Midea

Heating & Air Conditioning

INSTALLATION AND OPERATION MANUAL

CONDENSING UNITS

X DRIVE SERIES

Split System Heat Pump 2-5 Tons R454B

Up to 18 SEER2

Original instructions.

Please read this manual carefully and keep it for future reference.

All the pictures in this manual are for illustrations purpose only.

ALL PHASES OF THIS INSTALLATION MUST COMPLY WITH NATIONAL, STATE AND LOCAL CODES

⚠ WARNING

IMPORTANT — This document is customer property and is to remain with this unit. Please return to service information pack upon completion of work.
These instructions do not cover all variations in systems or provide for every possible contingency to be met in connection with the installation. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to your installing dealer or local distributor.

NOTICE

The manufacturer recommends installing only approved matched indoor and outdoor systems. All of the manufacturer's split systems are AHRI rated only and the indoor units must be matched with R454B TXV. Some of the benefits of installing approved matched indoor and outdoor split systems are maximum efficiency, optimum performance and the best overall system reliability.

CONTENTS

1 SAFETY

1.1 Safety Signs

This is the general warning sign. It is used to alert the user to potential hazards. All safety messages that follow this sign shall be obeyed to avoid possible harm.

⚠ DANGER

indicates a hazardous situation which, if not avoided, will result in death or serious injury

⚠ WARNING

indicates a hazardous situation which, if not avoided, could result in death or serious injury

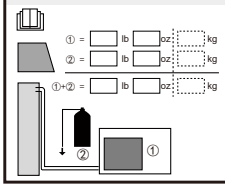
⚠ CAUTION

indicates a hazardous situation which, if not avoided, could result in minor or moderate injury

NOTICE

is used to address practices not related to physical injury

Explanation of symbols displayed on the unit

	**DANGER**	This symbol shows that this appliance used a mild flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	**WARNING**	This symbol shows that appliance shall be installed, operated and stored in a room with a floor area not less than the minimum room area.
	**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**	This symbol shows that information is available such as the operating manual or installation manual.
	**CAUTION**	This symbol shows that when addition of charge is required by the manufacturer installation instructions for completing the refrigerating system .Recorded the resulting total refrigerant charge for each refrigerating system.

1.2 Safety Precautions

Please read before proceeding

⚠ DANGER

ELECTRICAL HAZARD 380 VOLTS DC

Failure to follow this warning could result in property damage, severe personal injury, or death.

WAIT FIVE (5) MINUTES after disconnecting power prior to touching electrical components as they may hold a dangerous charge of 380 VDC,then verify DC Voltage is less than 42 VDC at inverter TEST POINTS P-N.

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NOTICE

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

This document contains a wiring diagram.
This is customer property and is to remain with this unit.

⚠ WARNING

This information is intended for use by individuals possessing adequate backgrounds of electrical and mechanical experience. Any attempt to repair air conditioning product may result in personal injury and/or property damage.

⚠ WARNING

HOT SURFACE

May cause minor to severe burning. Failure to follow this Caution could result in property damage or personal injury.
Do not touch the high-temperature components such as compressor .

⚠ DANGER

HAZARDOUS VOLTAGE

Failure to follow this warning could result in property damage, severe personal injury, or death.

Disconnect all electric power, Including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized.

⚠ WARNING

REFRIGERANT OIL

These units use R454B refrigerant. Use only R454B approved service equipment. These units use a POE oil that readily absorbs moisture from the atmosphere. To limit this 'hygroscopic' action, the system should remain sealed whenever possible. If a system has been open to the atmosphere for more than 4 hours, the compressor oil must be replaced. Never break a vacuum with air and always change the driers when opening the system for component replacement.

⚠ CAUTION

CONTAINS REFRIGERANT

Failure to follow proper procedures can result in personal illness or injury or severe equipment damage. System contains oil and refrigerant under high pressure. Recover refrigerant to relieve pressure before opening system.

Flammable refrigerant used.

⚠ WARNING

This product can expose you to chemicals including Lead and Lead components, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www. P65 Warnings.ca.gov.

⚠ CAUTION

EARTHING REQUIRED

Failure to inspect or use proper service tools may result in equipment damage or personal injury. All parts of this product that are capable of conducting electrical current are earthed. If earthing wires, screws, straps, clips, nuts, or washers used to complete a path to earth are removed for service, they must be returned to their original position and properly fastened.

⚠ WARNING

SERVICE VALVES

Failure to follow this warning will result in abrupt release of system charge and may result in personal injury and/or property damage. Extreme caution should be exercised when opening the Liquid Line Service valve. Turn valve stem counterclockwise only until the stem contacts the rolled edge.

⚠ WARNING

BRAZING REQUIRED

Failure to inspect lines or use proper service tools may result in equipment damage or personal injury. If using existing refrigerant lines make certain that all joints are brazed, not soldered.

If refrigerant gas leaks during installation, ventilate the area immediately.

Comply with national gas regulations.

⚠ WARNING

HIGH CURRENT LEAKAGE

Earthing is required before connecting electrical supply.
Failure to follow this warning could result in property damage, severe personal injury, or death.

NOTICE

INDOOR UNIT REQUIRED

The indoor units must be matched with R454B TXV. The model of R454B TXV can be changed according to the system capacity.

⚠ WARNING

RISK OF FIRE

Mild flammable refrigerant used.

Follow handling instructions carefully in compliance with national regulations.

⚠ DANGER

FIRE, EXPLOSION

Store in a well ventilated room without continuously operating flames or other potential ignition.

⚠ WARNING

Risk of electric shock. Can cause injury or death. Disconnect all remote electric power supplies before servicing.

Risk of fire mild. Flammable refrigerant used. To be repaired only by trained service personnel. Do not puncture refrigerant tubing.

Risk of fire. Dispose of properly in accordance with federal or local regulations.

Risk of fire. Consult repair manual/owner's guide before attempting to service this product. All safety precautions must be followed.

Risk of fire – auxiliary devices which may be ignition sources shall not be installed in the ductwork, other than auxiliary devices listed for use with the specific appliance. See instructions.

⚠ WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance shall be stored in a room that does not have continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).

Do not pierce or burn the unit.

Be aware that refrigerants may not contain an odour.

⚠ WARNING

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or persons who lack experience and knowledge, unless they are supervised or have been given instructions concerning the use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

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 shall only be performed as recommended by the equipment manufacturer.

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.

⚠ WARNING

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

– shall 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 shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

– The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable 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 hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall 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 shall 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, or 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 shall 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 shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the surroundings.

Where electrical components are being changed, they shall be fit according to their purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance. The following checks shall be applied to installations using flammable refrigerants:

– The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed.

– The ventilation machinery and outlets are operating adequately and are not obstructed.

– If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.

– Equipment marking must remain visible and legible. Markings and signs that are illegible shall be corrected.

Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any 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 shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until 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 shall be used. This shall be reported to the owner of the equipment so that all parties are advised. Initial safety checks shall include:

– That capacitors are discharged: this shall 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 earthing.

⚠ WARNING

Sealed electrical components shall 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 shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

Under no circumstances shall potential sources of ignition be used while searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall 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 re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated for the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

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

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

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

NOTICE: Examples of leak detection fluids are

-bubble method,

-fluorescent method agents.

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

- safely remove refrigerant following local and national regulations.

- evacuate.

-purge the circuit with inert gas.

- evacuate.

- continuously flush or purge with inert gas when using flame to open circuit; and.

- open the circuit.

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

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

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

Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant they contain.

Cylinders shall be kept upright. Ensure that the refrigeration system is grounded prior to charging the system with refrigerant.

Label the system when charging is complete (if it is not already labeled).

Take extreme care not to overfill the refrigeration system.

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

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 shall be taken in case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure ensure that:

– mechanical handling equipment is available, if required, for handling refrigerant cylinders;

– all personal protective equipment is available and being used correctly;

– the recovery process is supervised at all times by a competent person;

– recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f) Make sure that the cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate it in accordance with the manufacturer's instructions.

h) Do not overfill cylinders. (No more than 80% volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.

j) When the cylinders have been filled correctly and the process has been completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

Equipment shall be labeled stating that it has been de-commissioned and emptied of refrigerant. The label shall 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 labelled for that refrigerant (i.e.special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

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

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Do not use the air conditioner for other purposes.

In order to avoid any quality deterioration, do not use the unit for the cooling of precision instruments, food, plants, animals or works of art.

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 leak 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 this product as unsorted municipal waste. This waste should be collected separately for special treatment. Do not dispose of electrical appliances as unsorted municipal waste. Use separate collection facilities. Contact your local government for information regarding the connection systems available.

If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, harming your health and well-being.

To prevent refrigerant leak, 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 air conditioner 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 air conditioner until a service person confirms that the refrigerant leak is repaired.

Keep ventilation openings clear of obstruction.

⚠ CAUTION

Be sure the air conditioner is earthed.In order to avoid electric shock, make sure that the unit is earthed and that the earth wire is not connected to a gas or water pipe, lightning conductor or telephone earth wire.

Do not operate the air conditioner with a wet hands. An electric shock may happen.

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.

To avoid oxygen deficiency, ventilate the room sufficiently if equipment with a burner is used together with the air conditioner.

Arrange the drain hose to ensure smooth drainage. Incomplete drainage may cause wetting of the building, furniture, etc.

Never touch the internal parts of the controller. Do not remove the front panel. Some parts inside are dangerous to touch, and machine troubles may occur.

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.

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.

Storage package protection should be constructed such a way that mechanical damage to the equipment inside the package will not cause a leak of the REFRIGERANT CHARGE.

The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.

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.

The effectiveness of signs should not be diminished by too many signs being placed together.

Any pictograms used should be as simple as possible and contain only essential details.

The storage of the appliance should be in accordance with the applicable regulations or instructions, whichever is more stringent.

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.

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.

Do not install the air conditioner in a location where flammable gas may leak out. If the gas leaks out and stays around the air conditioner, a fire may break out.

⚠ WARNING

The appliance uses R454B refrigerant.

⚠ WARNING

This outdoor unit must combine the indoor unit with refrigerant leak detection device.

These instructions are exclusively intended for qualified contractors and 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.

2 ABOUT THE PRODUCT

2.1 Component Layout and Refrigerant Circuits

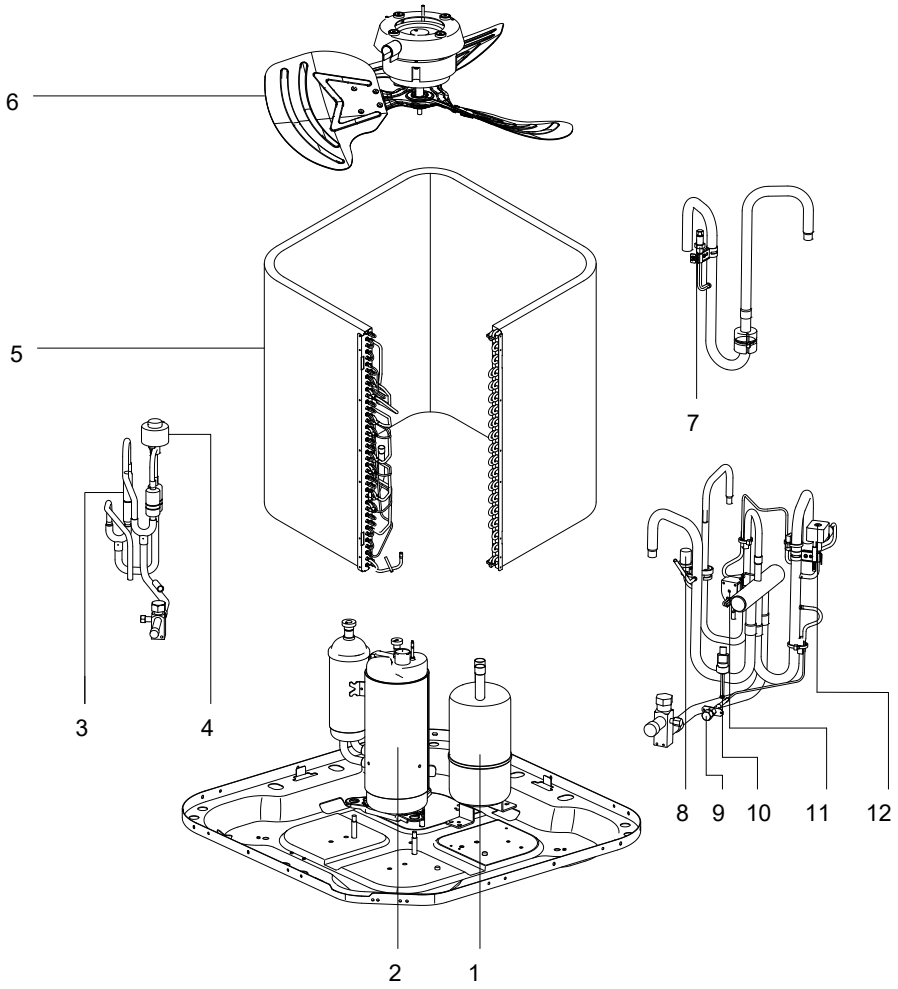


Figure 2-1

Legend			
NO.	Parts name	NO.	Parts name
1	Accumulator	7	Fusible Plug
2	Inverter Compressor	8	High Pressure Switch
3	Check Valve	9	Service Port
4	Electronic Expansion Valve	10	Pressure Transducer(PT)
5	Condenser Coil	11	Reversing Valve
6	Fan	12	Pressure Equalizer Valve

Table 2-1

2.2 Operation Range

Use the system in the following temperatures to ensure safe and effective operation. The Operating range for the heat pump is shown in Table 2-2.

If the heat pump operating conditions cannot be met, the safety protection function may be triggered and the air conditioner may malfunction.

Model	2/3/4/5 Ton	
Cooling	Ambient temperature	40 ºF - 120 ºF
Heating	Ambient temperature	3 ºF - 86 ºF

Table 2-2

2.3 Attached Fittings

Installation Fittings include the following three materials:

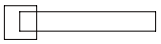
Name	Appearance	Quantity
Outdoor unit operation and installation manual		1
Zip tie		4
Conventional 24VAC non-communicating control wires		1

Table 2-3

Check if any accessory in the above figure is missing. All the accessories must be kept properly. All the fittings should be factory fittings.

3 UNIT LOCATION CONSIDERATIONS

⚠ WARNING

Ensure that apparatus is mounted securely.

3.1 Unit Dimensions

Unit Dimensions	
Models	H x W x L (Inches)
2/3 Ton	24-15/16 x 28 x 28
4/5 Ton	33-3/16 x 29-1/8 x 29-1/8

Table 3-1

The unit's weight values are on the cardboard box.

When mounting the outdoor unit on a roof, be sure the roof will support the unit's weight. Properly selected isolation is recommended to prevent sound or vibration transmission to the building structure.

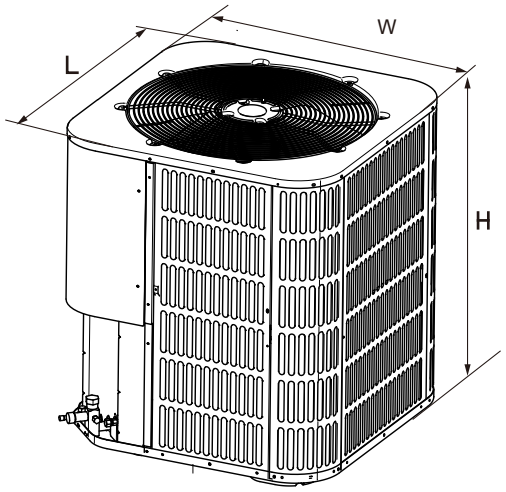


Figure 3-1

3.2 Refrigerant Line Limits

System Capacity Model	Liquid Line	Suction Line	Total Equivalent Length - Feet			
			25	50	75	100
	Inch O.D.		Maximum Vertical Separation - Feet			
2 Ton	3/8 *	3/4 Std.	25	50	45	40
		5/8 Opt.	25	50	45	40
3 Ton	3/8 *	5/8 Opt.	25	50	50	50
		3/4 Std.	25	50	50	50
4 Ton	3/8 *	7/8 Std.	25	50	50	40
		3/4 Opt.	25	50	50	40
5 Ton	3/8 *	7/8 Std.	25	50	50	40
		3/4 Opt.	25	50	50	40
		1 1/8 Opt.	25	40	N/A	N/A

Table 3-2

* Standard line size is recommended;
N/A: Application not recommended;
Refrigerant charge: refer to Sec. 16

- Maximum line equivalent length = 100 feet.
- Maximum vertical equivalent length = 50 feet.
- Use only the line diameters indicated in Table 3-2.
- If the suction line sets are greater than 50 feet, do not use a larger suction line than recommended.

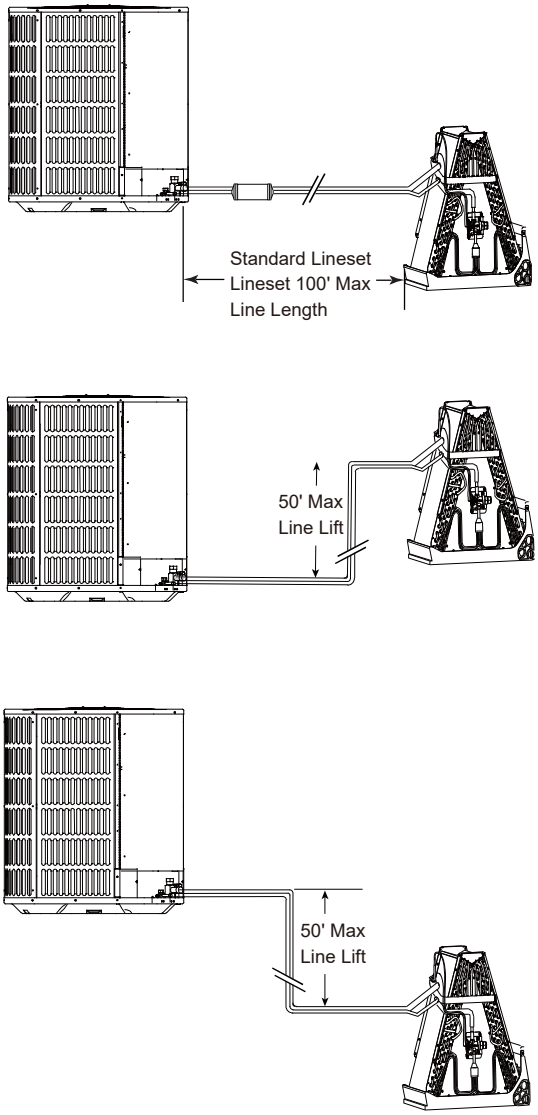


Figure 3-2

3.3 Location Restrictions

⚠ WARNING

The outdoor unit shall be located in a well-ventilated location other than the occupied space, such as in the open air.
For installation of the indoor unit, refer to the corresponding installation and operation manual.
If an indoor unit is installed in an unventilated area, the area shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard.

Ensure the top discharge area is unrestricted for at least 60 inches above the unit.

Do not locate outdoor unit near bedrooms since normal operational sounds may be objectionable.

Position unit to allow adequate space for unobstructed airflow, wiring, refrigerant lines, and serviceability.

Position the outdoor unit a minimum of 12 inches from any wall or surrounding shrubbery to ensure adequate airflow.

24 inches clearance must be provided in front of the control box (access panels) and any other side requiring service.

Maintain a distance of 24 inches. between units.

Position the unit where water, snow, or ice from roof or overhang cannot fall directly on it.

Only use this unit in well-ventilated area and ensure unit's airflow inlet and outlet would not be impeded by obstructions. Do not use this unit in the following locations:

- Locations with mineral oil.
- Locations with saline atmospheres, such as seaside locations.
- Locations with sulphurous atmospheres, such as near natural hot springs.
- Where high voltage electricity is present, such as in certain industrial locations.
- On vehicles or vessels, such as trucks or ferry boats.
- Where exposure to oily or very humid air may occur, such as kitchens.
- In proximity to sources of electromagnetic radiation, such as high-frequency transmitters or other high strength radiation devices.

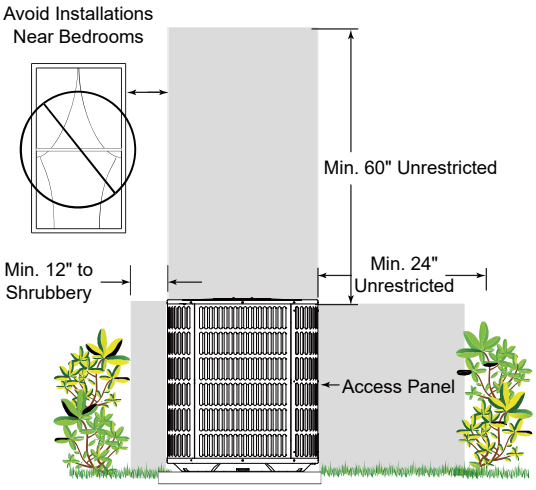


Figure 3-3

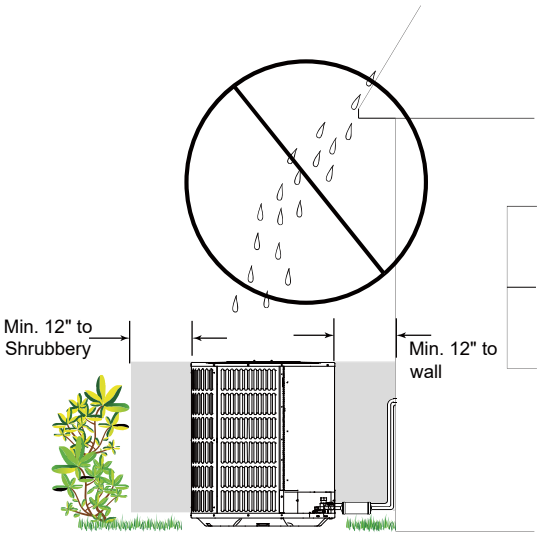


Figure 3-4

NOTICE

Precautions must be taken for units being installed in areas where snow accumulation and prolonged below-freezing temperatures occur.

- Units should be elevated 3-12 inches above the pad or rooftop, depending on local weather. This additional height will allow drainage of snow and ice melted during defrost cycle prior to its refreezing. Ensure that drain holes in unit base pan are not obstructed, which could prevent the drainage of defrost water (Figure 3-5).
- If possible, avoid locations that are prone to snow drifts. If not possible, a snow drift barrier should be installed around the unit to prevent a build-up of snow on the sides of the unit.

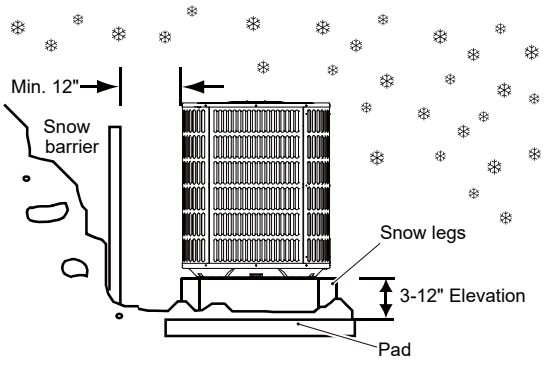


Figure 3-5

3.4 Refrigerant Charge and Room Area Limitations

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

Similarly, the total amount of refrigerant in the system shall 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.

NOTICE

The nouns in this section are explained as follows:
m_c: The actual refrigerant charge in the system.
A: the actual room area where the appliance is installed.
A_{min}: The required minimum room area.
m_{max}:The allowable maximum refrigerant charge in a room.
Q_{min} : The minimum circulation airflow.
Anv_{min}: The minimum opening area for connected rooms.
TA_{min}: The required minimum total area of the conditioned space (For appliances serving two or more rooms with an air dut system).
TA: The total area of the conditioned space connected by air ducts. (For appliances serving two or more rooms with an air dut system).

3.4.1 The room area calculation requirements

⚠ CAUTION

The space considered shall 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 shall 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.
Spaces connected by only drop ceilings, ductwork, or similar connections shall not be considered a single space.

Units mounted higher than 70-55/64 inches and spaces divided by partition walls that are no higher than 62-63/64 inches 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 A_{min}, provided all of the following conditions are met as Figure 3-6.

1) Low level opening

①The opening shall not be less than Anv_{min} in Table 3-3.
②The area of any openings above 11-13/16 inches from the floor shall not be considered in determining compliance with Anv_{min}.
③At least 50 % of the opening area of Anv_{min} shall be below 7-7/8 inches from the floor.
④The bottom of the opening is not more than 3-15/16 inches from the floor.
⑤The opening is a permanent opening that cannot be closed.
⑥For openings extending to the floor the height shall not be less than 25/32 inches above the surface of the floor covering.

2) High level opening

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

3）Room size requirement

①The room into which refrigerant can leak, plus the connected adjacent room(s) shall have a total area not less than A_{min}. A_{min} is shown in Table 3-5.
②The room area in which the unit is installed shall be not less than 20% A_{min}. A_{min} is shown in Table 3-5.

NOTICE

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 (Anv_{min}) in connected rooms is related to the room area (A), the actual refrigerant charge of refrigerant in the system (m_c) , and the allowable MAXIMUM REFRIGERANT CHARGE in the system (m_{max}), Anv_{min} can be determined according to Table 3-3.

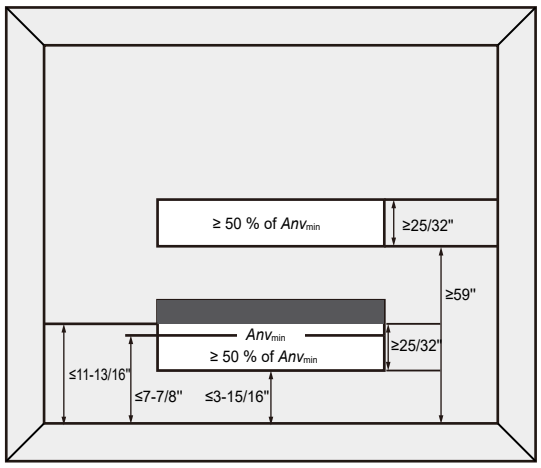


Figure 3-6 Opening conditions for connected rooms

The minimum opening area for connected rooms

A		m_c		m_{max}		Anv_{min}	
ft²	m²	lb-oz	kg	lb-oz	kg	ft²	m²
100	10	17-3	7.8	6-10	3.0	1.3	0.13
110	11	17-3	7.8	7-5	3.3	1.2	0.12
120	12	17-3	7.8	8-0	3.6	1.1	0.11
130	13	17-3	7.8	8-10	3.9	1.0	0.10
140	14	17-3	7.8	9-5	4.2	1.0	0.10
150	14	17-3	7.8	10-0	4.5	0.9	0.09
160	15	17-3	7.8	10-10	4.8	0.8	0.08
170	16	17-3	7.8	11-5	5.1	0.7	0.07
180	17	17-3	7.8	12-0	5.4	0.6	0.06
190	18	17-3	7.8	12-10	5.7	0.5	0.05
200	19	17-3	7.8	13-5	6.0	0.5	0.05
210	20	17-3	7.8	14-0	6.3	0.4	0.04
220	21	17-3	7.8	14-10	6.6	0.3	0.03
230	22	17-3	7.8	15-5	6.9	0.2	0.02
240	23	17-3	7.8	16-0	7.2	0.1	0.01
250	24	17-3	7.8	16-10	7.5	0.1	0.01
260	25	17-3	7.8	17-5	7.8	0.0	0.00

Table 3-3

NOTE: Take the m_c=17 lb 3 oz as an example.

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.

3.4.2. The allowed maximum refrigerant charge and 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 (m_{max}) and the required minimum room area (A_{min}/TA_{min}) is shown in Table 3-4 and Table 3-5.

The allowable maximum refrigerant charge

A/TA		m_{max}		A/TA		m_{max}	
ft²	m²	lb-oz	kg	ft²	m²	lb-oz	kg
30	3	2-0	0.9	150	14	10-0	4.5
40	4	2-10	1.2	160	15	10-10	4.8
50	5	3-5	1.5	170	16	11-5	5.1
60	6	4-0	1.8	180	17	12-0	5.4
70	7	4-10	2.1	190	18	12-10	5.7
80	8	5-5	2.4	200	19	13-5	6.0
90	9	6-0	2.7	210	20	14-0	6.3
100	10	6-10	3.0	220	21	14-10	6.6
110	11	7-5	3.3	230	22	15-5	6.9
120	12	8-0	3.6	240	23	16-0	7.2
130	13	8-10	3.9	250	24	16-10	7.5
140	14	9-5	4.2	260	25	17-5	7.8

Table 3-4

The required minimum room area

m_c		A_{min}/TA_{min}		m_c		A_{min}/TA_{min}	
lb-oz	kg	ft^2	m^2	lb-oz	kg	ft^2	m^2
2-2	1.0	33.1	3.1	10-2	4.6	152.1	14.2
2-9	1.2	39.7	3.7	10-9	4.8	158.7	14.8
3-0	1.4	46.3	4.4	11-0	5.0	165.3	15.4
3-7	1.6	52.9	5.0	11-7	5.2	171.9	16.0
3-15	1.8	59.5	5.6	11-14	5.4	178.5	16.6
4-6	2.0	66.1	6.2	12 -5	5.6	185.1	17.2
4-13	2.2	72.7	6.8	12-12	5.8	191.7	17.9
5-4	2.4	79.3	7.4	13-3	6.0	198.4	18.5
5-11	2.6	86.0	8.0	13-10	6.2	205.0	19.1
6-2	2.8	92.6	8.7	14-1	6.4	211.6	19.7
6-9	3.0	99.2	9.3	14-8	6.6	218.2	20.3
7-0	3.2	105.8	9.9	14-15	6.8	224.8	20.9
7-7	3.4	112.4	10.5	15-6	7.0	231.4	21.5
7-15	3.6	119.0	11.1	15-14	7.2	238.0	22.2
8-6	3.8	125.6	11.7	16-5	7.4	244.6	22.8
8-13	4.0	132.2	12.3	16-12	7.6	251.2	23.4
9-4	4.2	138.8	12.9	17-3	7.8	257.9	24.0
9-11	4.4	145.5	13.6				

Table 3-5

The minimum circulation airflow

m_c		Q_{min}		m_c		Q_{min}	
lb-oz	kg	CFM	m^3/h	lb-oz	kg	CFM	m^3/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				

Table 3-6

⚠ CAUTION

The allowable maximum refrigerant charge of the Table 3-4 or the required minimum room area of the Table 3-5 is available only if the following conditions are met:
Minimum velocity of 3.28 ft/s, which is calculated as the indoor unit airflow divided by the nominal face area of the outlet. And the grill area shall not be deducted.
Minimum airflow rate must meet the corresponding values in Table 3-6, which is related to the actual refrigerant charge of the system (m_c).
R454B refrigerant leakage sensor is configured.

NOTICE

The maximum refrigerant limit described above applies to unventilated areas. If adding additional measures, such as areas with mechanical ventilation or natural ventilation, The maximum refrigerant charge can be increased or the minimum room area can be reduced.
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 3-4 or Table 3-5.

⚠ CAUTION

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 Table 3-3, 3-4, 3-5, 3-6.

- Installation scheme flow chart

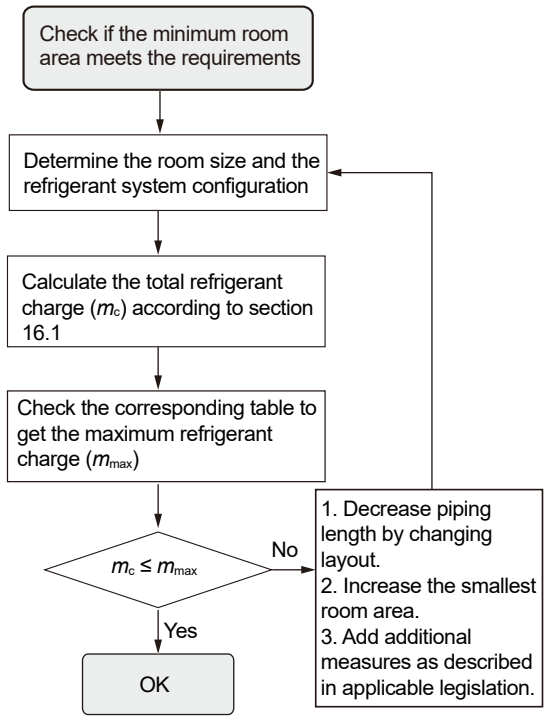


Figure 3-7

4 UNIT PREPARATION

4.1 Prepare the Unit for Installation

- Check for damage and report promptly to the carrier any damage found to the unit (Figure 4-1).
- The charge port can be used to ensure the refrigerant charge has been retained during shipment.

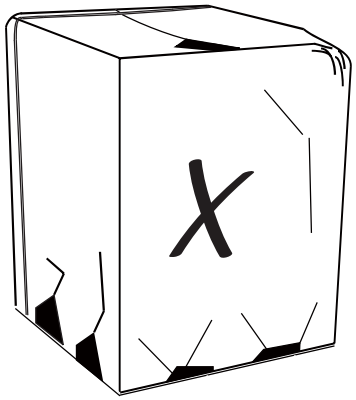


Figure 4-1

⚠ WARNING

The appliance shall be stored so as to prevent mechanical damage from occurring.

5 SETTING THE UNIT

5.1 Pad Installation

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

- The pad must be at least 1-2 inches larger than the unit on all sides.
- The pad must be separated from any structure.
- The pad must be level.
- The pad must be high enough above grade to allow for drainage.
- The pad location must comply with National, State, and Local codes.

NOTICE

These instructions are intended to provide a method to tie-down a system to a cement slab as a securing procedure for high wind areas. Check local codes for tie-down methods and protocols.

⚠ WARNING

The outdoor unit suction pipe service valve and liquid pipe service valve need to be protected. Do not grab them when moving the outdoor unit.

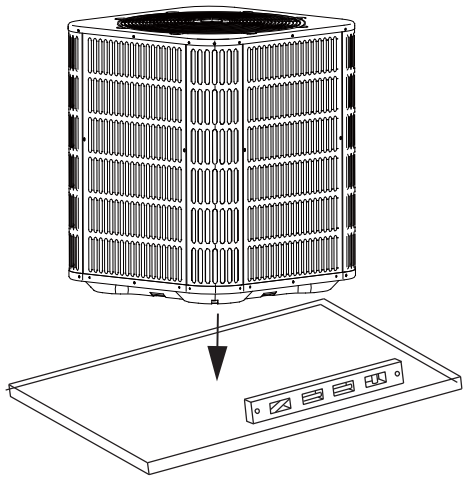
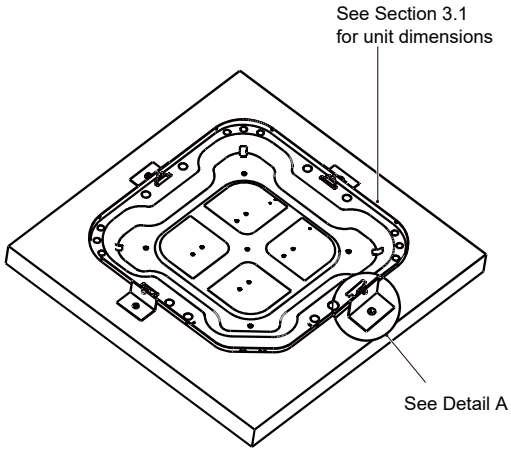


Figure 5-1



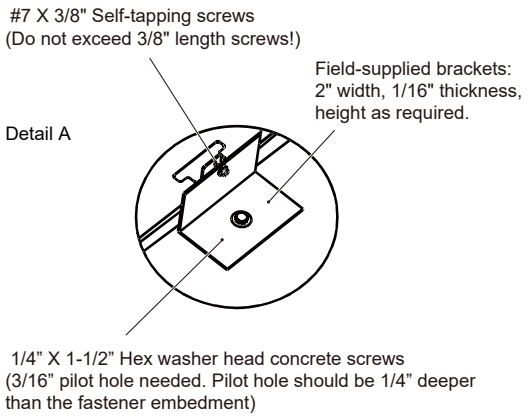


Figure 5-2

6 REFRIGERANT LINE CONSIDERATIONS

6.1 Refrigerant Line and Service Valve Connection Sizes

Models	Suction Line	Liquid Line	Suction Line Connection	Liquid Line Connection
	Dimensions in inches			
2/3 Ton	3/4	3/8	3/4	3/8
4/5 Ton	7/8	3/8	7/8	3/8

Table 6-1

6.2 Required Refrigerant Line Length

Determine required line length (Figure 6-1). Refer to Section 3.2.

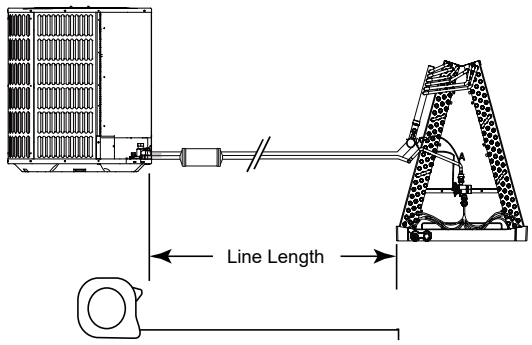


Figure 6-1

6.3 Refrigerant Line Insulation

NOTICE

The Suction Line must always be insulated. DO NOT allow the Liquid Line and Suction Line to come in direct (metal to metal) contact.

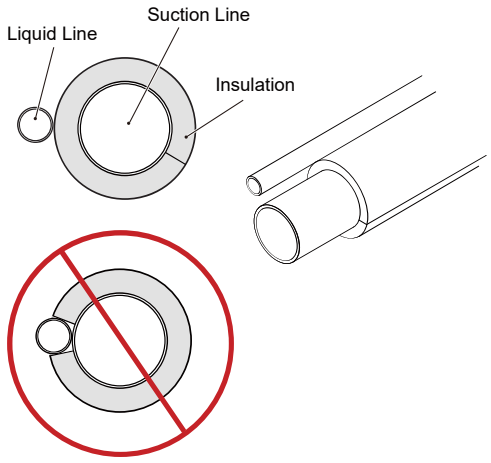


Figure 6-2

6.4 Reuse Existing Refrigerant Lines

⚠ CAUTION

If using existing refrigerant lines, make certain 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 size of the refrigerant lines is correct. Refer to Section 3.2 and Table 6-1.
- Ensure that the refrigerant lines are free of leaks, acid, and oil.
- If the existing tube has been used with another refrigerant (e.g. R410A), should not be used.

7 REFRIGERANT LINE ROUTING

7.1 Precautions

NOTICE

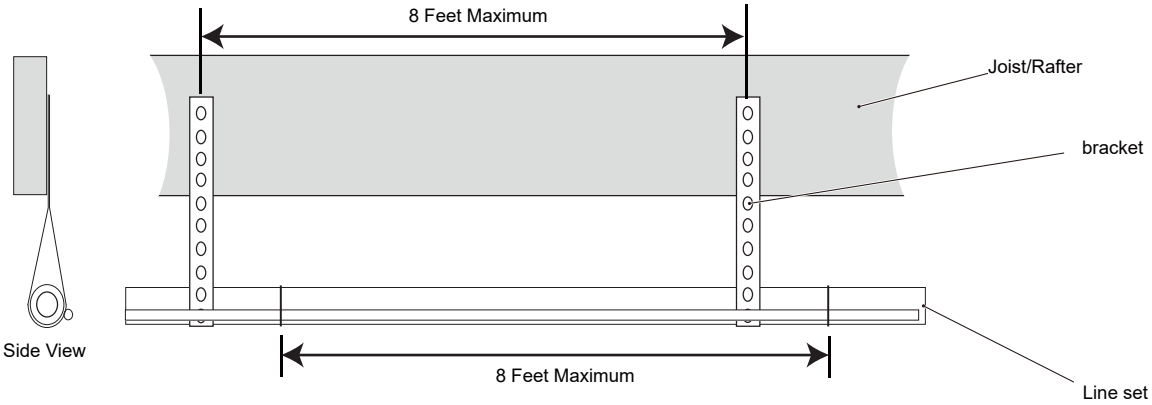
Take precautions to prevent noise within the building structure due to vibration transmission from the refrigerant lines. For example:

- When the refrigerant lines have to be fastened to floor joists or other framing in a structure, use isolation type hangers.
- Isolation hangers should also be used when refrigerant lines are run in stud spaces or enclosed ceilings.
- Where the refrigerant lines run through a wall or sill, they should be insulated and isolated.
- Isolate the lines from all ductwork.
- Minimize the number of 90º turns.

Comply with National, State, and Local codes when isolating line sets from joists, rafters, walls, or other structural elements.

⚠ WARNING

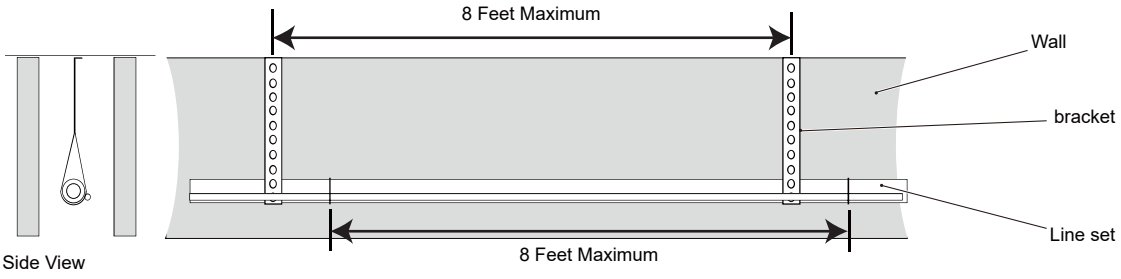
The pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code. Inspection prior to being covered or enclosed,or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.



Secure Suction Line from joists using brackets every 8 ft. Secure Liquid Line directly to Suction Line using tape, wire, or other appropriate method every 8 ft.

Brackets from Joist/Rafter

Figure 7-1



Secure Suction Line using brackets every 8 ft. Secure Liquid Line directly to Suction Line using tape, wire, or other appropriate method every 8 ft.

Brackets on Walls

Figure 7-2

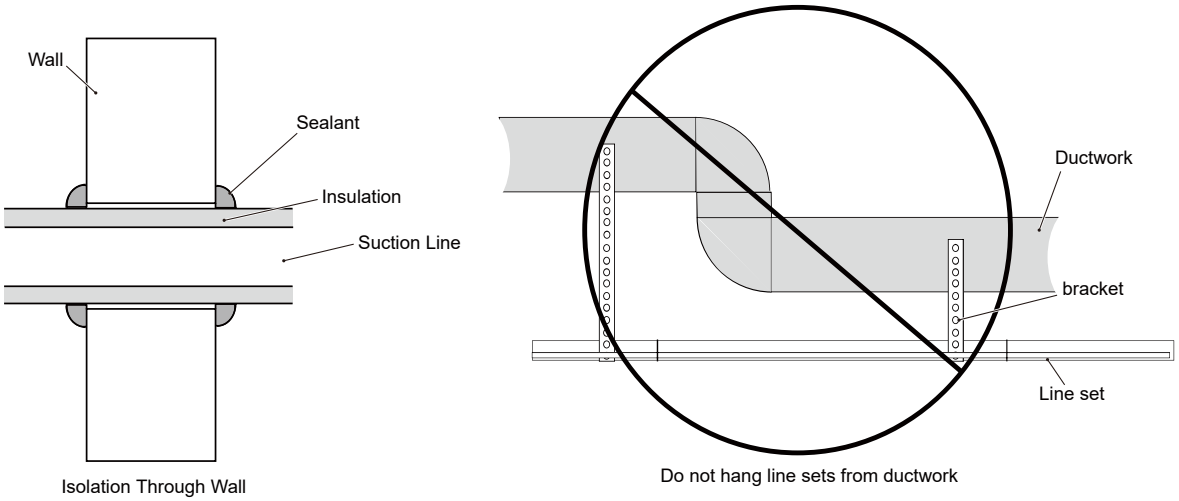


Figure 7-3

8 REFRIGERANT LINE CONNECTION

8.1 Connection the Refrigerant Lines

⚠ WARNING

Pipe work and installation shall be in compliance with national codes ASHRAE15.

The installation of pipe-work shall be kept to a minimum.

It is recommended to install a filter dryer，the filter drier should be installed in the liquid line between the outdoor unit's liquid line service valve and the indoor coil's metering device. The filter dryer should compatible with R454B refrigerant.

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 shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts. A vacuum valve shall be provided 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 refabricated.
- 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 inspection and tests.

9 REFRIGERANT LINE BRAZING

9.1 Braze the Refrigerant Lines

1. Remove caps or plugs. Use a deburring tool to deburr the pipe ends. Clean both internal and external surfaces of the tubing using an emery cloth.

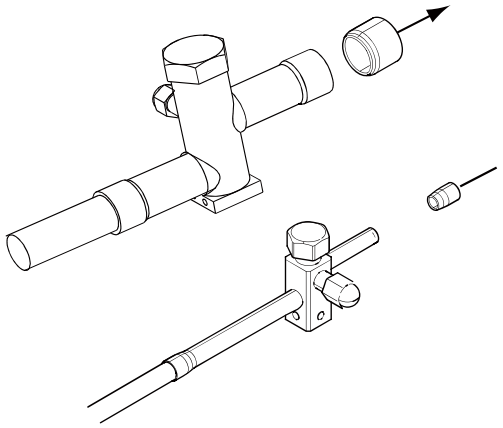


Figure 9-1

2. Remove the pressure tap cap from both service valves.

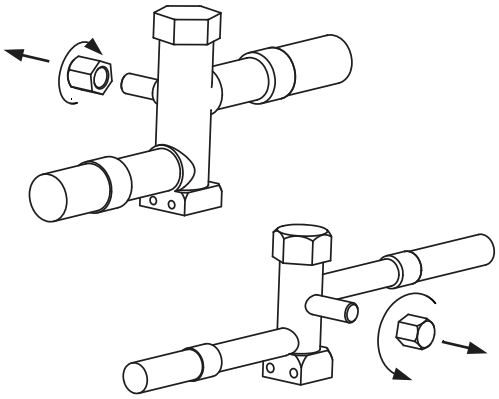


Figure 9-2

3. Purge the refrigerant lines and indoor coil with dry nitrogen.

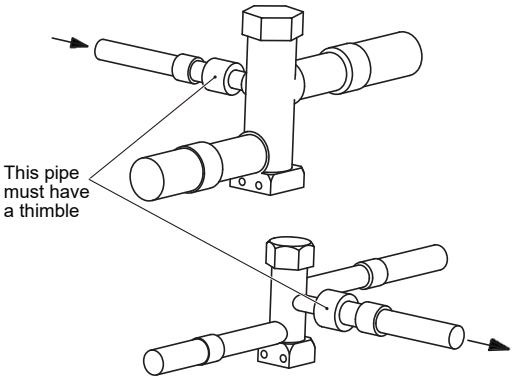


Figure 9-3

4. Wrap a wet rag around the valve body to avoid heat damage and continue the dry nitrogen purge (Figure 9-4).

   Braze the refrigerant lines to the service valves.

   Continue the dry nitrogen purge. Do not remove the wet rag until all brazing is completed.

NOTICE

Remove the wet rag before stopping the dry nitrogen purge.

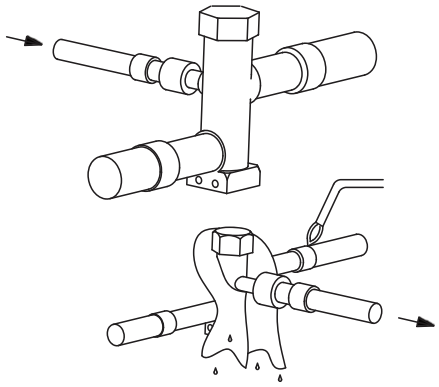


Figure 9-4

5. Replace the pressure tap caps with the torque of 6 ft.lb after the service valves have cooled.

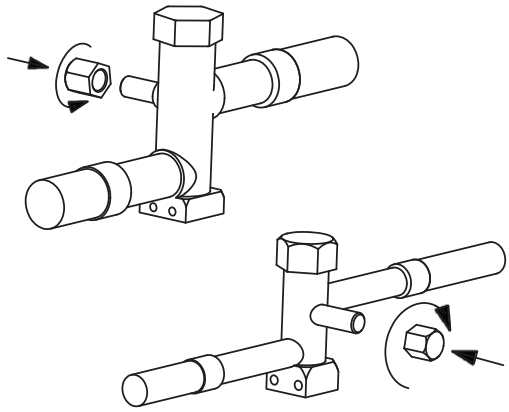


Figure 9-5

10 REFRIGERANT LINE LEAK CHECK

10.1 Check for Leaks

1. Pressurize the refrigerant lines and indoor heat exchanger coil to 250 psig using dry nitrogen.

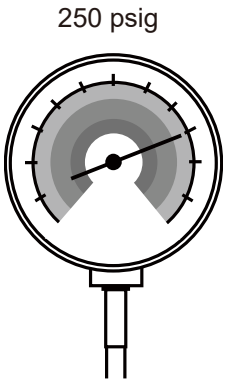


Figure 10-1

2. Check for leaks by using bubbles or refrigerant leak detector at each brazed location.

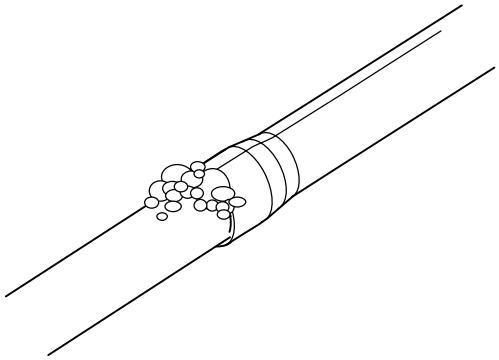


Figure 10-2

⚠ WARNING

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

11 EVACUATION

11.1 Evacuate the Refrigerant Lines and Indoor Coil

NOTICE

Do not open the service valves until the refrigerant lines and indoor coil leak check and evacuation are complete.

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

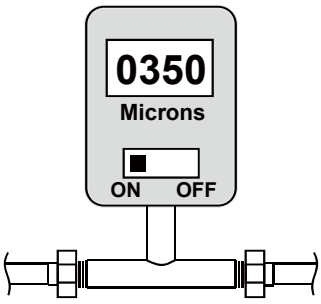


Figure 11-1

2. Observe the micron gauge. Evacuation is complete if the micron gauge does not rise above 500 microns in one (1) minute.

   Once evacuation is complete, turn off the vacuum pump and micron gauge, and close the valves on the manifold gauge set.

Figure 11-2

12 SERVICE VALVES

12.1 Open the Service Valves

⚠ WARNING

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

NOTICE

Leak check and evacuation must be completed before opening the service valves. The brazed line set valves should be used for leak checking and vacuuming. Using the separate suction port for this process will result in loss of charge.

The Suction Service Valve must be opened first BEFORE opening the Liquid Service Valve.

1. Remove Service Valve Cap (Figure 12-1).
2. Fully insert hex wrench into the stem and back out counterclockwise until valve stem just touches the rolled edge (approximately five (5) turns.)
3. Replace the Valve Stem Cap to prevent leaks. Tighten finger tight plus an additional 1/6 turn.
4. Repeat STEPS 1 - 3 for Liquid Service Valve.

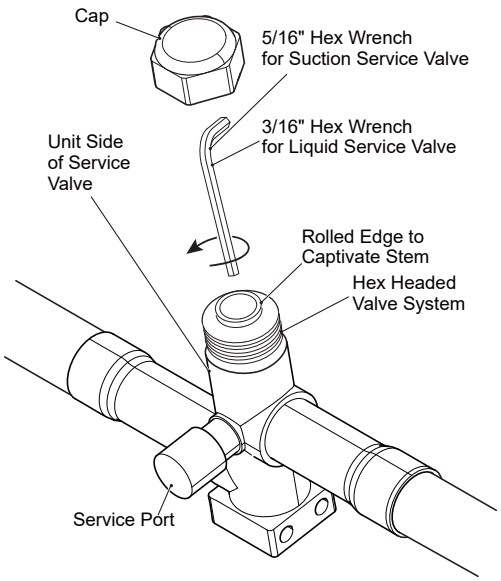


Figure 12-1

13 ELECTRICAL - LOW VOLTAGE

In the U.S.A., wiring must conform with current local codes and the current National Electric Code (NEC). In Canada, wiring must conform with current local codes and the current Canadian Electrical Code (CEC).

⚠ WARNING

Installation and servicing of air conditioning equipment can be hazardous due to internal refrigerant pressure and live electrical components. Only trained and qualified service personnel should install or service this equipment. Installation and service performed by unqualified persons can result in property damage, personal injury, or death.

Risk of electrical shock. Disconnect all remote power supplies before installing or servicing any portion of the system. Failure to disconnect power supplies can result in property damage, personal injury, or death.

⚠ CAUTION

The connectors of PQ communication wires and conventional 24VAC non-communicating control wires must be connected reliably and protected by insulation.

The wires unused should be insulated, and the copper wires should not be exposed.

Sharp metal edges can cause injury. When installing the unit, use care to avoid sharp edges.

Avoid sharp metal edges for wires to prevent wear, or it may lead to short circuit or electric leakage and cause danger.

NOTICE

Electrostatic discharge can affect electronic components. Take care during unit installation and service to protect the unit's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the unit, the control and the technician at the same electrostatic potential. Touch hand and all tools on an unpainted unit surface before performing any service procedure to neutralize electrostatic charge.

Do not connect the power cords (high voltage) to the PQ communication wires or conventional 24VAC non-communicating control wires (low voltage), otherwise it will damage the control board.

Tighten the zip tie after connecting the wires to prevent small animals from entering the electric control box and causing damage.

The PQ communication wires and conventional 24VAC non-communicating control wires should be fixed well. Otherwise, the connectors may be loose or the terminal may be damaged when they are pulled.

The PQ communication wires must be routed as close as possible. Otherwise, the communication may be abnormal.

When there is strong electromagnetic interference in the environment, it is recommended to use shielded wires for PQ communication wires.

Otherwise, the communication may be abnormal. When the shielded wires are used, the shielding layers at both ends must be connected to earth.

Power cords and communication wires and conventional 24VAC non-communicating control wires must be separated from each other with a distance of more than 2 inches. Otherwise, the communication may be abnormal.

The PQ communication wires and conventional 24VAC non-communicating control wires connectors are SELV connection points.

13.1 Low Voltage Wires Maximum Length

Table 13-1 defines the maximum total length of low voltage wires from the outdoor unit to the indoor unit.

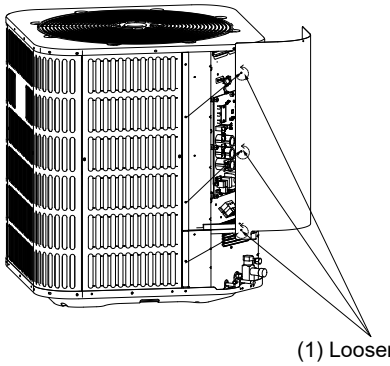
Conventional 24VAC Non-communicating Control Wires	
Wires Size	Max Length
18 AWG	150 ft
16 AWG	225 ft
PQ Communication Wires	
Wires Size	Max Length
16/18 AWG	150 ft

Table 13-1

13.2 Low Voltage Wires Connections

The PQ communication mode can be used when connecting an indoor unit which has PQ communication function. The conventional 24VAC non-communicating control mode can be used when connecting any indoor unit with a R454B refrigerant sensor.

1. Remove the electrical control box panel.



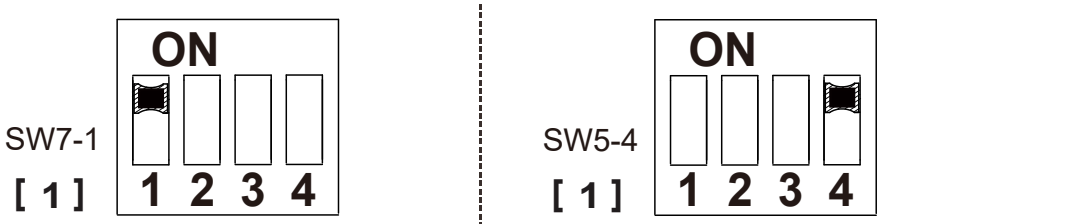
(1) Loosen seven screws on both sides
(2) Remove the electrical control box panel

Figure 13-1

2. Connect the PQ communication wires to use the communication mode or connect the conventional 24VAC non-communicating control wires to use the non-communicating mode.

2. 1 PQ communication wires connections.

2.1.1 Communication mode setup

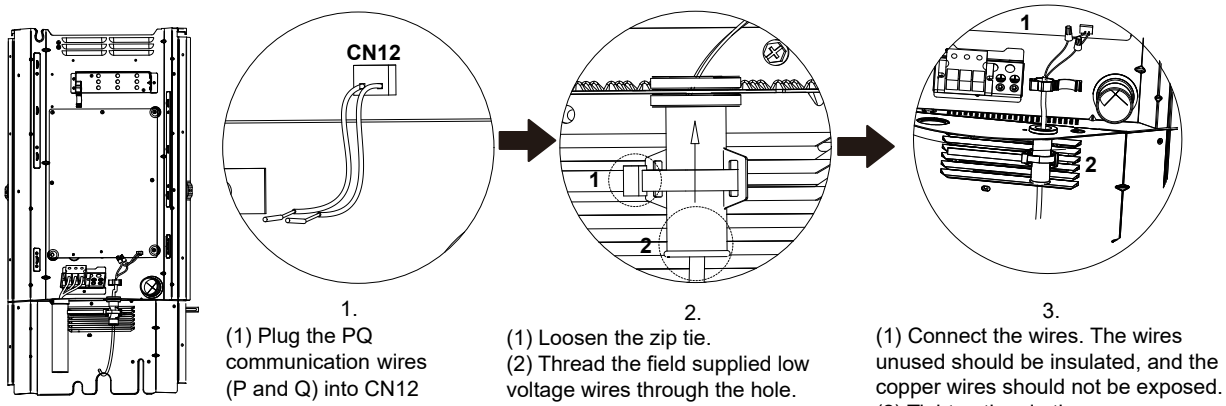


indoor unit dipswitch SW7-1 is in ON position

outdoor unit dipswitch SW5-4 is in ON position

Figure 13-2

2.2.2 To connect the PQ communication wires, firstly peel off the half-stripped wires of the pre-installed communication wires. Then thread the field supplied low voltage wires through the hole. Finally connect the PQ communication wires (P and Q) to the two field supplied wires.Arrange the low voltage wires (refer to the cautions and note above), and tighten the zip tie.



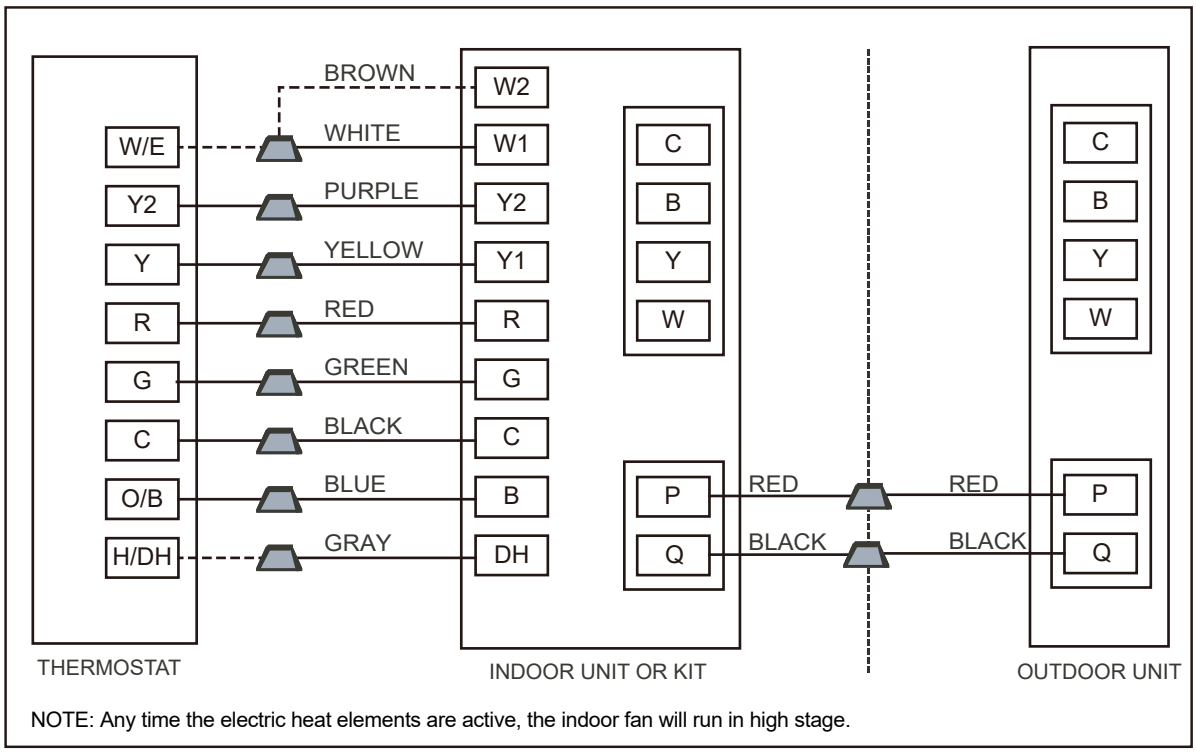
1.
(1) Plug the PQ communication wires (P and Q) into CN12 on the control board.
(2) Peef off the half-stripped wires.

2.
(1) Loosen the zip tie.
(2) Thread the field supplied low voltage wires through the hole.

3.
(1) Connect the wires. The wires unused should be insulated, and the copper wires should not be exposed.
(2) Tighten the zip tie.

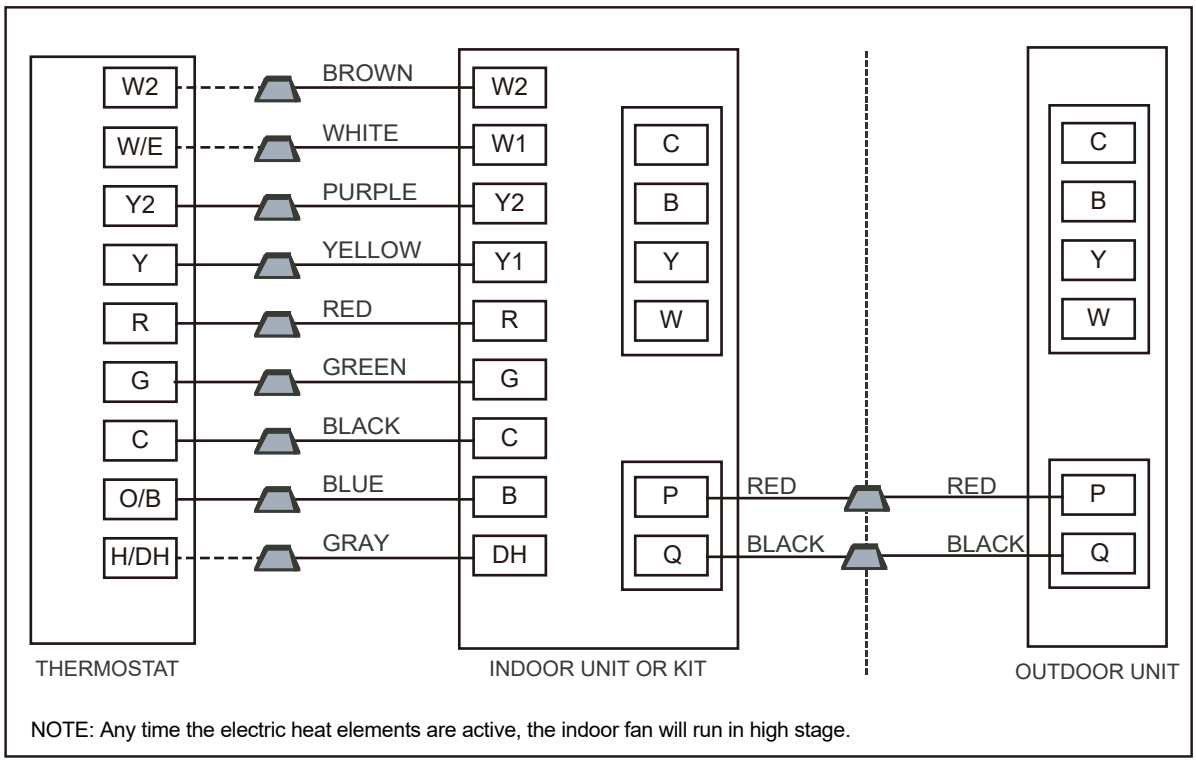
Figure 13-3

- PQ communication wires connections diagram.



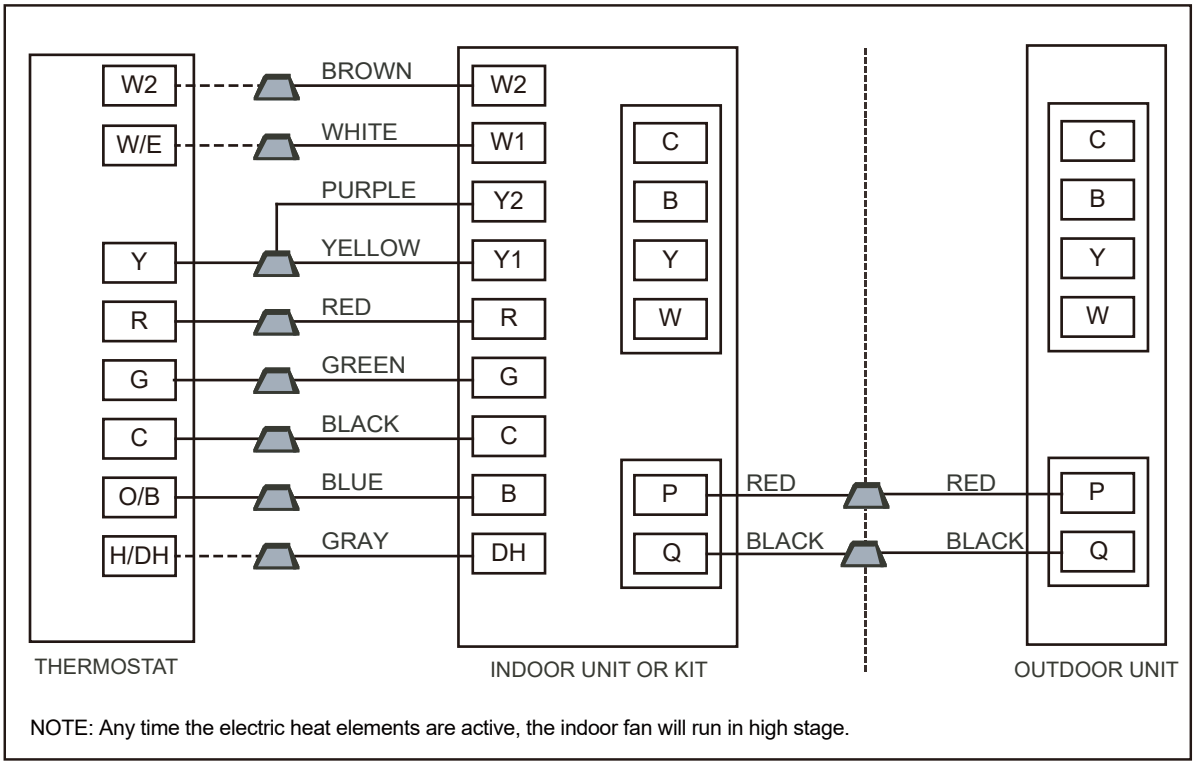
NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 13-4 3H and 2C Thermostat Communication Mode Setup



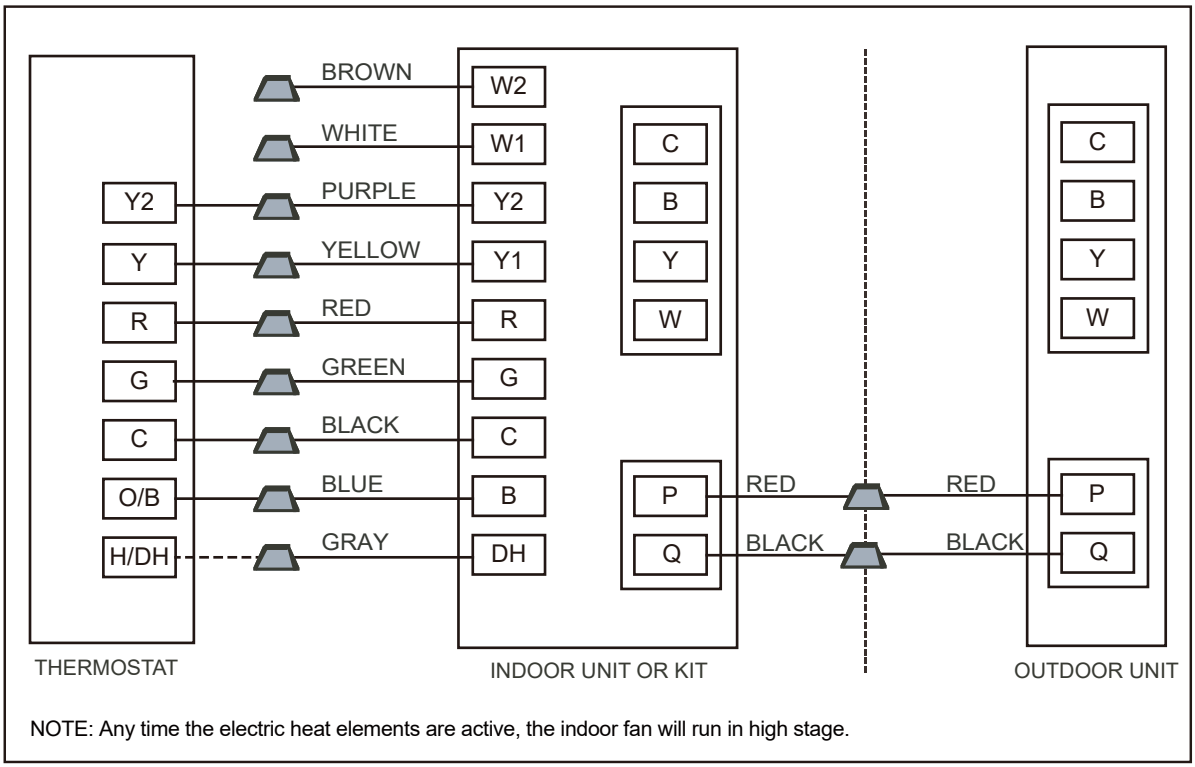
NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 13-5 4H and 2C Thermostat Communication Mode Setup



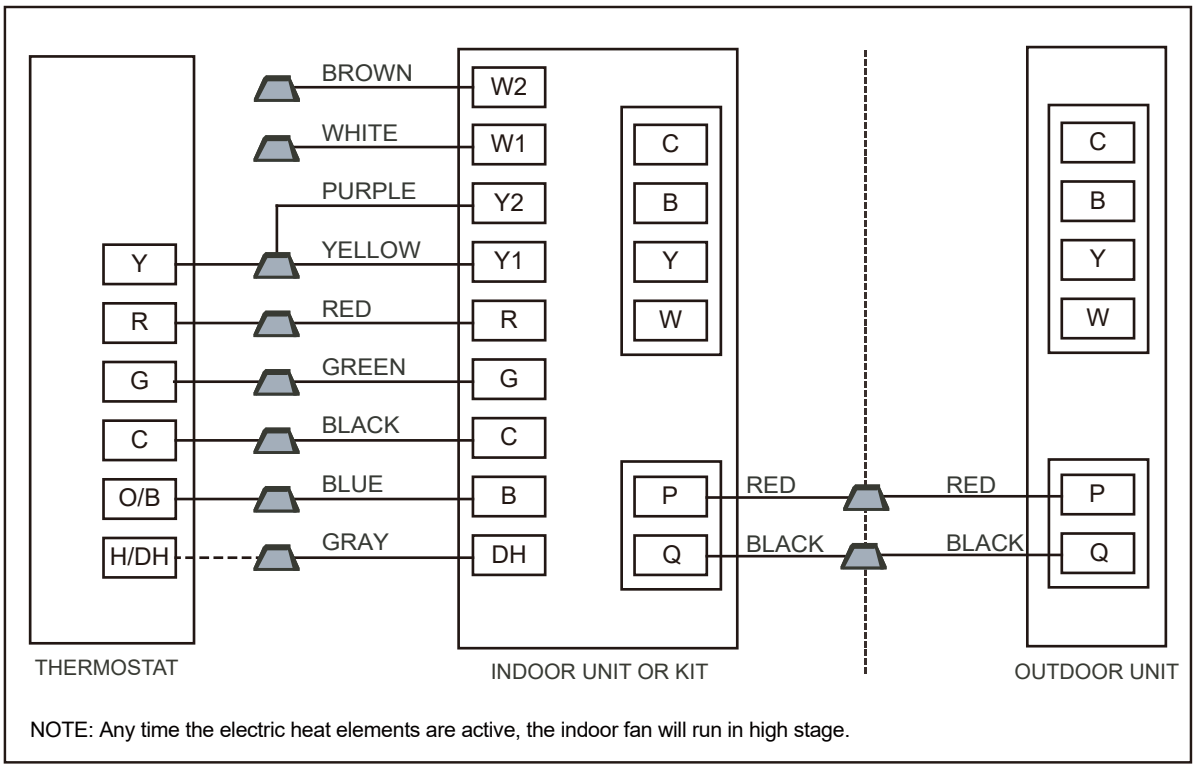
NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 13-6 3H and 1C Thermostat Communication Mode Setup



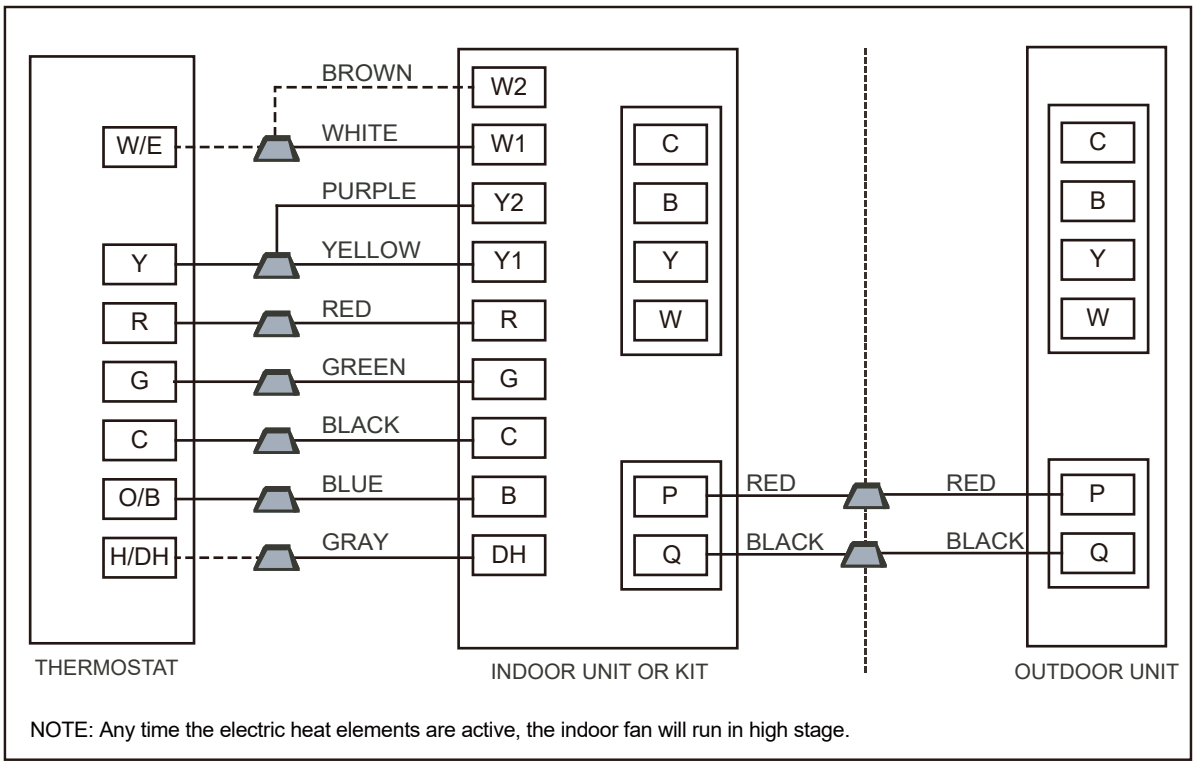
NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 13-7 2H and 2C Thermostat Communication Mode Setup



NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 13-8 1H and 1C Thermostat Communication Mode Setup

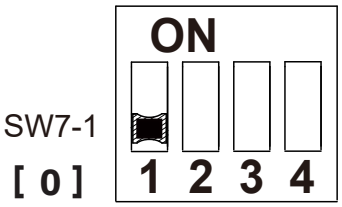


NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

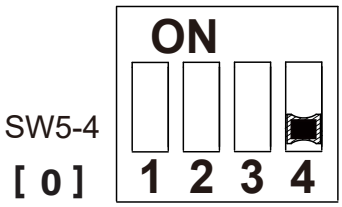
Figure 13-9 2H and 1C Thermostat Communication Mode Setup

2.2. The conventional 24VAC non-communicating control mode

2.2.1 Conventional 24VAC non-communicating control mode setup.



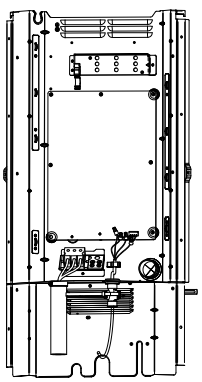
indoor unit dipswitch SW7-1 is in OFF position

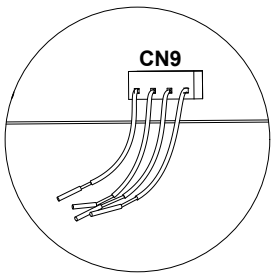


outdoor unit dipswitch SW5-4 is in OFF position

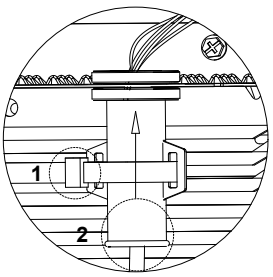
Figure 13-10

2.2.2 To connect the conventional 24VAC non-communicating control wires, take out the 24VAC non-communicating control wires (C, B, Y and W) from the accessory bag and plug it into CN9 on the control board firstly. Secondly peel off the half-stripped wires. Then thread the field supplied low voltage wires through the hole. Finally connect the conventional 24VAC non-communicating control wires (C, B, Y and W) to the four field supplied wires. Arrange the low voltage wires (refer to the cautions and note above), and tighten the zip tie.

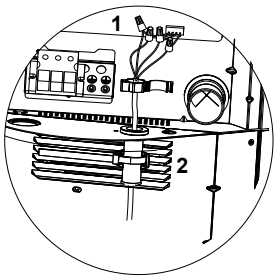




1.
Peel off the half-stripped wires of the conventional 24VAC non-communicating control wires



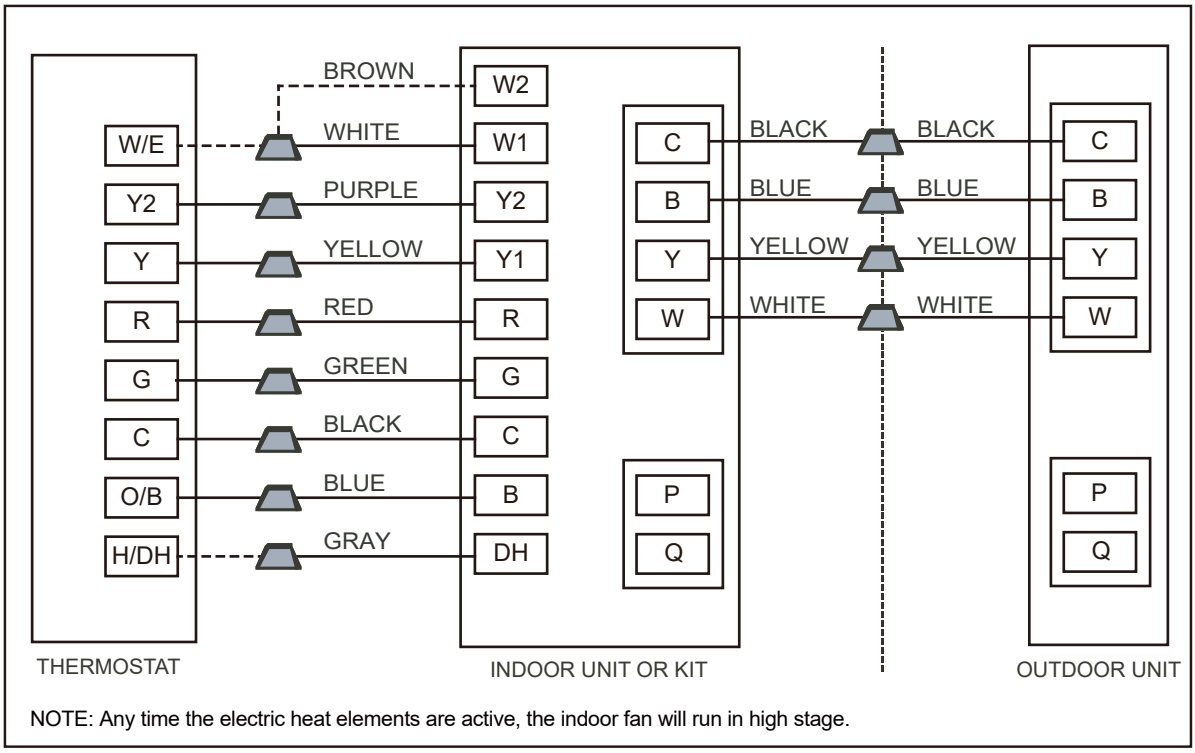
2.
(1) Loosen the zip tie.
(2) Thread the field supplied low voltage wires through the hole.



3.
(1) Connect the wires. The wires unused should be insulated, and the copper wires should not be exposed.
(2) Tighten the zip tie.

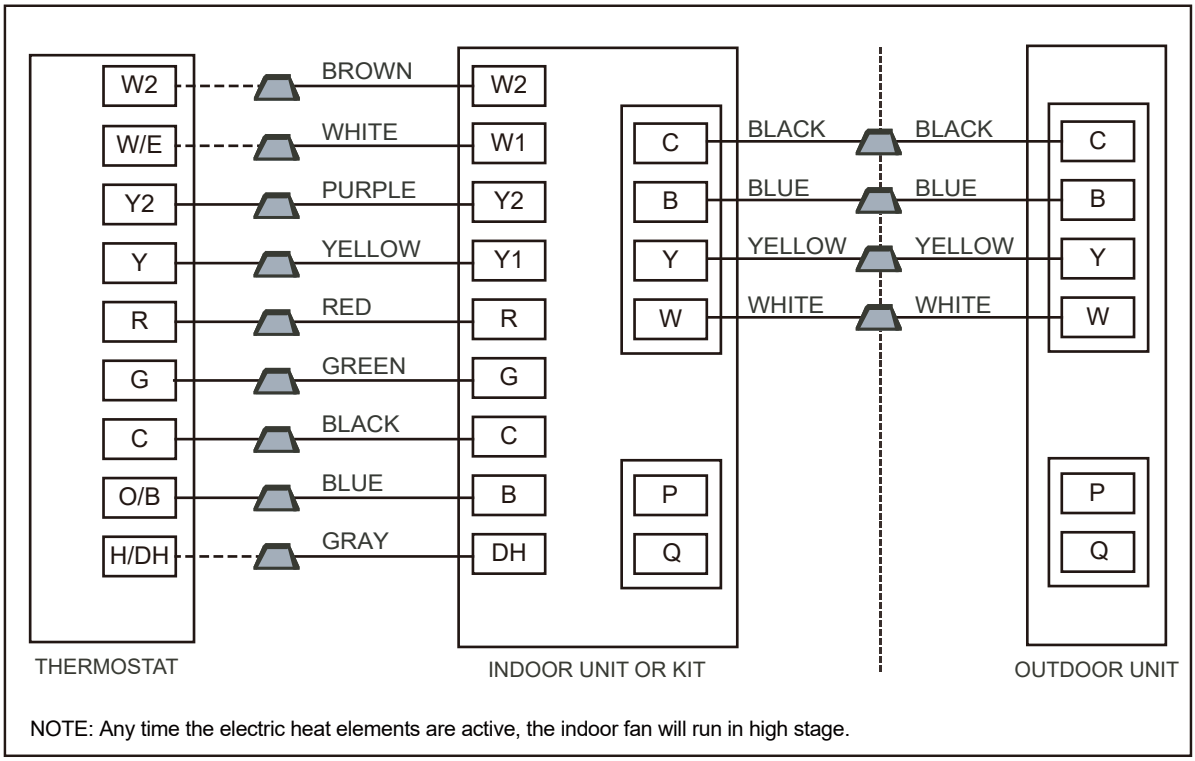
Figure 13-11

- Conventional 24VAC non-communicating control wires connections diagram



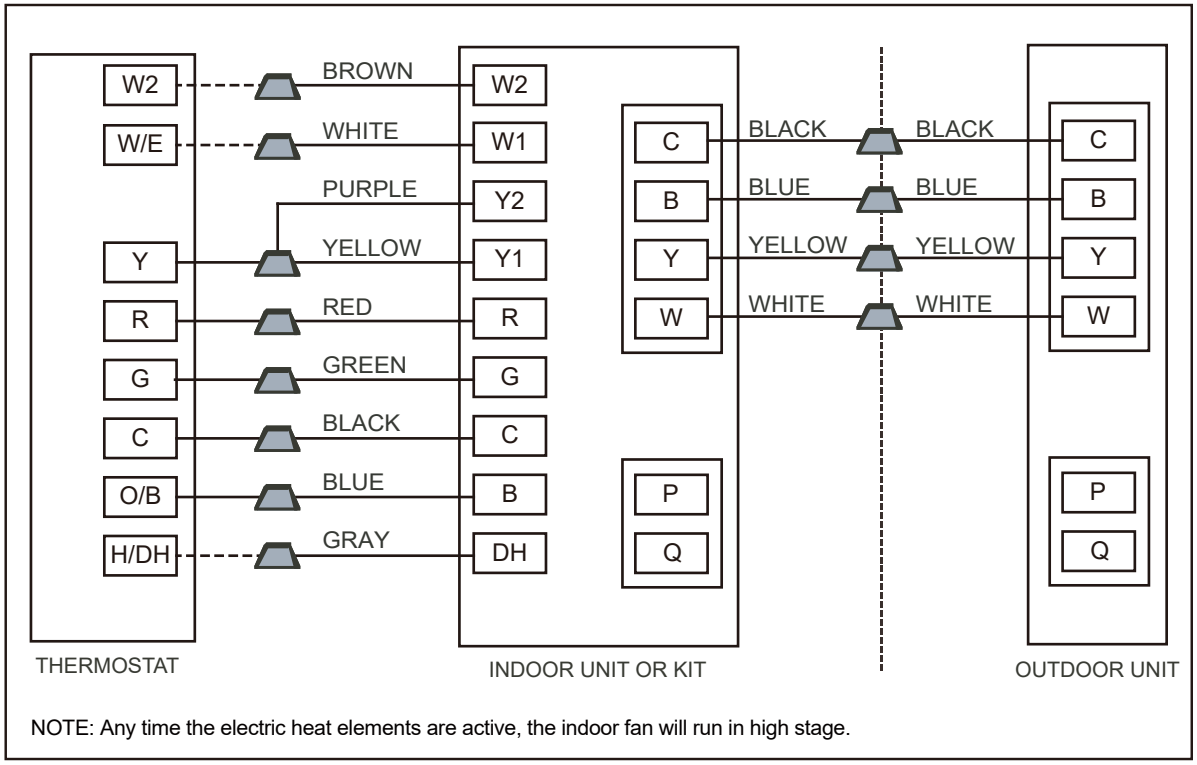
NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 13-12 3H and 2C Thermostat Non-communicating Setup



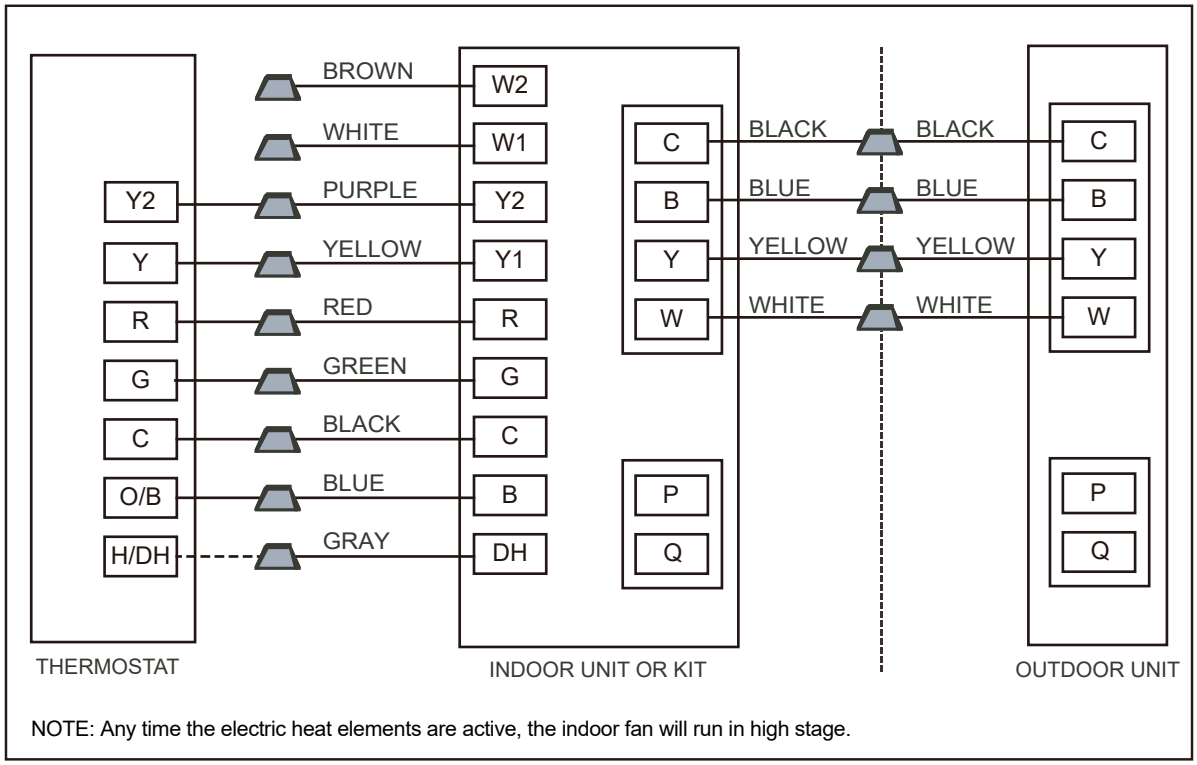
NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 13-13 4H and 2C Thermostat Non-communicating Setup



NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 13-14 3H and 1C Thermostat Non-communicating Setup



NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 13-15 2H and 2C Thermostat Non-communicating Setup

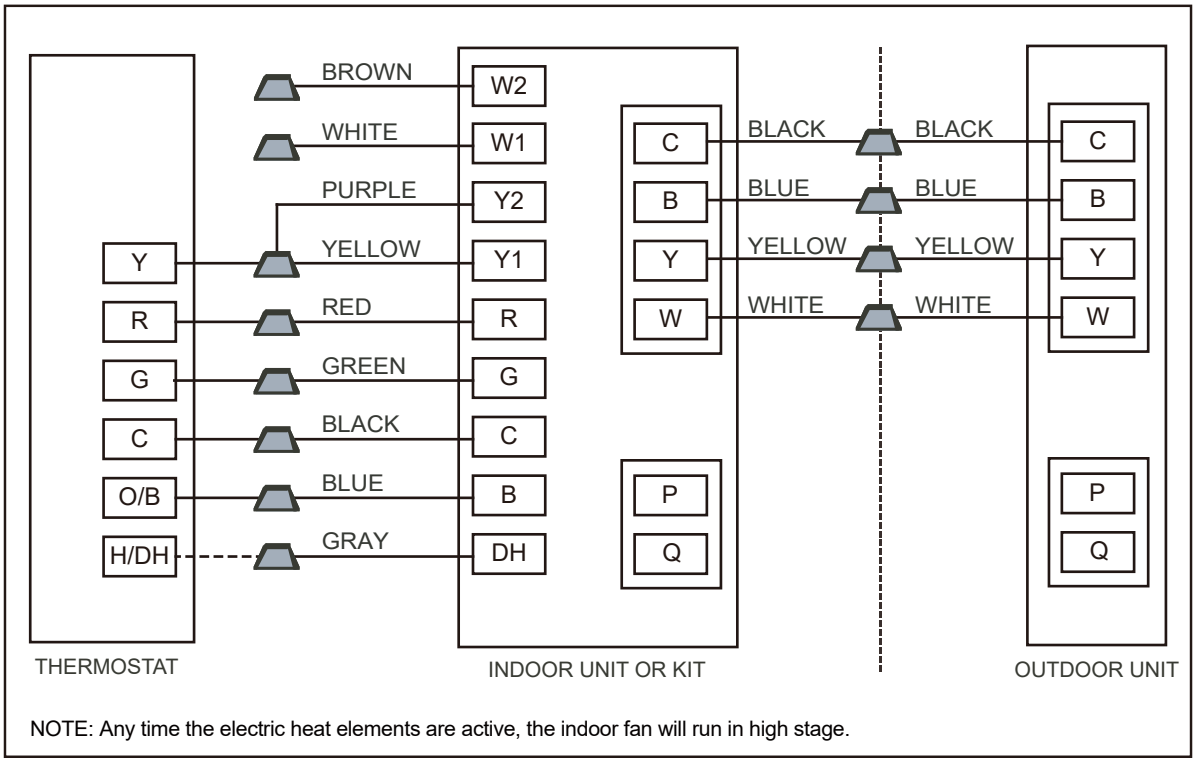


Figure 13-16 1H and 1C Thermostat Non-communicating Setup

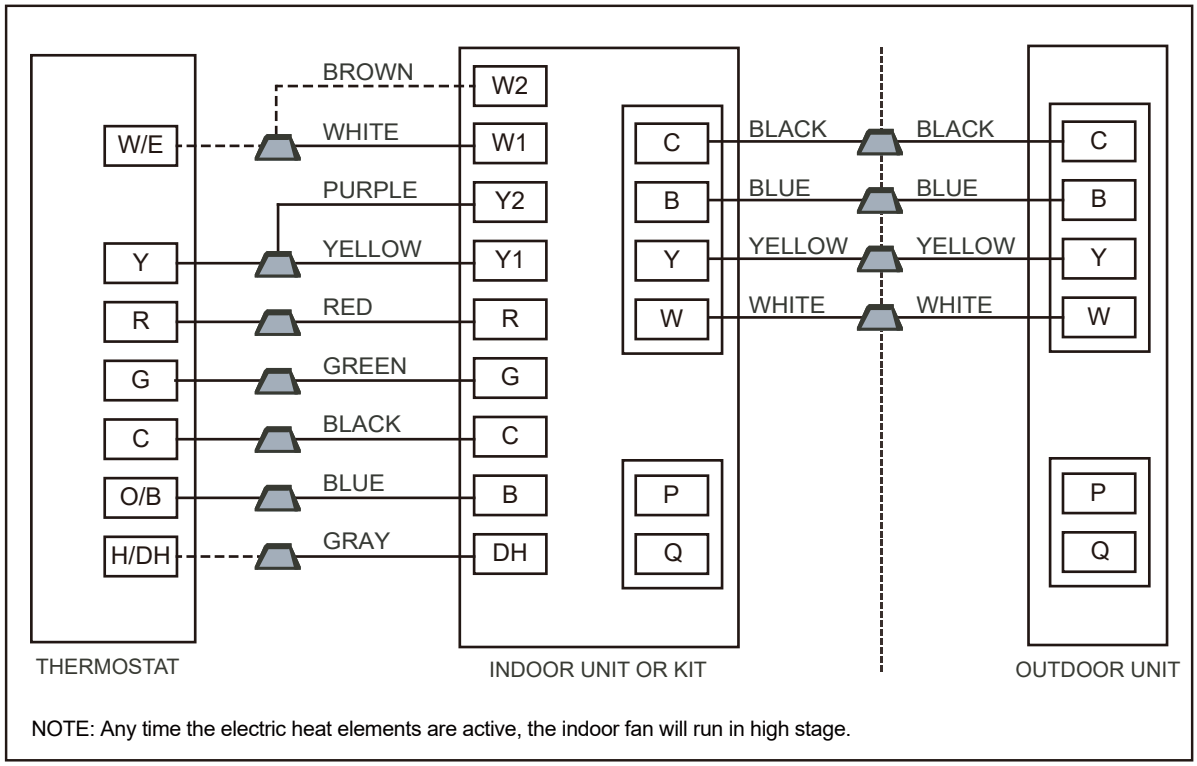


Figure 13-17 2H and 1C Thermostat Non-communicating Setup

NOTICE

To use PQ communication mode, need to match the indoor unit which has PQ communication function.

PQ communication supports non-polar communication.

If there are 2 or more systems (communication) in the same area, make sure the low voltage wires are connected to the right unit that are connected to the same refrigerant line.

The above pictures are for indication, the actual object may be different.

⚠ CAUTION

Conventional 24VAC non-communicating control mode and PQ communication mode can not be used at the same time.Do not interconnect different conventional 24VAC non-communicating control wires or communication wires (CBYW, PQ, etc.), otherwise it will damage the control board. Figure 13-18, Figure 13-19, Figure 13-20 , Figure 13-21 , Figure 13-22 , Figure 13-23 show the wrong wiring.

- Conventional 24VAC non-communicating control mode and PQ communication mode can not be used at the same time.

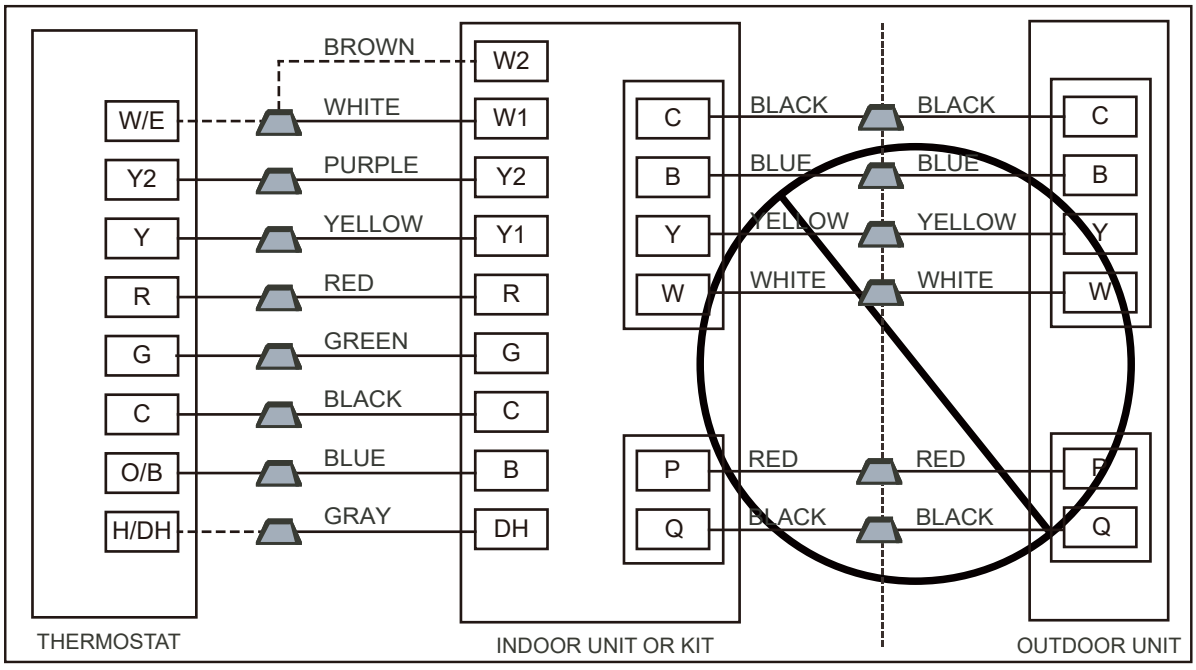


Figure 13-18 Example of 3H and 2C Thermostat Wrong Wiring

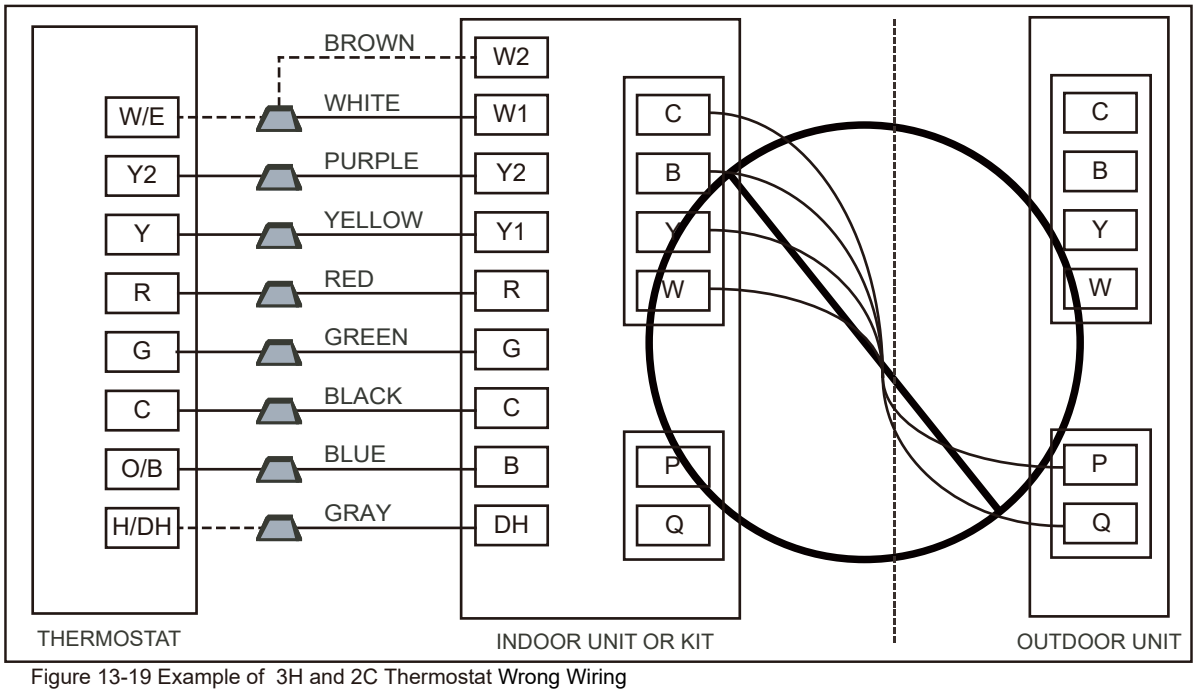


Figure 13-19 Example of 3H and 2C Thermostat Wrong Wiring

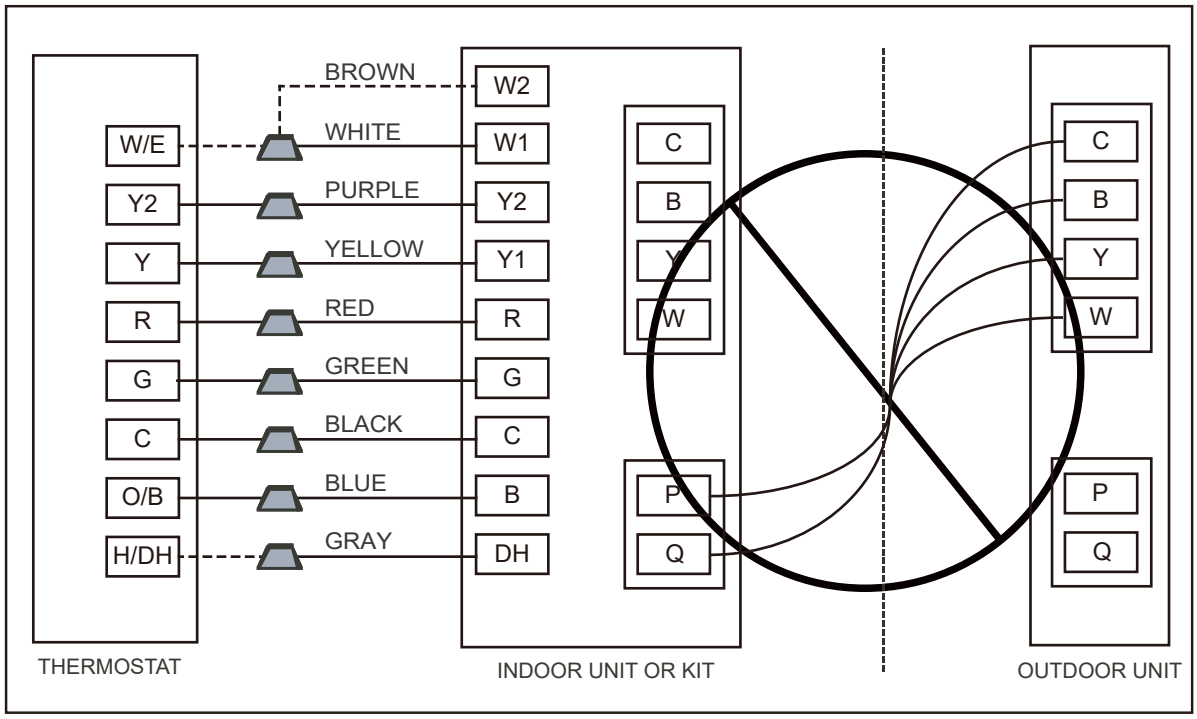


Figure 13-20 Example of 3H and 2C Thermostat Wrong Wiring

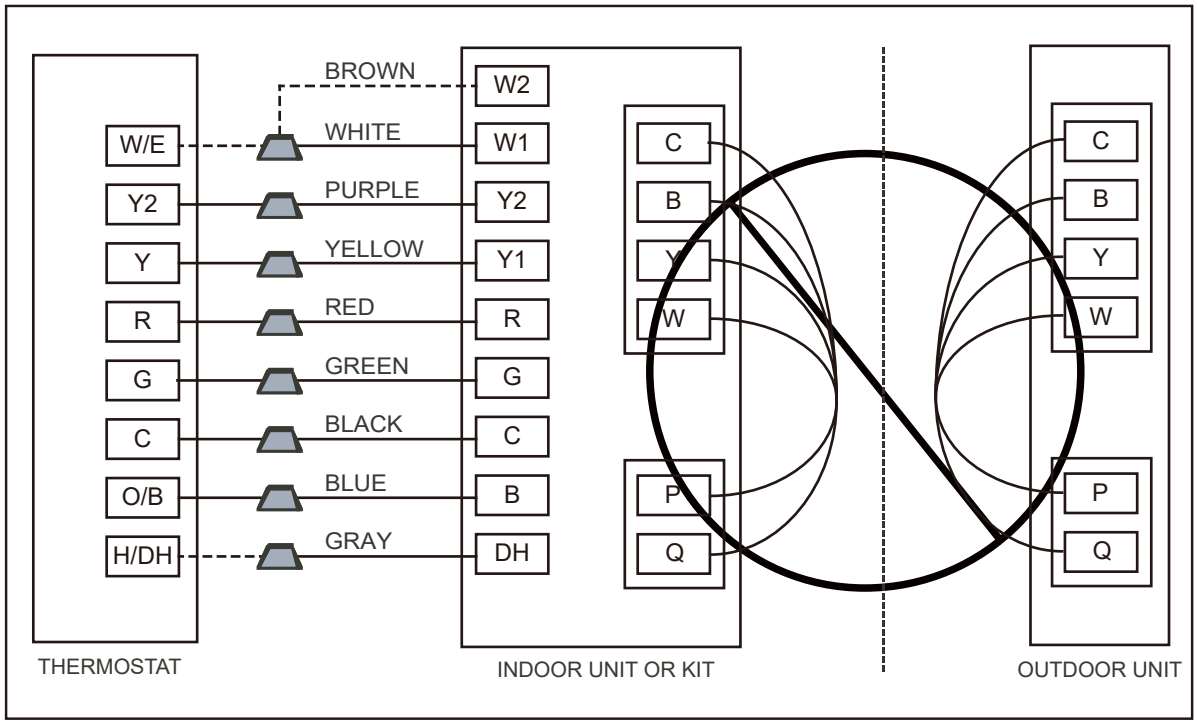


Figure 13-21 Example of 3H and 2C Thermostat Wrong Wiring

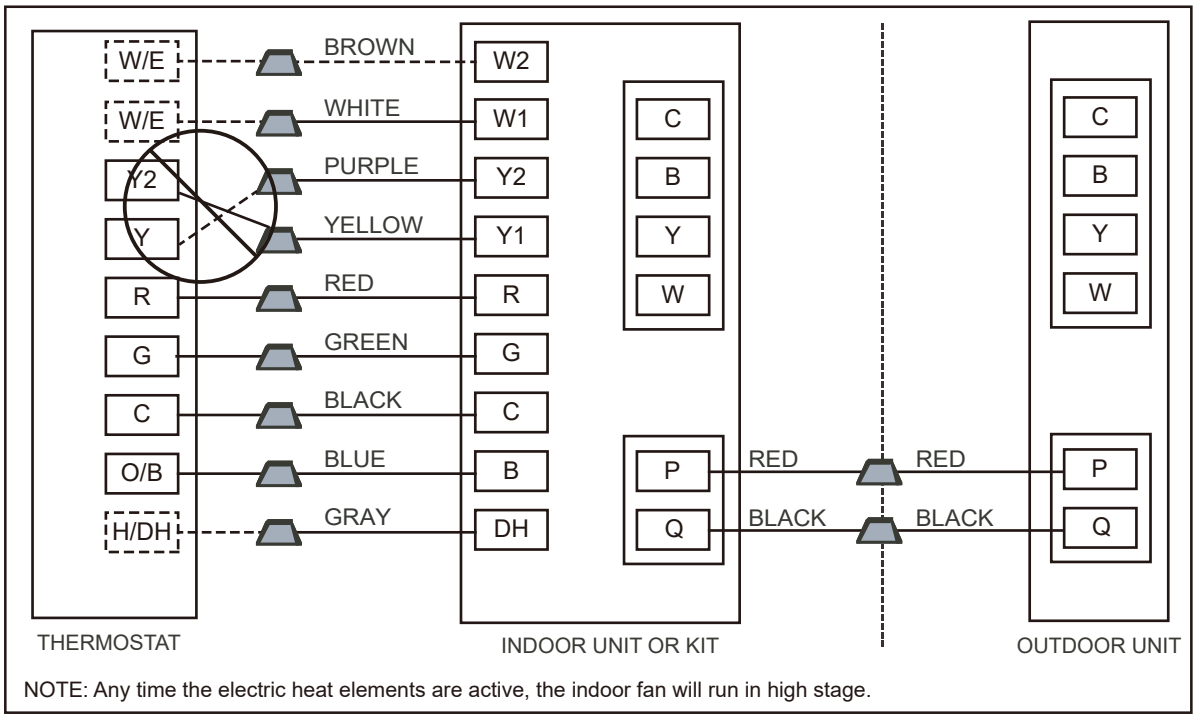


Figure 13-22 Example of Thermostat Wrong Wiring: Y2 connects to Y1.

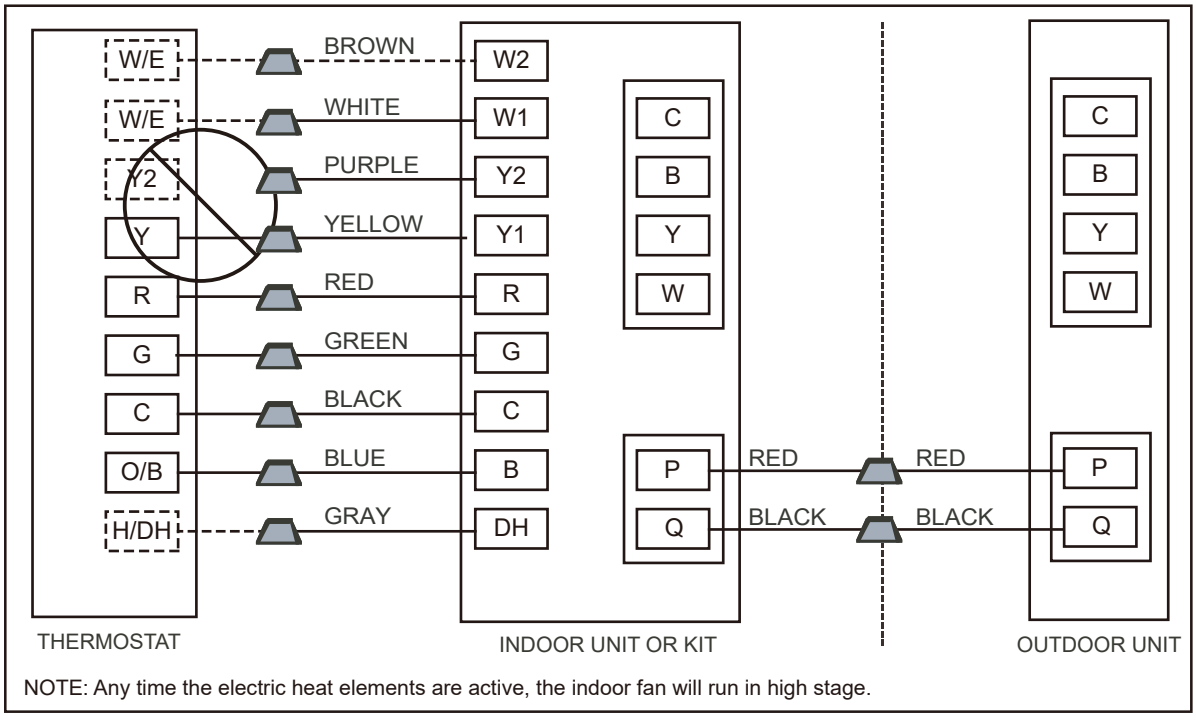


Figure 13-23 Example of Thermostat Wrong Wiring: only Y connects to Y1.

14 ELETRICAL – HIGH VOLTAGE

In the U.S.A., wiring must conform with current local codes and the current National Electric Code (NEC). In Canada, wiring must conform with current local codes and the current Canadian Electrical Code (CEC).

⚠ WARNING

Installation and servicing of air conditioning equipment can be hazardous due to internal refrigerant pressure and live electrical components. Only trained and qualified service personnel should install or service this equipment. Installation and service performed by unqualified persons can result in property damage, personal injury, or death.

Risk of electrical shock. Disconnect all remote power supplies before installing or servicing any portion of the system. Failure to disconnect power supplies can result in property damage, personal injury, or death.

Fire Hazard. Use of aluminum wire with this product may result in a fire, causing property damage, severe injury or death. Use copper wire only with this product.

Can cause injury or death. Unit must be properly earthed in accordance with national and local codes.

Natural earthing poles embedded in the earth can be used, but do not connect the earth wire to the following locations:

(a) Pipes of flammable or explosive gases, which may lead to an explosion or fire.

(b) Insulated plastic pipes, otherwise there is no earthing effect.

(c) Telephone line or lightning rod, otherwise it will be dangerous for increasing the earth potential during lightning strikes.

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.

⚠ CAUTION

Sharp metal edges can cause injury. When installing the unit, use care to avoid sharp edges.

Avoid sharp metal edges for wires to prevent wear, or it may lead to short circuit or electric leakage and cause danger.

Wires should be fixed well. Otherwise, the connectors may be loose or the terminal may be damaged when they are pulled.

NOTICE

Electrostatic discharge can affect electronic components. Take care during unit installation and service to protect the unit's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the unit, the control and the technician at the same electrostatic potential. Touch hand and all tools on an unpainted unit surface before performing any service procedure to neutralize electrostatic charge.

Do not add phase junction capacitors, otherwise it may cause serious damage to the product.

Do not start the unit before installing pipes. Otherwise, the compressor will be damaged.

14.1 High Voltage Power Supply

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

14.2 High Voltage Wires Sizes, Disconnect Switch and Breaker

Refer to the unit nameplate for minimum circuit ampacity, and maximum fuse or circuit breaker (HACR TYPE per NEC). Install power cords and properly sized disconnect switch and breaker.

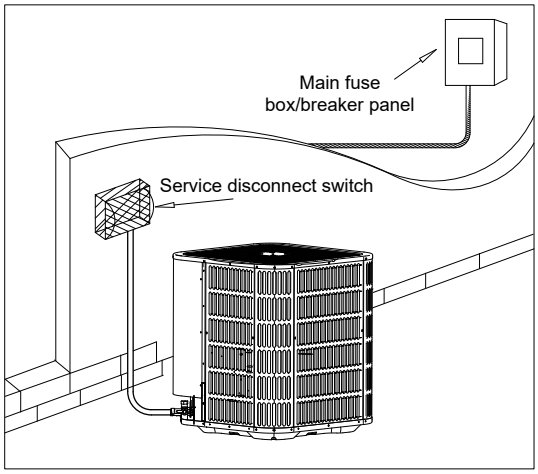


Figure 14-1

14.3 High Voltage Wires Connections

1. Remove the electrical control box panel. Refer to Figure 13-1.

2. Firstly thread the power cords (L1, L2) and earth wire through the power cords hole. Secondly connect L1, L2 and earth wire to terminals of the power socket properly one by one. Finally fasten the pipe of the power cords and earth wire.

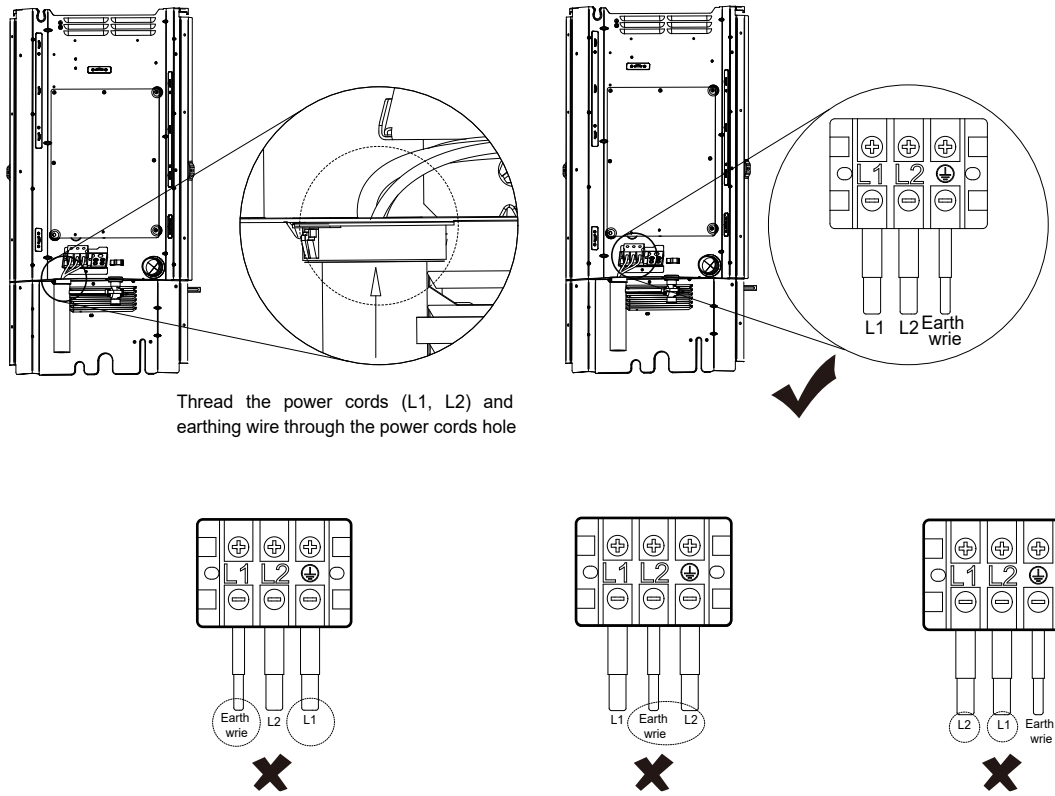


Figure 14-2

3. Ensure the fasteners are appropriately tightened. Table 14-1 shows torque values for fasteners.

Fastener	Torque
Sheet Metal Screws	10 in · lb
Power Cords Terminal block Screws	17 in · lb

Table 14-1

14.4 Wires Connections Overviews

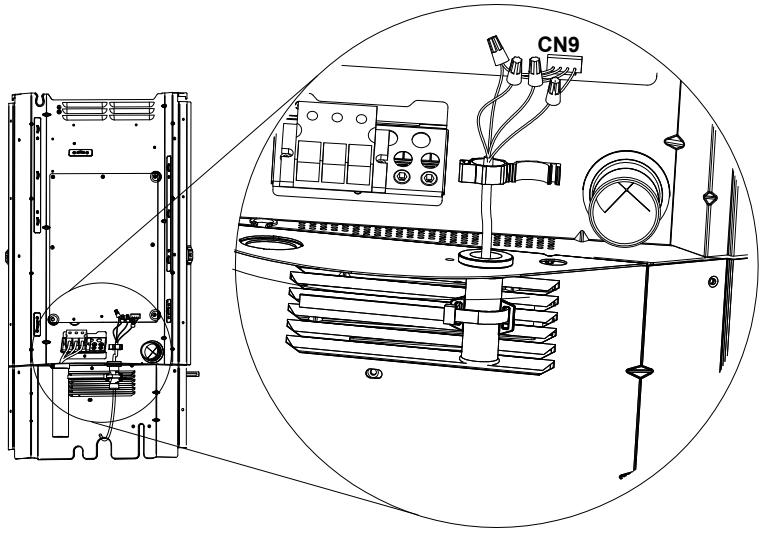


Figure 14-3 The conventional 24VAC non-communicating control mode wires connections

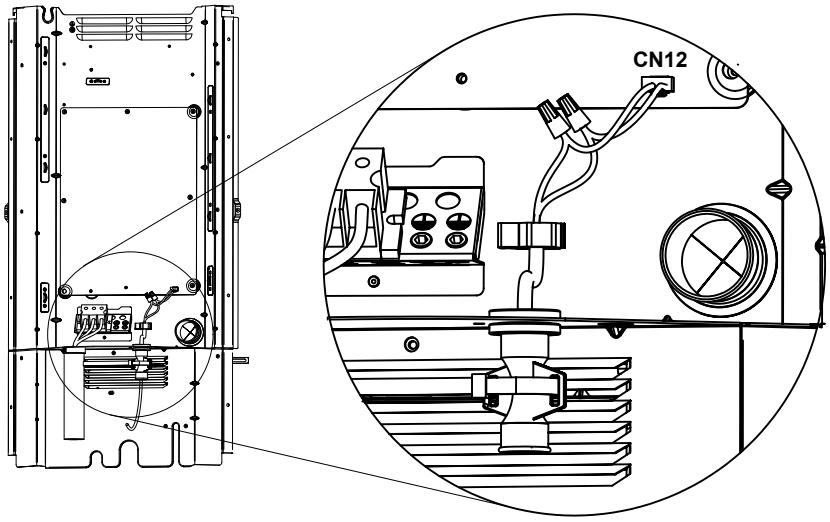


Figure 14-4 The PQ communication mode wires connections

NOTICE

Refer to the unit wiring diagram located on the inside of the electrical control box panel.

During installation, the earth wire should be longer than the power cords to ensure that the earth wire can be earthed reliably when the fixed device is loose.

The above pictures are for indication, the actual object may be different.

14.5 Unit Type Selection

Select the appropriate tonnage allows the unit to operate in the range of compressor and fan speeds that are optimized for best unit performance and efficiency. If the intended capacity for the application is 3/5 Ton, need to do nothing. If the intended capacity for the application is 2/4 Ton, “J2” DIP switch must be configured to “OFF” .

J2	
DIP Switch	Capacity
ON	3/5 Ton
OFF	2/4 Ton

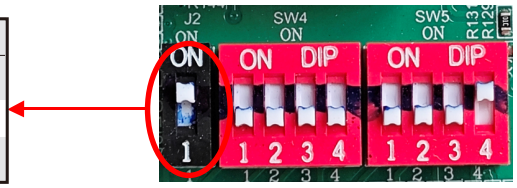


Figure 14-5

15 START UP

15.1 System Start Up

1. Ensure Sections 8, 9, 10, 10, 11, 12, 13, 14 have been completed. Check the electrical wiring again, and check whether the DIP switch meets the requirements according to the wiring diagram on the electrical control box panel.

2. Set System Thermostat to OFF.

Figure 15-1

3. Check voltage supply at the disconnect switch. The voltage must be within the range listed on the unit nameplate. If not, do not start appliance until the power company has been consulted and the voltage condition corrected.Turn on disconnect to apply power to the indoor and outdoor units.

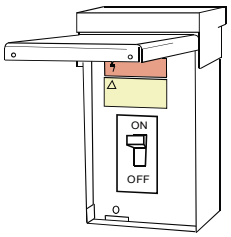


Figure 15-2

4. Upon initial unit installation, wait one (1) hour before starting the unit if compressor crankcase heater is used and the outdoor ambient temperature is below 70 ºF.

Figure 15-3

5. Set system thermostat to ON.

Figure 15-4

6. Recheck unit voltage with unit running. Power must be within range shown on unit nameplate.

16 SYSTEM CHARGE ADJUSTMENT

16.1 Charging: Weigh-In Method

NOTICE

When use a refrigerant tank with siphon to add refrigerant, the refrigerant tank should be placed upright. When use a refrigerant tank without siphon to add refrigerant, the refrigerant tank should be placed upside down.

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

Model	Factory Charge	Adjustment multiplier for liquid line length
2 Ton	5 lb 3 oz	0.59 oz/ft
3 Ton	6 lb 1 oz	0.59 oz/ft
4/5 Ton	8 lb 8 oz	0.59 oz/ft

Table 16-1

NOTICE

The factory charge in the outdoor unit is sufficient for 25 ft of standard size interconnecting liquid line.

New Installations — Calculating additional charge for line set greater than 25 ft.

1. Total Line Length (ft) = _____(a)
2. Standard Line set (ft) = 25 (b)
3. (a) minus (b) = _____(c)
4. Refrigerant Multiplier = 0.59 oz/ft (d)
5. Refrigerant Adjustment (c*d) = _____(e)*

*If line set is less than 25 ft, (e) < 0,means recover refrigerant. If line set is more than 25 ft, (e) > 0, means charge refrigerant.

Sealed-System Repairs — Calculating total system charge.

1. Total Line Length (ft) = _____(a)
2. Standard Line set (ft) = 25 (b)
3. (a) minus (b) = _____(c)
4. Refrigerant Multiplier = 0.59 oz/ft (d)
5. Refrigerant Adjustment (c*d) = _____(e)*
6. Factory Charge (nameplate) = _____(f)
7. Total System Charge (e+f) = _____.

*If line set is less than 25 ft, (e) < 0,means recover refrigerant. If line set is more than 25 ft, (e) > 0, means charge refrigerant.

NOTICE

The only mode approved for validating system charge is while in Cooling "Force Mode". Outdoor temperature must be between 50 °F and 120 °F with indoor temperature kept between 70 °F and 80 °F.

16.2 Subcooling Charging and Refrigerant Adjustment in Cooling (Above 50 °F Outdoor Temp.)

1. Check the outdoor ambient temperatures.

   Subcooling (in cooling mode) is the only recommended method of charging above 50 ºF outdoor ambient temperatures.

   For outdoor ambient temperatures below 50 ºF use weigh-in charge method.

NOTICE

It is important to return in the spring or summer to accurately charge the system in the cooling mode when outdoor ambient temperature is above 50 ºF.

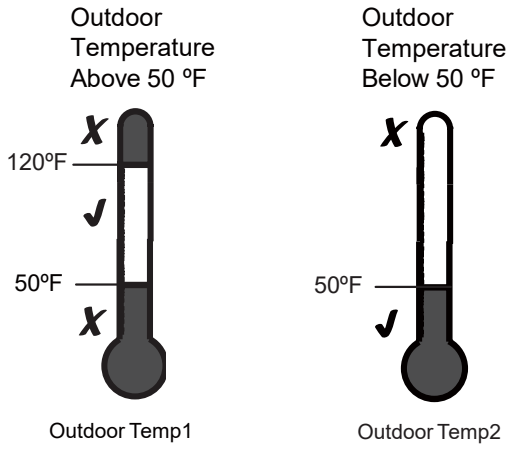


Figure 16-1

For best results, the indoor temperature should be kept between 70 ºF and 80 ºF during the install.

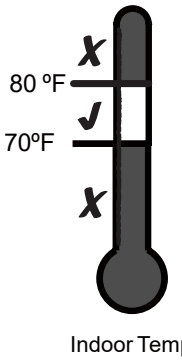


Figure 16-2

2. Ensure Sections 8, 9, 10, 10, 11, 12, 13, 14 have been completed.

3. Stabilize the system.

   After starting the system in cooling mode, short press “FORCE” button, and “ ⊢ ” symbol should appear. System may take 10 minutes to ramp up. Operate the system for a minimum of twenty (20) minutes.

Figure 16-3

NOTICE

After a twenty (20) minute stabilization period operating at 100% capacity (i.e. once the compressor reaches the frequency shown in Table 16-2), maintain continuous operation while adjusting refrigerant charge. After adjusting, operate system for a minimum of five (5) minutes for system to stabilize, otherwise repeat step 3.

Compressor Frequency in Force Mode in Cooling				
Outdoor unit Capacity (Ton)	2 Ton	3 Ton	4 Ton	5 Ton
Frequency (Hz)	46	66	54	60

Table 16-2

Figure 16-4

4. Calculate superheat value (According to Table 16-3)

   Measured Suction Line Temp = _____ºF

   Measured Suction Line Pressure = _____ psig

   Calculate superheat value = _____ºF

NOTICE

Check the superheat and select correct subcooling according to superheat, refer to Table 16-5. It is recommended to keep the superheat at 10 -18 °F if a third party indoor unit is used.

When mounting the indoor heat exchanger coil above the outdoor unit, if the refrigerant line total lift is over 15 ft, adjust the refrigerant according to the larger value of the subcooling range in the Table 16-5. For example, if the superheat is 14 °F, lift measurements is 20 ft, select the supercooling 8 -12 °F instead of 6 - 10 °F in the Table 16-5.

5. Calculate subcooling value (According to Table 16-4)

   Measured Liquid Line Temp. = _____ºF

   Measured Liquid Line Pressure = _____ psig

   Calculate subcooling value = _____ºF

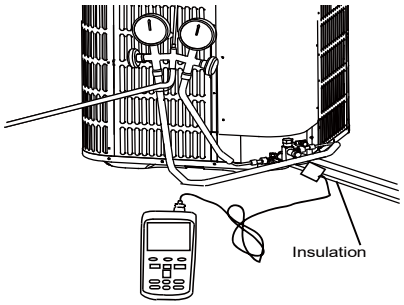


Figure 16-5

NOTICE

If calculated subcooling value is lower than the design subcooling value (Table 16-5), please add refrigerant. Repeat steps 3 through 5.

If the superheat is out of range, refer to Troubleshooting section of service manual.

Suction Temp (°F)	Final Superheat (°F)								
	6	8	10	12	14	16	18	20	22
	Suction Gauge Pressure (psig)								
40	95	91	87	84	80	77	74	70	67
42	99	95	91	87	84	80	77	74	70
44	103	99	95	91	87	84	80	77	74
46	107	103	99	95	91	87	84	80	77
48	111	107	103	99	95	91	87	84	80
50	116	111	107	103	99	95	91	87	84
52	120	116	111	107	103	99	95	91	87
54	125	120	116	111	107	103	99	95	91
56	129	125	120	116	111	107	103	99	95
58	134	129	125	120	116	111	107	103	99
60	139	134	129	125	120	116	111	107	103
62	144	139	134	129	125	120	116	111	107
64	149	144	139	134	129	125	120	116	111
66	155	149	144	139	134	129	125	120	116
68	160	155	149	144	139	134	129	125	120
70	166	160	155	149	144	139	134	129	125
72	171	166	160	155	149	144	139	134	129

Table 16-3 R454B Refrigerant chart - Final Superheat

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

Table 16-4 R454B Refrigerant chart - Final Subcooling

Design Subcooling		
Model	Subcooling/°F	Superheat/°F
2/3 Ton	6-10*	6-8*
	8-12	8-18
4/5 Ton	6-10*	8-10*
	10-12	8-18

NOTE: * optimized range for superheat/subcooling.

Table 16-5

6. Adjust refrigerant level to attain proper gauge pressure.

NOTICE

Add refrigerant if the subcooling reading from Table 16-4 is lower than the designed value (Table 16-5).

- Connect gauges to refrigerant bottle and unit as illustrated (Figure 16-6).
- Purge all hoses.
- Open tank.
- Stop adding refrigerant when subcooling matches the design value (Table 16-5).

NOTICE

Recover refrigerant if the subcooling reading from Table 16-4 is higher than the design value (Table 16-5).

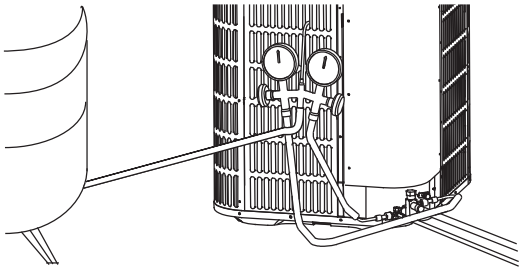


Figure 16-6

7. Stabilize the system.

- Wait 5 minutes for the system condition to stabilize between adjustments.

NOTICE

When the subcooling matches the design value (Table 16-5), the system is properly charged.

- Remove gauges.
- Replace service port caps to prevent leaks. Tighten finger tight plus an additional 1/6 turn.

8. Record System Information for reference (Table 16-6).
   Record system pressures and temperatures after charging is complete.

Description	Value
Outdoor model number	
Measured Outdoor Ambient	°F
Measured Indoor Ambient	°F
Measured Liquid Line Temp	°F
Measured Suction Line Temp	°F
Liquid Gauge Pressure	psig
Suction Gauge Pressure	psig

Table 16-6

16.3 Record the Refrigerant Charge Amount

After refrigerant is charged, record the amount of refrigerant to be charged on the label of the outdoor unit. ① indicates the amount of refrigerant to be charged by the factory, ② indicates the additional refrigerant, and ① + ② indicates the total refrigerant to be charged.

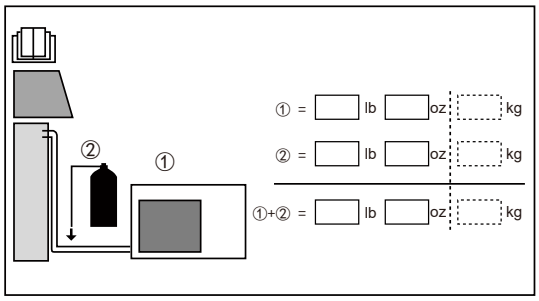


Figure 16-7

17 SYSTEM OPERATION AND SERVICE

17.1 Control Logic Description

- The compressor's speed is controlled based on coil pressures monitored by the unit's pressure transducer. To ensure stable and adequate capacity, the compressor speed will modulate relative to evaporator pressure during cooling operation and relative to condensing pressure during heating operation. The target pressure can automatically adjust based on compressor operation or the difference between set temperature and actual temperature so optimal capacity can be achieved. Target pressure can be manually adjusted (SW4) to achieve improved dehumidification and capacity demands.

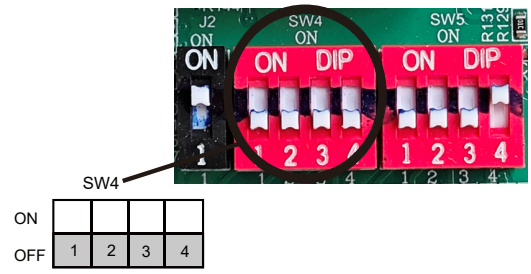


Figure 17-1

DIP Switch	Description	
SW4-1	ON	Unused
	OFF	Must be set at OFF position*
SW4-2	ON	Unused
	OFF	Must be set at OFF position*
SW4-3	ON	Adaptive capacity output disable
	OFF	Adaptive capacity output enable*
SW4-4	ON	Accelerated cooling/heating
	OFF	Normally cooling/heating*

Table 17-1

*Factory Default

- Adaptive capacity function is a "self-learning function" which allows a range of target coil temperatures to adapt for better unit operation and reduced short cycling.
- Accelerated cooling/heating function changes the initial target coil temperature to provide "enhanced comfort" by increasing unit capacity.

17.2 Sensors

- T3 = Outdoor Coil Temperature
  - — High/Low temperature protection
  - — Defrost control (heating mode)
- T3L = Liquid Line Temperature
- T4 = Outdoor Ambient Temperature
  - — Operating condition permission
  - — Defrosting condition permission
  - — Outdoor fan control (heating mode)
- T5 = Compressor Discharge Temperature
  - — High/Low temperature protection
  - — Electronic Expansion Valve control (EEVA) (heating mode only)
- PT = Pressure transducer

17.3 Pressure Equalizer Valve (PEV)

Used to balance the pressure in the system before the compressor starts up.

17.4 Defrost Description

- The Demand Defrost Control (DDC) monitors the outdoor unit coil temperature using thermistor (T3). A second thermistor (T4) monitors outdoor ambient temperature. Based on these parameters, as well as accumulative run time and high pressure, the DDC calculates proper initiation of defrost.
- Any one of the below three conditions is required to enter defrost:

  1. The calculated temperature difference between the outdoor temperature (T4) and the coil temperature (T3) is called Delta T. After Delta T is achieved and continues for 3 minutes.
  — T4 ≥ 39 °F, Delta T = 18 °F
  — T4 ≥ 30 °F, Delta T = 16 °F
  — T4 ≥ 19 °F, Delta T = 14 °F
  — When T4 < 19 °F, T3 < 9 °F, accumulative compressor run time ≥ 80 minutes.

  2. After “Minimum Running Time” (MRT) is achieved. MRT is based on outdoor ambient temperature (T4), for example:
  — MRT is 4 hours when: T4 < 23 °F
  — MRT is 2 hours when: 23 °F ≤ T4 < 40 °F
  — MRT is 50 minutes when Last defrosting time is at least 8 minutes.

  3. After the high pressure saturation temperature drops below 82 °F for 20 minutes, when 14 °F ≤ T4 < 29 °F.

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

  Defrost Termination Settings (SW5) offers different defrost termination options for enhanced defrost for different geographical and outdoor conditions.

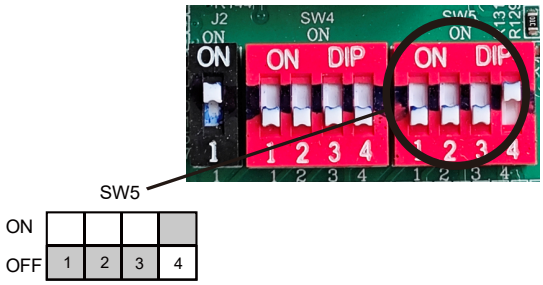


Figure 17-2

DIP Switch	Description	
SW5-1	ON	Heating time reduced 10%
	OFF	Normal *
SW5-2	ON	Defrosting extended for 120 seconds
	OFF	Normal *
SW5-3	ON	Reserved
	OFF	Normal *
SW5-4	ON	Communication mode *
	OFF	Non-communicating mode

Table 17-2

Manual Defrost:

1. The system must have a call for heat and have been operating for a minimum of 8 minutes.
2. Press “Force” button on inverter board for 6 seconds to begin forced defrost.
3. Wait approximately 40 seconds for defrost to initiate.
4. Once defrost initiates, the display will indicate “dF”.
5. Defrost test will terminate automatically, after which the display will indicate running speed.
6. If a second defrost test is required, repeat steps 2-5 after 5 minutes.

17.5 Compressor Crankcase Heater Description

Refrigerant migration during the OFF cycle can result in noisy start-ups, therefore a Crankcase Heater (CCH) is used to minimize refrigerant migration thereby minimizing start-up noise and/or bearing “wash out”. All CCHs must be installed on the lower half of the compressor shell. Its purpose is to warm the compressor during the OFF cycle, driving refrigerant from compressor. After extended shutdown periods in cold weather, it is recommended to allow CCH to be energized for at least 12 hours prior to compressor operation by applying line voltage to heat pump with thermostat OFF.

- CCH operation energizes:
  1. First time line voltage is applied and compressor discharge temperature T5 < 53.6 °F.
  2. Compressor stops running for 3 hours (outdoor ambient temperature T4 < 41 °F OR compressor discharge temperature T5 < 53.6 °F).
- CCH operation de-energizes:
  1. Compressor discharge temperature T5 ≥ 60.8 °F.
  2. Compressor starts running.

17.6 Reversing Valve Operation

- Reversing valve energizes during heat mode and de-energizes in cooling mode.The input voltage is 220V.

NOTICE

During a heat call on first time operation the unit will run about 1 minute in cooling to build up pressure for reversing valve to change.

17.7 Protection Functions

- Outdoor coil temperature protection (T3)
  i. If T3 ≥ 147.2 °F, compressor is de-energized.
  ii. If T3 < 133 °F, compressor is energized.
- Ambient temperature protection (T4)
  i. If 40 °F ≤ T4 < 120 °F, unit can operate in cooling.
  ii. If 3 °F ≤ T4 < 86 °F, unit can operate in heating.
  iii. If T4 < 1.4 °F, heat pump will provide 24 V control to indoor unit energizing electric heat (if installed).
- Discharge Temperature (DT) protection (T5)
  i. If DT > 230 °F during cooling or heating mode, the compressor will stop.
  ii. If DT < 185 °F during cooling or heating mode, the compressor will restart.
- High Pressure (HP) protection (mechanical open/close pressure switch)
  i. High Pressure Switch opens at P > 580 Psig, the compressor and outdoor fan stop.
  ii. High Pressure Switch closes at P < 435 Psig, the compressor and outdoor fan restart.
- Low Pressure (LP) protection
  i. If Low Pressure < 22 psig for 3 seconds during cooling mode, the compressor and outdoor fan will stop.
- Low discharge superheat protection
  i. Head discharge superheat HDSH ＜ 9 °F last 40 minutes.

17.8 Error Code Table and Troubleshooting

Code	Description	Possible Reason
AtL	Ambient Temperature Limited(T4)	Ambient temperature is out of the range/There are other heat sources around T4
b2	Temperature sensor fault in indoor unit (T2)	T2 sensor is short circuit or open circuit
b3	R454B refrigerant sensor fault in indoor unit	R454B refrigerant sensor failure
b4	R454B refrigerant sensor communication fault in indoor unit	Wiring error/R454B refrigerant sensor failure
b5	Communication fault between indoor unit and outdoor unit	Wiring error/Mode collection error/Control board in outdoor unit or indoor unit failure
bF	Furnace driver board fault	Furnace driver board fault
b7	R454B refrigerant leakage protection in indoor unit	R454B refrigerant leakage/R454B refrigerant sensor failure
b8	R454B refrigerant sensor over service life in indoor unit	R454B refrigerant sensor over service life/ R454B refrigerant sensor failure
b9	Indoor unit DIP switch does not match R454B refrigerant sensor	The DIP switch of indoor unit is incorrectly set
C3	The coil sensor is seated fault in cooling (T3)	T3 sensor is not properly placed/There are other heat sources around T4
E41	Temperature sensor fault (T3)	T3 temperature sensor is short circuit or open circuit
E42	Temperature sensor fault (T3L)	T3L temperature sensor is short circuit or open circuit
E43	Temperature sensor fault (T4)	T4 temperature sensor is short circuit or open circuit
E44	Temperature sensor fault (T5)	T5 temperature sensor is short circuit or open circuit
E51	Outdoor unit high/low input voltage protection	Input voltage out of range/Control board in outdoor unit failure
E52	Outdoor unit high/low DC bus voltage protection	Input voltage out of range/Control board in outdoor unit failure/Fan failure/Compressor failure
E7	Compressor discharge sensor is seated fault (T5)	T5 sensor is not properly placed/Wiring error/T3 sensor is not properly placed
E81	EEVA coil fault	Wiring error/EEVA coil failure/Control board in outdoor unit failure
EA	Control program does not match drive program in outdoor unit	Program error
F1	High pressure switch fault	HPS is open circuit/ HPS failure
F2	5 times (P21/o37) protection in 100 minutes, system lockout	TXV/EEV blocked/Charging leakage (low refrigerant)/ Service valves are not open
F4	Pressure transducer fault (PT)	Pressure transducer (Pc) is short circuit or open circuit /Control board in outdoor unit failure
H01	Drive chip Communication fault in outdoor unit	Program error/Control board in outdoor unit failure
J00-JCF	Compressor drive fault	Service valves are not open/Wiring error/Compressor failure/Control board in outdoor unit failure
n00-nCF	Fan drive fault	Wiring error/Fan failure/Control board in outdoor unit failure
o37	Lack of refrigerant in heating mode	Service valves are not open/Poor heat exchange on Condensing side/pressure transducer(PT) failure/Charging leakage (low refrigerant)/EEV blocked(heating)
P0	Compressor IPM temperature protection	IPM screws are not tightened/The radiator air duct is dirty/ IPM is not coated with thermal paste
P1	High pressure switch protection (HPS)	Service valves are not open/Poor heat exchange/abnormal throttleon condensing side/HPS is open circuit/refrigerant over charge
P11	High pressure protection in heating (PT)	Service valves are not open/Poor heat exchange on Condensing side/pressure transducer(PT) failure/refrigerant over charge/EEV blocked(heating)
P21	Low pressure protection in cooling (PT)	Service valves are not open/Poor heat exchange on evaporation side/pressure transducer(PT) fault/Charging leakage (low refrigerant)/TXV blocked(cooling)
P31	Outdoor unit input over current protection	Service valves are not open/Wiring error/Current sensor failure/Compressor failure/Control board in outdoor unit failure
P32	Compressor over current protection	Service valves are not open/Wiring error/Compressor failure/Control board in outdoor unit failure
P4	High compressor discharge temperature protection (T5)	High temperature and overload/Throttle blockage/Charging leakage (low refrigerant)/T5 failure
P5	Condensor coil temperature protection in cooling (T3)	High temperature and overload/poor heat exchange on condensing side/T3 failure
PH	Low discharge superheat protection	TXV or EEVA failure/Ambient temperature is out of the range/Refrigerant over charged/Fan is abnormal//T5 sensor is not properly placed

Table 17-3

NOTE: If F2 fault occurs, need to be repaired and need to be re-powered.

SYSTEM FAULTS			WHAT TO CHECK MODE	POWER SUPPLY OR HIGH VOLTAGE WIRES	LOW VOLTAGE WIRES OR THERMOSTAT	INEFFICIENT IDU FUSE	IDU FUSE	MAIN BOARD	RES IDU AIRFLOW	INEFFICIENT ODU AIRFLOW	RES ODU AIRFLOW	REF. ODU FAN	REF. UNDERCHARGE	REF. OVERCHARGE	REF. O/R. RESTRICTIONS	TXV STUCK OPEN OF NEED TO ADJUST	EEVA OR COIL DEF.	REV. OR COIL DEF.	SERVICE VALVE LEAKING	REV. LEAKING	INDOOR COIL LEAKING	PT DEF.	T3 SENSOR DEF.	T3L SENSOR DEF.	T4 SENSOR DEF.	T5 SENSOR DEF.	T2 SENSOR DEF.	R454B REFRIGERANT SENSOR DEF.	R454B REFRIGERANT SENSOR OVER SERVICE LIFE	EEVA DEF.	HPS SENSOR DEF.	FURNACE DRIVER BOARD FAULT	INDOOR UNIT DIP SWITCH DOES NOT MATCH R466/R454B REFRIGERANT SENSOR
SYSTEM	Display shows nothing	C	P	S			S																									
		H	P	S			S																									
	System won't start SS	C	P	P	S		S																									
		H	P	P	S		S																									
	Capacity is insuffciency	C						P	P	P		P				S			S	S						S					
		H						P	P	P		P					S		S	S						S					
	Display is not normal when running	C					P																									
		H					P																									
	Cool when heating requirement	C					P																									
		H		P															S													
REFRIGERANT CIRCUIT	P1	C								P	P			S	P																	
		H						P						S	P																	
	P11	C								P	P			S	P																	
		H						P						S	P																	
	P21/o37/F2	C			P								P			S				S												
		H			P								P			S				S								S				
	P31	C				P	S			P	P			S	P	S																
		H				P	S				P			S	P	S																
	P32	C								P	P			S	P																	
		H							P					S	P																	
	P5	C							P	P				S	S							S										
		H													S																	
	P0	C					S		P	P	S																					
		H					S		P	P	S																					
	P4	C										P					S									S						
		H										P				P										S						
	PH	C											P				P								S							
		H											P												S							
	C3	C																							P						S	
	E7	C																							S				P			
		H																											P			
	b7	C																				P						S				
		H																				P						S				
	AtL(Ambient temp. beyond the license)	C																					S									
		H																					S									
ELECTRIC-AL OR CONTROL	E41	C																						P								
		H																						P								
	E42	C																							P							
		H																							P							
	E43	C																								P						
		H																								P						
	E44	C																									P					
		H																									P					
	b2	C																										P				
		H																										P				
	E81	C																											P			
		H																											P			
	F1	C																							S						P	
		H																													P	
	F4	C																					P									
		H																					P									
	H01	C								P																						
		H								P																						
	b3	C																											P			
		H																											P			
	b4	C			P					S																			P			
		H			P					S																			P			
	b5	C	P	P	P					S																						
		H	P	P	P					S																						
	bF	C																												P		
		H																												P		
	b8	C																													P	
		H																													P	
	b9	C																														P
		H																														P
	EA	C								P									P													
		H								P									P													

SYSTEM FAULTS		WHAT TO CHECK MODE	POWER SUPPLY OR HIGH VOLTAGE WIRES	LOW VOLTAGE WIRES OR THERMOSTAT	INEFFICIENT COMP.	IDU FUSE	RES IDU AIRFLOW	MAIN BOARD	INEFFICIENT ODU FAN	RES ODU AIRFLOW	REF. UNDERCHARGE	RES ODU RADIATOR	REF. OVERCHARGE	REF. CIR. RESTRICTIONS	TXV STUCK OPEN OR NEED TO ADJUST	EEVA OR COIL DEF.	REV. OR COIL DEF.	SERVICE VALVE LEAKING	REV. LEAKING	INDOOR COIL LEAKING	PT DEF.	T3 SENSOR DEF.	T3L SENSOR DEF.	T4 SENSOR DEF.	T5 SENSOR DEF.	T2 SENSOR DEF.	R454B REFRIGERANT SENSOR DEF.	R454B REFRIGERANT SENSOR OVER SERVICE LIFE	EEVA DEF.	HPS SENSOR DEF.	FURNACE DRIVER BOARD FAULT	INDOOR UNIT DIP SWITCH SETTINGS NOT MATCH R466B/R290/R454B/T1 SENSOR
ELECTRIC-AL OR CONTROL	J00-JCF	C	P				S	S							S	S	S														
		H	P				S	S							S	S	S														
	n00-nCF	C	P					S			S																				
		H	P					S			S																				
	E51	C						S																							
		H						S																							
	E52	C						S																							
		H						S																							

Table 17-4

C-Cooling
H-Heating
P-Primary Causes
S-Secondary Causes
Comp.-compressor
RES.-Restrictions
REF.-Refrigeration
DEF.-Defective
CIR.-Circuit
EEVA-A Electronic expansion valve
REV.-Reversing Valve
PT-Pressure Transducer
T3-Outdoor coil temp. sensor
T4-Ambient temp. sensor
T5-Comp. discharge temp. sensor
T3L-Outdoor coil outlet temp. sensor
HPS-High pressure switch
RES IDU AIRFLOW-Perhaps failue of fan motor or fan capacitor or filter
RES ODU AIRFLOW-Perhaps failue of fan motor or fan capacitor or recirculation or blocking coil
RES ODU RADIATOR-Perhaps failue of blocking radiator

17.9 Status Code

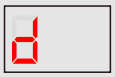
System Protection Status Codes		Icon
|-	Forced operation mode	
- (top)	Running indication under high pressure	
_ (bottom)	Running indication under low pressure	
A	Running indication under return oil mode	
C	Running indication under current limited condition	
d	Running indication under T5 limited condition	
F	Running indication under COMP. IPM Temp. limited condition	
L	Running indication under T3 limited condition	
r	Running indication under compressor ratio limited condition	
U	Running indication under low voltage limited condition	
dF	Running indication under defrost mode	

Table 17-5

NOTICE

If the first digit displayed on the LED digital tube is one of the above-mentioned protection codes (followed by two digits indicating the current operating frequency of the compressor in Hz), the outdoor unit will continue to run under certain conditions. However, when the system is in defrost mode, it will only display "dF" (without any numbers following).

17.10 Parameter Point Check Table

- To display system parameters, press the “Check” button to index through the series of parameters available. The first time you press the “Check” button, it will display the sequence, and after 1 second it will display the value of the parameter. If you press the “Check” button again, it will display the next sequence. Refer to Figure 16-3 for check button location on the control board.
- Normal Status, last two digits will display under the following conditions

  i. Unit not operating (Standby Mode); “outdoor ambient temperature”.
  ii. Unit operating; displays “compressor operating frequency”.
- After 20 seconds on same parameter, the display will revert back to normal status.
- If a system protection is active, first digit will display “status code”.

No.	Point check content	Example	Remark
0	Outdoor unit capacity: H5=Heat pump 5 ton	H5	H5=Heat Pump 5 ton
1	Outdoor unit mode:0-standby,2-cooling,3-heating	2	0 standby, 2 cooling, 3 heating
2	Outdoor unit set compressor speed	56	Hz
3	System last fault code	E4	system
4	T3: outdoor coil temp.(°F)	108	°F
5	T3L: outdoor coil outlet temp.(°F)	102	°F
6	T4: outdoor ambient temp.(°F)	95	°F
7	T5: compressor discharge temp.(°F)	140	°F
8	Compressor IPM temp.(°F)	120	°F
9	Pe: evaporating pressure(psig) (only for cooling mode)	130	psig
10	Pc: condensing pressure(psig) (only for heating mode)	320	psig
11	Tes: target evaporating temp.(°F) (only for cooling mode)	43	°F
12	Te: evaporating temp.(°F)	43	°F
13	Tcs: target condensing temp.(°F) (only for heating mode)	106	°F
14	Tc: condensing temp.(°F)	106	°F
15	Target value of the compressor discharge superheat(°F) (only for heating mode)	36	°F
16	Compressor discharge superheat (°F)	36	°F
17	Openings of EEVA(P)	200	0-480P
18	Fan speed stage	8	(0-10)
19	Outdoor unit fan current(A)	1	A
20	Compressor current(A)	10	A
21	Outdoor unit input current(A)	10	A
22	Outdoor unit input voltage(V)	230	V
23	Outdoor unit DC bus voltage(V)	380	V
24	Outdoor unit power(*0.1kW)	200	Outdoor unit * 0.1 kW
25	Continuous running time of the compressor(min)	35	minutes/0-999/Maintain at maximum
26	Outdoor unit main control software version	11	11
27	Indoor unit Heat Kit Staging (only for communication mode)	1	0~3
28	T2: indoor unit coil temp.(°F) (only for communication mode)	55	°F
29	Indoor unit software version (only for communication mode)	11	
30	Reserved	- -	
31	Remark“--”	- -	

Table 17-6

18 DISPOSAL

Comply with national regulations.

Components and accessories from the units are not part of ordinary domestic waste.

Complete units, compressors, motors etc. are only to be disposed of via qualified disposal specialists.

This unit uses flammable refrigerant R454B. Please contact the dealer when you want to dispose of this unit. Law requires that the collection, transportation and disposal of refrigerants must conform with the regulations governing the collection and destruction of hydrofluorocarbons.

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