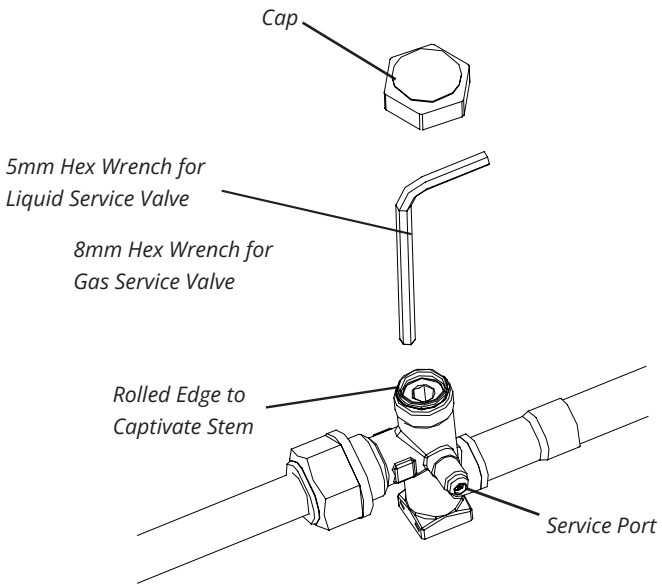


Fig. 5-11 Open the Service Valves

⚠ WARNING ⚠

Extreme caution should be exercised when opening the Liquid Service Valve. Turn counterclockwise until the valve stem just touches the rolled edge. No torque is required. Failure to follow this will result in abrupt release of system charge and may lead to personal injury and/or property damage.

FOR INSTALLATION WITH A NO-VAC® QUICK CONNECT® LINE SET, REFER TO THE NEXT SECTION

This unit is compatible with the No-Vac® Quick Connect® Line Set, enabling a Do-It-Yourself installation.*

Installation Option with MRCOOL No-Vac® Quick Connect® Line Set*

INSTRUCTIONS FOR USE WITH NO-VAC® QUICK CONNECT® LINE SET SOLD SEPARATELY. KINK RESISTANT, PRECHARGED, SIMPLE SECURE QUICK CONNECT, 100% CONNECTION GUARANTEE*

Read and follow the instructions and diagram below*:
Connections must be made exactly as specified to avoid system leaks and/or damage.

1. Take out matching male connectors M1 and M2.
2. Remove protective cap with the copper gasket at each stop valve on the **CONDENSER** and ensure the threads are clean and complete.
3. Tighten the M1 connector to the cutoff valve *1 with a tightening force of 37 ft/lb (50 Nm). Tighten the M2 connector to the cutoff valve *2 with a tightening force of 52 ft/lb (70 Nm).
4. Repeat step 3 for **AIR HANDLER** at the other end of the **LINE SET**.
5. Unroll and route the **LINE SET** between the **AIR HANDLER** and the **CONDENSER**. Bend the line set piping by hand to route the line set to suit your application. Use care when bending the line set. Refer to the **Pipe Bending** section on **page 20** for more detailed instructions on how to properly and safely bend the line set refrigerant piping, as well as the correct bend radius.
6. Remove protective caps of the valves at both ends of the **LINE SET**. Verify all threads are clean and complete.
7. Tighten the LINE SET F1 valve to the M1 Connector (attached in Step 3) with a force of 33 ft/lb (45 Nm). Tighten the LINE SET F2 valve to the M2 Connector (attached in Step 3) with a tightening force of 33 ft/lb (45 Nm).
8. Repeat this process for the **AIR HANDLER** at the other end of the **LINE SET**.
9. At the **OUTDOOR UNIT** remove the protective cap at the cutoff valve switch and open the stop/cutoff valve with a hex wrench to release refrigerant into the system. If there is any fizz, grease, or other leakage, close the valve immediately and check that Steps 3 & 7 were done properly. Otherwise, using a sponge or spray bottle, apply a soapy water solution to the connection points to check for micro leaks. If any bubbles form, it indicates there is a leak. If this occurs, close the valve immediately and check that steps 3 & 7 were done properly and re-tighten the valves and line set if necessary.
10. After the correct connection, re-tighten the cutoff valve's protection cap and cover the M1, M2, and F1, F2 connections with the gray insulating sleeve to help prevent condensation.

NOTE ON WRENCHES
The wrench sizes needed for tightening the No-Vac® Quick Connect® Line Set are listed below. Based on the availability of the wrench sizes needed, it is recommended to use two large crescent (adjustable-type) wrenches. Using one to hold the valve while using the other wrench to tighten the line set connector.

IMPORTANT
The stop/cutoff valves on the unit must be opened AFTER connecting the lines and BEFORE turning on the unit. Otherwise, operation can cause leakage and/or damage to the unit.

Fig. 6-1 Complete System Replacement Using the No-Vac® Quick Connect® Line Sets

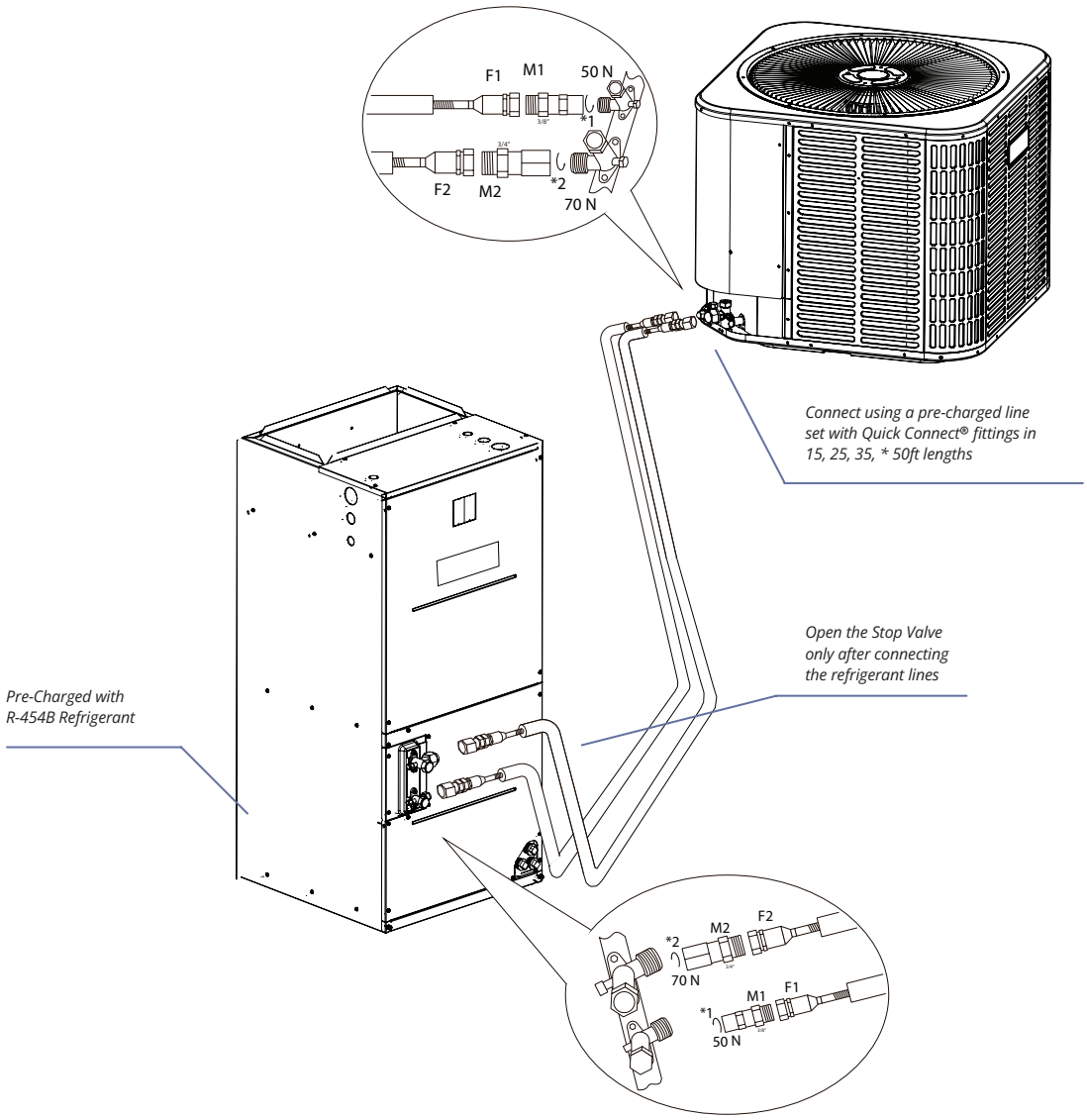


Table 6-1 Pipe & Wrench Sizing

Piping Size (Stamp on Piping)	Wrench Size Required	
	Standard	Metric
3/8″	1″	25mm
3/4″	1-3/8″	35mm
Or 2x large crescent (adjustable-type) wrenches		

Table 6-2 Allen/Hex Sizing

Allen/Hex Wrench Sizes Needed to Open Stop/Cutoff Valves	
Piping/Valve Size (Stamped on Piping	Allen Wrench Size
3/8″	5mm
3/4″	8mm

**Failure to follow the instructions provided could result in severe harm to you, this product, or other property. The manufacturer, distributer, and seller are not responsible for any harm resulting from the failure to follow instructions and the failure to these instructions will void any and all warranties express or limited.*

7. 1 Low Voltage Wire Requirement

- Define the maximum length of low voltage wiring from condensing unit to indoor unit and thermostat.
- Field installed electrical conduit is required at the low voltage wire entry point. Animals like frogs, snakes, spiders, and others may climb into the control box resulting in the PCB damage. Manufacturer reserves the rights to reject warranty claim on PCB if not complied.

Fig. 7-1 Sealing Requirement

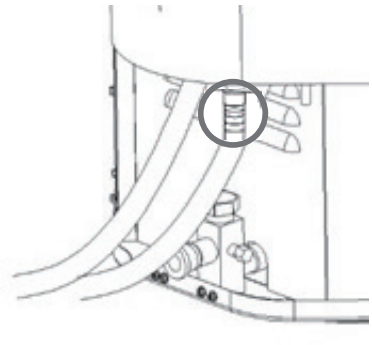


Table. 7-1 Control Wiring

Control Wiring	
Wire Size	Max. Wire Length
18 AWG	164 ft.

7. 2 Low Voltage Hook-Up Diagrams

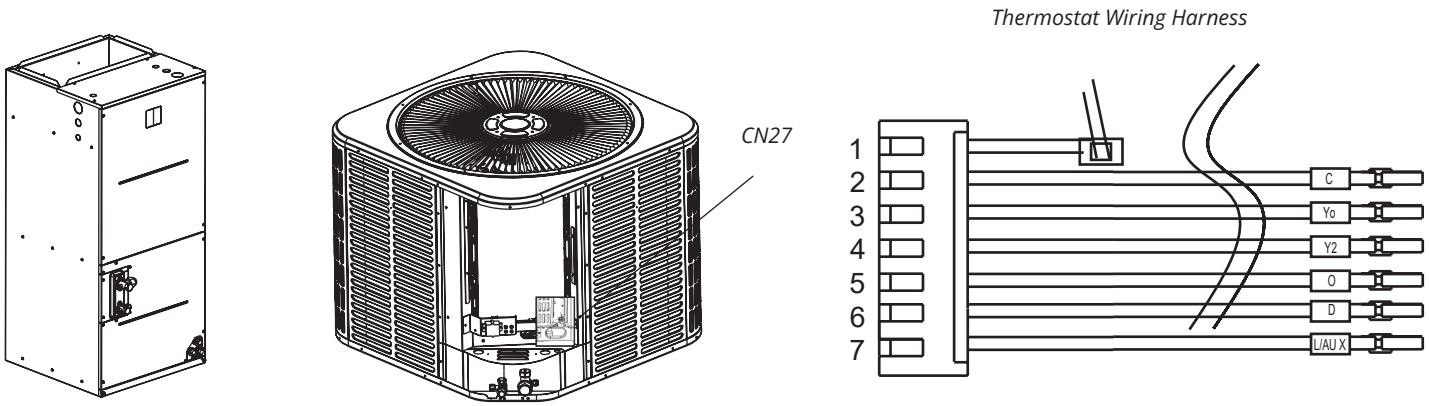
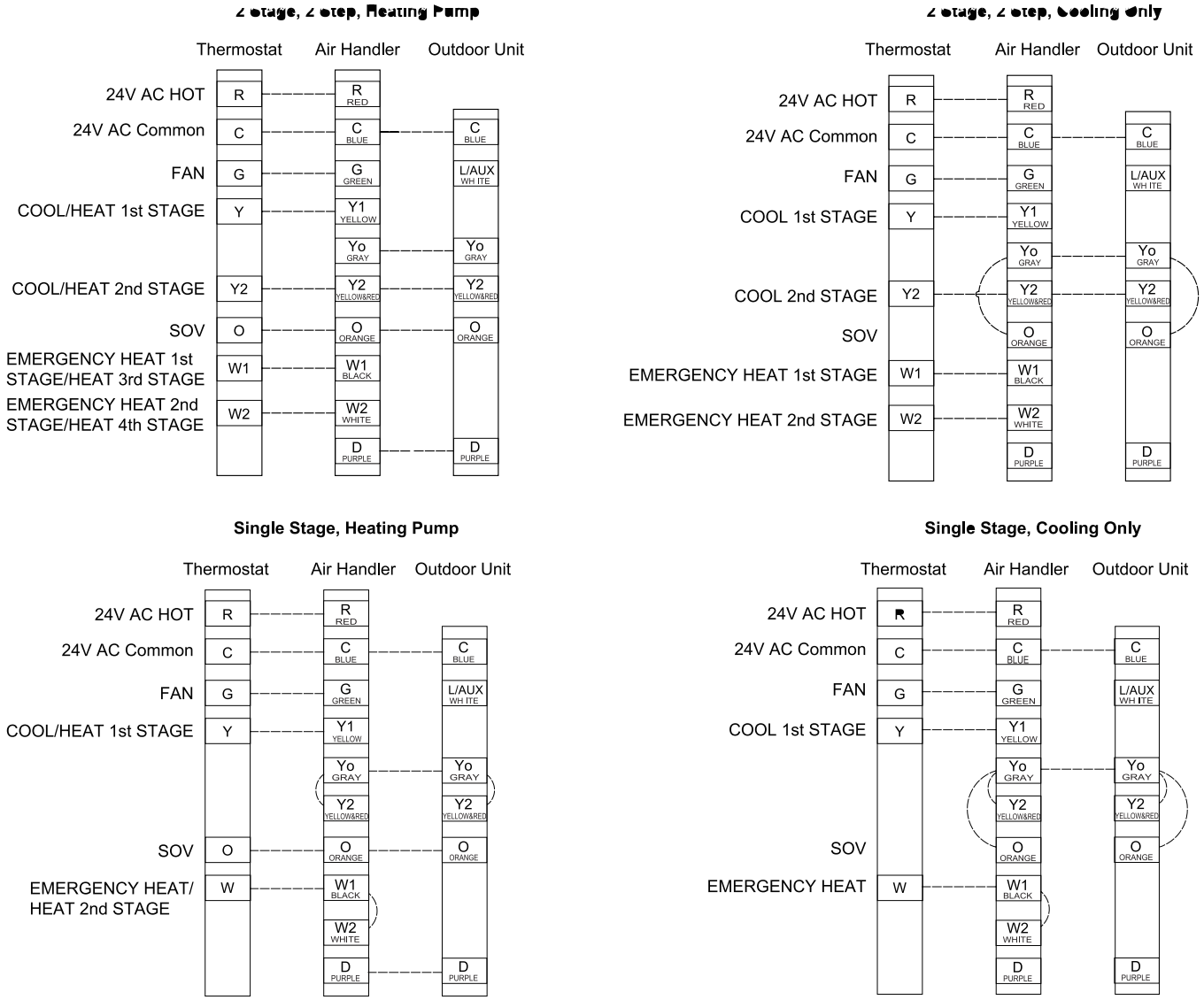


Fig. 7-2 Low Voltage Hook-Up

Class 2 low voltage control wiring should not be run in conduit with main power wiring and must be separated from power wiring, unless class 1 wire of proper voltage rating is used.

- Low voltage control wiring should be color-coded 18 AWG
- Refer to wiring diagrams attached to indoor and outdoor sections to be connected
- Make sure separation of control wiring and power wiring has been maintained

Fig. 7-3 Schematic Diagram for Control Wiring Connection



7. 3 High Voltage Power Supply

⚠ WARNING ⚠

During installation, testing, servicing, and troubleshooting of this product, it may be necessary to work with live electrical components. **Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury**.

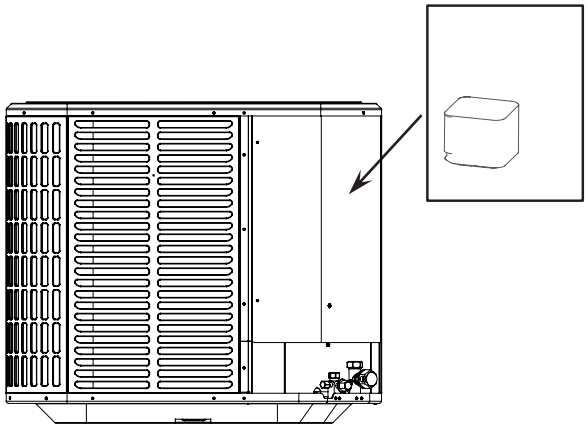


Fig. 7-4 Read the Warning Label

Table 7-2 Power Supply

Power Supply			
Model	Voltage	MCA	Breaker
TCU-24HH/DV20-C	208/230V-1Ph-60Hz	16A	25A
TCU-36HH/DV20-C		22A	35A
TCU-48HH/DV20-C		35A	60A
TCU-60HH/DV20-C		35A	60A

7. 4 High Voltage Disconnect Switch

Install a separated disconnect switch at the condensing unit. Field provided flexible electrical conduit must be used for high voltage wiring. In order to get full warranty coverage on the compressor, it's mandatory to install a surge protector to prevent damage to the unit caused by abnormal electrical spikes.

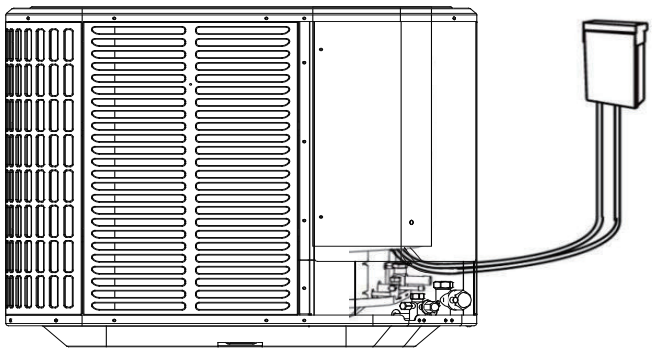


Fig. 7-5 Install an Independent Switch

7. 5 High Voltage Ground

Ground the condensing unit according to national, state, and local code requirements.

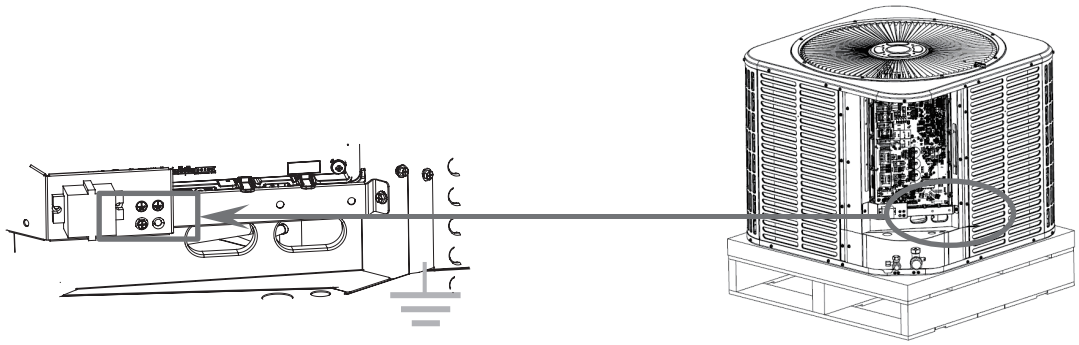


Fig. 7-6 Unit Grounding

7. 6 Electrical Diagram

Field wiring must comply with National Electric Code (C.E.C. in Canada) and any applicable local ordinances.

⚠ WARNING ⚠

Disconnect all power to the unit before installing or servicing. More than one disconnect switch my be required to de-energize the equipment. Hazardous voltage can cause severe personal injury or death.

Table 7-3 Minimum Cross-Sectional Area of Power and Signal Cables

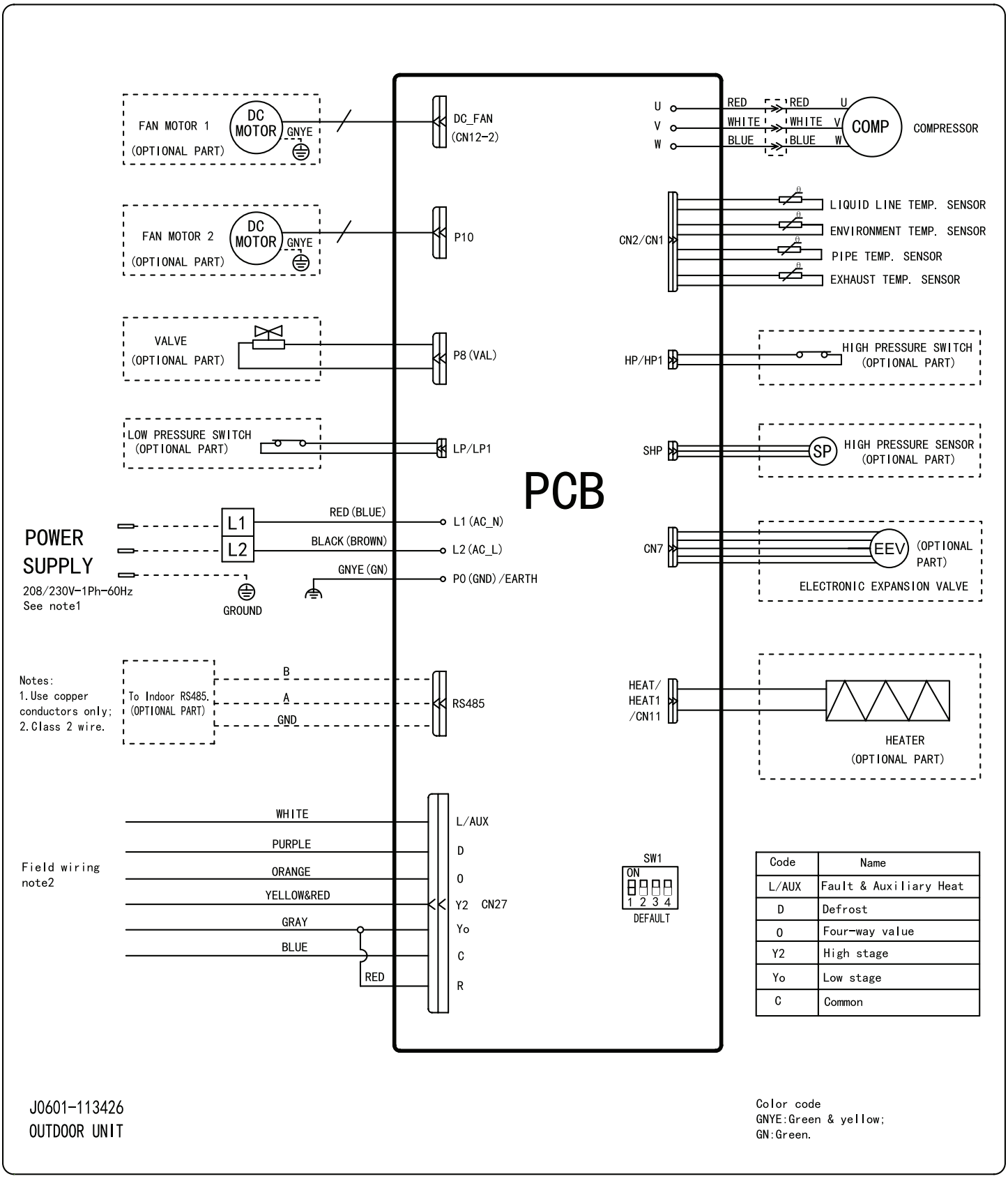
Wiring Material Ampacities	AWG
4	22
7	20
10	18
13	16
18	14
25	12
30	10
40	8
55	6
70	4

The Ampacities shown apply to appliance wiring materials with insulation rated no less than 90°C (194°F). Supply circuit power wiring must be 167°F minimum copper conductors only.

It is important that proper electrical power is available for connection to the unit model being installed. Refer to the unit nameplate, wiring diagram, and electrical data in the installation instructions.

- If required, install a branch circuit disconnect of adequate size, located within sight of and readily accessible to the unit
- When the electric heat is installed, units may be equipped with one or two 30~60 amp circuit breakers. These breakers protect the internal wiring in the event of a short circuit and serve as a disconnect. Circuit breakers installed within the unit do not provide over-current protection of the supply wiring and therefore may be sized larger than the branch circuit protection
- Supply circuit power wiring must be 167°F minimum copper conductors at least. Refer to electrical data in this section for ampacity, wire size, and circuit protector requirements. Supply circuit protective devices may be either fuses or “HACR” type circuit breakers

Figure 7-7 Electrical Diagram



Code	Name
L/AUX	Fault & Auxiliary Heat
D	Defrost
O	Four-way value
Y2	High stage
Yo	Low stage
C	Common

1. Set the thermostat to OFF
2. Turn on disconnect switch to apply power to the indoor and outdoor units
3. Wait an hour before starting the unit if the outdoor ambient temperature < 59°
4. Set the thermostat to ON

⚠ *Using the air conditioner when the temperature is beyond the specified range may cause the air conditioner protection device to start, and the air conditioner may fail to operate. If Possible, use the air conditioner in the following temperature conditions.*

Table 8-1 Temperature

Mode / Temperature	Heating	Cooling	Dry
Room Temperature	0°C~30°C (32°F~86°F)	17°C~32°C (63°F~90°F)	
Outdoor Temperature	-20°C~27°C (-5°F~80°F)	-15°C~52°C (32°F~125°F)	

With the power supply connected, if you restart the air conditioner after shutdown, or switch it to another mode during operations, the air conditioner protection device will activate. The compressor will resume operation after 3 minutes.

Table 8-2 Heating

⚠ Characteristics of Heating Operation (Applicable to Heat Pump Models) ⚠
Preheating: When the heating function is enabled, the indoor unit will take 2~5 minutes for preheating, after that the air conditioner will start heating and blows warm air.
Defrosting: During heating, when the outdoor unit frosted, the air conditioner will enable the automatic defrosting function to improve the heating effect. During defrosting, the indoor and outdoor fans stop running. The air conditioner will resume heating automatically after defrosting finish.

9.1 Default Display

LED on main control board can display the operating status of outdoor unit (ODU).

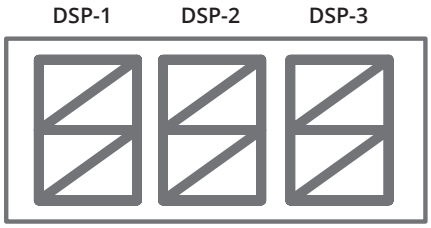


Fig. 9-1 Display

DSP1-1 / DSP1-2: Normally blank, but it displays codes accordingly if there is damaged sensor and command response.

See fault code Table 1 for details.

DSP1-3: Displays the outdoor unit's operation mode.

Table 9-1 Error Codes

Error Code	Error Content
E0	Indoor and outdoor communication failure
E1	Indoor environment temperature sensor failure
E2	Indoor fan coil temperature sensor failure
E3	Outdoor fan coil temperature sensor failure
E4	System abnormalities (low refrigerant)
E5	Model configuration errors
E6	Indoor PG/DC fan failure
E7	Outdoor environment temperature sensor failure
E8	Outdoor exhaust temperature sensor failure
E9	Outdoor IPM module failure/compressor drive failure
EA	Outdoor current sensor failure
EB	Main control board and display screen communication failure
EC	Outdoor modules communication failure
EE	Outdoor EEPROM fault
EF	Outdoor DC fan failure
EH	Outdoor air intake sensor failure
EP	Outdoor compressor shell top failure
EU	Outdoor voltage sensor failure
EJ	Outdoor middle coil temperature sensor failure

Error Code	Error Content
EN	Outdoor air pipe temperature sensor failure
EY	Outdoor liquid pipe temperature sensor failure
FA	Compressor phase current detection fault
FB	Refrigeration and heating overload protection
FC	Reduced frequency power overload protection
FE	Reduced frequency module current (compressor phase current) protection
FF	Reduced frequency module temperature protection
FH	Reduced frequency drive protection
FP	Dewdrop protection
FU	Frost protection
F0	Infrared human sensing sensor failure
F1	Electricity module failure
F2	Exhaust temperature sensor failure protection
F3	Outer pipe temperature sensor bag failure protection
F4	Refrigerant circuit abnormal protection
F5	PFC protection
F6	Compressor missing/reverse phase protection
F7	Module temperature protection
F8	Four-way valve reversing abnormal protection

Table 9-1 Error Codes (cont.)

Error Code	Error Content
F9	Module temperature sensing circuit failure
FJ	Reduced frequency exhaust protection
FN	Reduced frequency external machine AC current protection
FY	Reduced frequency lack of fluorine protection
H1	High pressure switch malfunction
H2	Low pressure switch malfunction
H3	High pressure sensor failure
H4	Low pressure sensor failure
HD	Indoor refrigerant leakage protection

Error Code	Error Content
P0	IPM module protection
P1	Over and under voltage protection
P2	Overcurrent protection
P3	Other protections
P4	Outdoor exhaust temperature too high protection
P5	Refrigeration anti-freezing protection
P6	Refrigeration anti-overheating protection
P7	Heating and anti-overheating protection
P8	Outdoor temperature too high or too low protection
P9	Compressor drive protection (abnormal load)
PA	Top outlet wind plate communication fault/ mode conflict

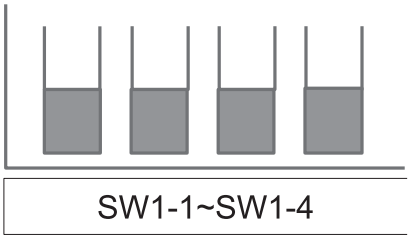
Table 9-2 DSP1-3 Descriptions

DSP1-3	Description
0	Standby
1	Ready
2	Cooling
3	Cooling
4	Oil Return Operation
5	Defrosting Operation
6	Forced Defrosting
7	Forced Cooling Operation
8	Forced Heating Operation
A	Fault
H	Dehumidification Mode Operation

DSP1-3: Displays the outdoor unit's operation mode.

9. 2 Field Setting

Fig. 9-2 Setting by Dip Switches



NOTE: The DIP switch is checked only once when the main control is powered on. After the DIP switch is powered on, it is not checked again.

Table 9-3 Dip Switches

SW1 Dip Switch		Description	
NO.	Setting Item	Status	Content
SW1-1	Single Cooling / Heat Pump	ON	AC Outdoor Unit
		Digit	HP Outdoor Unit
SW1-2	Operating Capacity	ON	Lower Capacity
		Digit	Normal Capacity
SW1-3 SW1-4	Control	ON	485 Communication
		Digit	24V ON/OFF Control

9. 3 Major Components Function

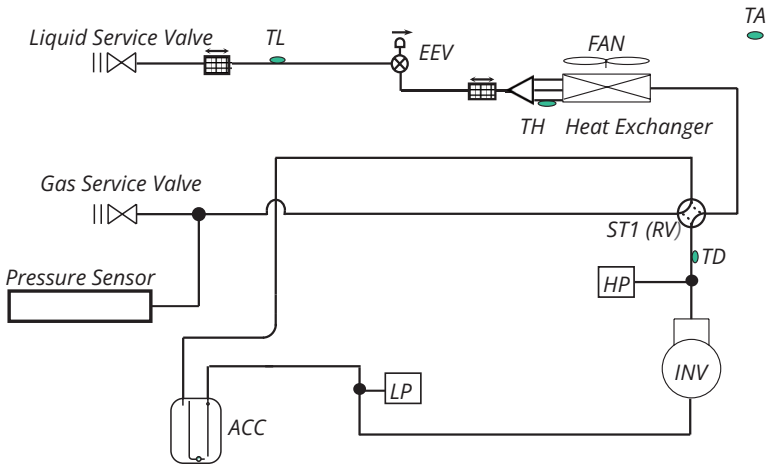


Fig. 9-3
Major Components

Table 9-4 Major Components Function

Name	Symbol	Function
Inverter Compressor	INV	Adjusts refrigerant flow rate by changing the speed (RPS) based on objective pressure
DC motor	FAN	Outputs heat exchanger capacity by adjusting the motor rotation speed based on operating pressure
Electronic Expansion Valve	EEV	1. Fully open in cooling mode and defrost operation 2. Control compressor discharge superheat in heating mode
Reversing Valve	ST1 (RV)	Switches the operation mode between heating and cooling (including defrost control)
Temperature Sensor	TH	Used to control defrost during heating operation
	TA	Used to detect outdoor air temperature and control fan speed
	TL	Used to detect liquid line temperature and calculate sub-cooling (SC)
	TD	Used to detect compressor discharge temperature and calculate discharge: superheat (DSH)
	TF	Used to detect heat sink temperature of inverter module
High Pressure Switch	HP	Used to detect high pressure
Low Pressure Switch	LP	Used to detect low pressure
Accumulator	ACC	Used to prevent the compressor from ingesting liquid refrigerant

CAUTION

If one of the following conditions occurs, switch off the power supply immediately and contact your dealer for further assistance:

- The operation light continues to flash rapidly after the unit has been restarted
- The unit continually trips fuses or circuit breakers
- A foreign object or water enters the air conditioner
- The indoor unit leaks
- Other abnormal situations

10. 1 Common Problems

The following symptoms are not a malfunction and in most situations will not require repairs.

Table 10-1 Common Problems

Problem	Possible Cause
Abnormal noises from outdoor unit	The unit will make different sounds based on its current operating mode.
Both the indoor and outdoor units make noises	The air conditioner may hum during operation. This is a normal phenomenon, which is caused by refrigerant gas flowing through the indoor and outdoor units.
	When the air conditioner is turned on, and just stopped or defrosted, a hiss may be heard. This noise is normal and is caused by refrigerant gas stopping or turning.
Unit does not turn on when pressing ON/OFF button	The unit has a 3-minute protection feature that prevents the unit from overloading. The unit cannot be restarted within three minutes of being turned off.
	Cooling and Heating Models: If the operation light and PRE-DEF (preheating/defrost) indicators are lit, the outdoor temperature is too cold and the unit's anti-cold wind is activated to defrost the unit.
The unit changes from COOL mode to FAN mode	The unit changes its setting to prevent frost from forming on the unit. Once the temperature increases, the unit will start operating again.
	The set temperature has been reached, at which point the unit turns off the compressor. The unit will resume operation when the temperature fluctuates again.
Both the indoor and outdoor units emit white mist	When the unit restarts in HEAT mode after defrosting, white mist may be emitted due to moisture generated from the defrosting process.
Dust is emitted from either the indoor or outdoor unit	The unit may accumulate dust during extended periods of non-use, which will be emitted when the unit is turned on. This can be mitigated by covering the unit during long periods of inactivity.
The unit emits a bad odor	The unit may absorb odors from the environment (such as furniture, cooking, cigarettes, etc.) which will be emitted during operations.
	The unit filters have become moldy and should be cleaned
The fan of the outdoor unit does not operate	During operation, the fan speed is controlled to optimize product operation.

10. 2 Troubleshooting Advice

When troubles occur, check the following points before contacting a repair company.

Table 10-2 Problems, Causes, Solutions

Problem	Possible Cause	Solution
The unit is not working	Power failure	Wait for the power to be restored
	The power switch is off	Turn on the power
	The fuse is burned out	Replace the fuse
	The unit's 3-minute protection has been activated	Wait three minutes after restarting the unit
Poor cooling performance	Temperature setting may be higher than the ambient room temperature	Lower the temperature setting
	The heat exchanger on the indoor or outdoor unit is dirty	Clean the affected heat exchange
	The air filter is dirty	Remove the filter and clean it according to instructions
	The air inlet or outlet of either unit is blocked	Turn the unit off, remove the obstruction, and turn it back on
	Doors and windows are open	Make sure that all doors and windows are closed while operating the unit
	Excessive heat is generated by sunlight	Close windows and curtains during periods of high heat or bright sunshine
	Low refrigerant due to leak or long-term use	Check for leaks, re-seal if necessary, and top off refrigerant
The unit starts and stops frequently	There's too much or too little refrigerant in the system	Check for leaks and recharge the system with refrigerant
	There is air, incompressible gas or foreign material in the refrigeration system	Evacuated and recharge the system with refrigerant
	System circuit is blocked	Determine which circuit is blocked and replace the malfunctioning piece of equipment
	The compressor is broken	Replace the compressor
	The voltage is too high or too low	Install a monostatic to regulate the voltage
Poor heating performance	The outdoor temperature is lower than 44.5°F	Check for leaks and recharge the system with refrigerant
	Cold air is entering through doors and windows	Make sure that all doors and windows are closed during use
	Low refrigerant due to leak or long-term use	Check for leaks, re-seal if necessary, and top-off refrigerant

COOLING & HEATING			**AESHV8T-2421BA	**AESHV9T-3621BA	**AESHV8T-4821BA	**AESHV7T-6021BA
Rated Cooling (95°F/35°C)	Capacity	Btu/h	24000	34000	47000	53000
	Cooling Capacity Range	Btu/h	7000~25000	8000~36000	9000~48000	9400~53000
	SEER2 / EER2	Btu/h.W	18.0 / 10.0	19.0 / 10.0	18.0 / 9.0	17.0 / 7.5
Rated Heating (47°F/8.3°C	Capacity	Btu/h	24000	36000	47000	53000
	HSPF2-4	Btu/h.W	8.5	9.0	9.0	8.5
Electrical Data	Voltage-Phase-Hz		208/230-1-60	208/230-1-60	208/230-1-60	208/230-1-60
	Min. Circuit Ampacity	A	16	22	35	35
	Max.Overcurrent Protection (MAX FUSE OR HACR BREAKER)	A	25	35	60	60
	Min / Max Volts	V	187/253	187/253	187/253	187/253
Max Allowed Pressure		MPa	4.3	4.3	4.3	4.3
Sound Pressure Rating		dB	67	68	70	70
Pre-Charged Refrigerant Type		Type/ oz/g	R454B / 75.84-3.52 / 2150-100	R454B / 100.53-3.52 / 2850-100	R454B / 141.09-3.52 / 4000-100	R454B / 141.09-3.52 / 4000-100
Compressor	Type / Model		Variable Rotary / GMCC	Variable Rotary / HIGHLY	Variable Rotary / HIGHLY	Variable Rotary / HIGHLY
Outdoor Motor	Brand / Type / Motor Mode		Broad-Ocean / DC / ZW511D000018L	Broad-Ocean / DC / ZW511D000018L	Broad-Ocean / DC / ZW511D000018L	Broad-Ocean / DC / ZW511D000018L
	Fin Type (code)	mm	1.2/0.095/ Hydrophilic Aluminium Louvered	1.4/0.095/ Hydrophilic Aluminium Louvered	1.4/0.095/ Hydrophilic Aluminium Louvered	1.4/0.095/ Hydrophilic Aluminium Louvered
	Tube Outside Dia. and Type	mm	7mm / Copper Tube	7mm / Copper Tube	7mm / Copper Tube	7mm / Copper Tube
Throttle Type			EEV	EEV	EEV	EEV
Valve Size	Liquid - Suction	inch	3/8-3/4	3/8-3/4	3/8-3/4	3/8-3/4
Line Set Size	Liquid - Gas	inch	3/8-3/4	3/8-3/4	3/8-7/8	3/8-7/8
Pre-Charged Standard Line Length		(m/ft)	7.5 / 25	7.5 / 25	7.5 / 25	7.5 / 25
Additional Charge		oz/ft	0.54	0.54	0.54	0.54
Lineset Length (Min - Max)		ft (m)	25(7.5)~100(30)	25(7.5)~100(30)	25(7.5)~100(30)	25(7.5)~100(30)
Max. Pipe Elevation		ft (m)	50(15)	50(15)	50(15)	50(15)
Ambient Temperature Range	Cooling	°F / °C	5 - 125°F / -15 - 52°C	5 - 125°F / -15 - 52°C	5 - 125°F / -15 - 52°C	5 - 125°F / -15 - 52°C
	Heating	°F / °C	-5 - 80°F / -20 - 27°C	-5 - 80°F / -20 - 27°C	-5 - 80°F / -20 - 27°C	-5 - 80°F / -20 - 27°C
Outdoor Unit	Dimension (W x H x D)	inch	29-1/8" × 24-15/16" × 29-1/8"	29-1/8" × 24-15/16" × 29-1/8"	29-1/8" x 33-3/16" x 29-1/8"	29-1/8" x 33-3/16" x 29-1/8"
	Packing (W x H x D)	inch	30-1/4" x 31-1/4" x 30-1/4"	30-1/4" x 31-1/4" x 30-1/4"	30-1/4" x 39-1/2" x 30-1/4"	30-1/4" x 39-1/2" x 30-1/4"
Weight (Net / Gross)		lbs	137/159	146/176	190/220	190/220

TRUINVERTER TOP DISCHARGE CONDENSER

Installation Manual

Scan here to download warranty documents or go to warrantyzonepro.com

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