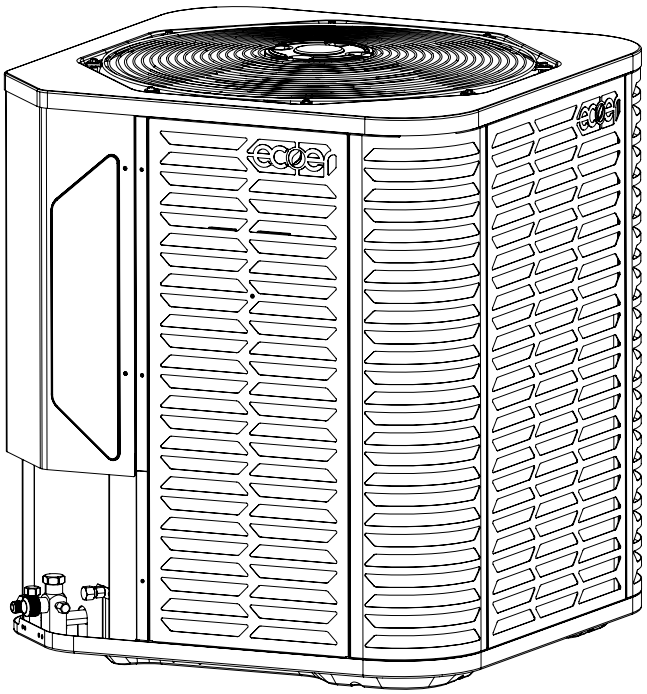
Making your home Green & Smart



Installation Manual

Inverter Ducted Split
2-5 Ton R-454B Heat Pump

NOTE: Appearance of unit may vary.

Installation must be performed in accordance with the requirements of NEC and CEC by authorized personnel only.

AHRI CERTIFIED® www.ahridirectory.org
Unitary Small HP
AHRI Standard 210/240
Certification applies only when the complete system is listed with AHRI.

c ETL LISTED US
Intertek

Contents

All phases of this installation must comply with National, State and Local Codes.

This document is customer's property and is to remain with this unit. Please return it to customer with service information 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.

⚠ SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all pre-cautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

1. Safety

Read the following safety instructions before installing the unit or doing servicing work.

NOTE: R454B refrigerant is a blend and should only be added to the system in liquid state.

⚠ **WARNING** may cause personal death or serious injury.

⚠ **CAUTION** may lead to injury or structural damage under some conditions.

⚠ WARNING

HAZARDOUS VOLTAGE

Failure to follow this warning could result in property damage, severe personal injury, or death.
Disconnect all electric power, including remote disconnections before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized.

REFRIGERANT OIL

Any attempt to repair central air conditioner and heat pump products may result in property damage, severe personal injury, or death.
Use only R-454B approved service equipment. All R-454B systems with variable speed compressors use variable speed compressor 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.

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 service valve. Turn valve stem counterclockwise only until the stem contacts the rolled edge. No torque is required.

BRAZING REQUIRED

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

HIGH CURRENT LEAKAGE

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

SERVICING/RISK OF FIRE

Flammable refrigerant used. Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.

VENTILATION

Ensure that the area is in the open or that it is ad-equately ventilated before breaking into the system or conducting any hot work.

CHECKING FOR PRESENCE OF REFRIGERANT

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

⚠ WARNING

INSTALLATION

Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.

1. That the installation of pipe-work shall be kept to a minimum.
2. That pipe-work shall be protected from physical damage.
3. Where refrigerant pipes shall be compliance with national gas regulations.
4. That mechanical connections shall be accessible for maintenance purposes.
5. Be more careful that foreign matter(oil, water,etc) does not enter the piping. Also, when storing the piping, securely seal the opening by pinching, taping, etc.
6. All working procedure that affects safety means shall only be carried by competent persons.
7. Appliance shall be stored in a well ventilated area where the room size corresponds to the room area as specifiec for operation.
8. Joints shall be tested with detection equipment with a capability of 5 g/year of refrigerant or better, with the equipment in standstill and under operation or under a pressure of at least these standstill or operation conditions after installation. Detachable joints shall NOT be used in the indoor side of the unit (brazed, welded joint could be used).
9. In cases that require mechanical ventilation, ventilation openings shall be kept clear of obstruction.

THE REQUIREMENTS FOR INSTALLATION SPACE OF APPLIANCE AND/OR VENTILATION REQUIREMENTS

1. The requirements for installation space of appliance and/or ventilation requirements are determined according to the mass charge amount(M) used in the appliance,the installation location,the type of ventilation of the location or of the appliance.
2. 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. IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA. B52. All field joints shall be accessible for inspection prior to being covered or enclosed.
3. That protection devices, piping, and fittings shall be protected as far as possible against adverse environmental effects, for example. the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris.
4. That piping in refrigeration systems shall be so designed and installed to minimize the likelihood of hydraulic shock damac.na the system.
5. That steel pipes and components shall be protected against corrosion with a rustproof coating before applying any insulation.
6. That precautions shall be taken to avoid excessive vibration or pulsation.
7. The minimum floor area of the room shall be mentioned in the form of a table or a single figure without reference to a formula.
8. 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.
9. Field-made refrigerant joints indoors shall be tightness tested according to the following requirements: 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.

⚠ WARNING

QUALIFICATION OF WORKERS

Any maintenance, service and repair operations must be required qualification of the working personnel. Every working procedure that affects safety means shall only be carried out by competent persons that joined the training and achieved competence should be documented by a certificate. The training of these procedures is carried out by national training organizations or manufacturers that are accredited to teach the relevant national competency standards that may be set in legislation. All training shall follow the ANNEX HH requirements of UL 60335-2-40 4th Edition.

Examples for such working procedures are:

• breaking into the refrigerating circuit;

• opening of sealed components;

• opening of ventilated enclosures.

In addition,this appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure they do not play with the appliance.

WORK PROCEDURE

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

PRESENCE OF FIRE EXTINGUISHER

If any hot work is to be conducted on the refrigerating equipment or any associated parts, the appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

NO IGNITION SOURCES

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

CHECKS TO THE REFRIGERATION EQUIPMENT

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

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

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

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

4. Markings on the equipment should be visible and legible. Markings and signs that are illegible shall be corrected.

5. Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

⚠ WARNING

CHECKS TO ELECTRICAL DEVICES

For systems containing refrigerant, all repair and maintenance to electrical components shall include initial safety checks and component inspection procedures such as that capacitors are discharged in a safe manner to avoid possibility of sparking, that no live electrical components and wiring are exposed while charging, recovering, or purging the system, and that there is continuity of earth bonding. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used that is reported to the owner of the equipment, so all parties are advised.

NOTE –Sealed electrical components shall be replaced, not repaired.

NOTE – Intrinsically safe components must be replaced, not repaired.

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

DETECTION OF FLAMMABLE REFRIGERANTS

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. The following leak detection methods are deemed acceptable for all refrigerant systems. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and that 12.5 % refrigerant is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

REMOVAL AND EVACUATION

When breaking into the refrigerant circuit to make repairsor for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed and, since flammability is a consideration, procedures such as safely remove refrigerant following local and national regulations, purging the circuit with inert gas, evacuating (optional for A2L), purging with inert gas (optional for A2L), or opening the circuit by cutting or brazing be adhered to. The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to be able to perform the required work. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and working area is well ventilated.

⚠ WARNING

CABLING

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

CHARGING PROCEDURES

In addition to conventional charging procedures; the following requirements shall be followed:

- Works shall be undertaken with appropriate tools only (In case of uncertainty,please consult the manufacturer of the tools for use with flammable refrigerants) .
- Ensure that contamination of different refrigerants does not occur when using charging equipment.
- Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept upright.
- Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete(if not already).
- Extreme care shall be taken not to overfill the refrigeration system.
- Prior to recharging the system it shall be pressure tested with oxygen free nitrogen (OFN), The system shall be leak tested on completion of charging but prior to commissioning.
- A follow up leak test shall be carried out prior to leaving the site.

DECOMMISSIONING

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is requiredprior to re-use of recovered refrigerant. It is essential that electrical power is available before the task iscommenced.

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 protetive equipment is available and being used correctly;
- the recovery process is supervised at all times by a competent person;
- recovery equipment and cylinders conform to the appropriate standards.

d. Pump down refrigerant system, if possible.

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

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

g. Start the recovery machine and operate in accordance with instructions.

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

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

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

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

LABELLING

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

⚠ WARNING

RECOVERY

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

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

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

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

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

UNVENTILATED AREAS

For appliances containing more than any refrigerating circuit, the manual shall include a statement advising that an unventilated area where the appliance using FLAMMABLE REFRIGERANTS is installed shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard. This shall include:

1. A warning that if appliances with A2L REFRIGERANTS connected via an air duct system to one or more rooms are installed in a room with an area less than >Amin as determined in Clause GG.2, that room shall be without continuously operating open flames (for example an operating gas appliance) or other POTENTIAL IGNITION SOURCES (for example an operating electric heater, hot surfaces). A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest.

2. For appliances using A2L REFRIGERANTS connected via an air duct system to one or more rooms, a warning with the substance of the following: "Auxiliary devices which may be a POTENTIAL IGNITION SOURCE shall not be installed in the duct work. Examples of such POTENTIAL IGNITION SOURCES are hot surfaces with a temperature exceeding X °C and electric switching devices".

NOTE X is the maximum allowable surface temperature as defined in 22.117.

The manufacturer should specify other potential continuously operating sources known to cause ignition of the refrigerant used.

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

3. For appliances using A2L refrigerants connected via an air duct system to one or more rooms, a warning that only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork. The manufacturer shall list in the instructions all approved auxiliary devices by manufacturer and model number for use with the specific appliance, if those devices have a potential to become an ignition source.

⚠ WARNING

4. A warning that if appliances connected via an air duct system to one or more rooms with A2L REFRIGERANTS are installed in a room with an area less than 4 minutes as determined in Clause GG.2. or installed in a room with an EFFECTIVE DISPERSAL VOLUME VED less than the minimum as determined by Clause 101.DVN.8, that room shall be without continuously operating open flames (e.g. an operating gas appliance) or other POTENTIAL IGNITION SOURCES (for e.g. an operating electric heater hot surfaces). A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest.
5. For REFRIGERANT DETECTION SYSTEMS, the function and operation and required servicing measures.
6. For LIMITED LIFE REFRIGERANT SENSORS Used in REFRIGERANT DETECTION SYSTEMS, the specified end-of-life and replacement instructions.
7. REFRIGERANT SENSORS for REFRIGERANT DETECTION SYSTEMS Shall Only be replaced with sensors specified by the appliance manufacture; and instructions to verify actuation of mitigation actions per Annex GG or Annex 101.DVN as applicable.
For appliances using FLAMMABLE REFRIGERANTS with safety features that depend upon the proper function of a leak detection system used for leak mitigation, the instructions and unit markings shall contain the substance of the following:
"LEAK DETECTION SYSTEM installed. Unit must be powered except for service." If any remote located REFRIGERANT SENSOR is employed to detect leaked refrigerant, such a remote located REFRIGERANT SENSOR shall also apply to this marking or be accompanied by such instructions.

TRANSPORTATION,MARKING AND STORAGE

a. General

The following information is provided for units that employ FLAMMABLE REFRIGERANTS.

b. Transport of equipment containing flammable refrigerants

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.

c. Marking of equipment using signs

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.
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.

d. Disposal of equipment using flammable refrigerants

See national regulations.

e. Storage of equipment/appliances

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

f. Storage of packed (unsold) equipment

Storage package protection should be constructed in 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.

⚠ CAUTION
AUTHORIZED PERSONNEL ONLY This information is intended for use by individuals possessing adequate backgrounds of electrical and mechanical experience. Any attempt to repair central air conditioner or heat pump products may result in personal injury and/or property damage.
INDOOR UNIT REQUIRMENT It is recommended to equip indoor units with **adjustable TXV/EEV for R-454B heat pump**. The model of TXV/EEV should be suitable for the system capacity and should be with internal check valves for heat pump, which can be verified to work properly by checking superheat in cooling. No micro channel coil shall be used for heat pump. Micro channel coils are suitable for cooling only system.
HOT SURFACE May cause minor to severe burns Failure to follow this caution could result in property damage or personal injury. Do not touch top of compressor.
GROUNDING REQUIRED Failure to inspect or use proper service tools may result in equipment damage or personal injury. Reconnect all grounding devices. All parts of this product that are capable of conducting electrical current are grounded. If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, it must be returned to their original position and properly fastened.
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 the system.

Explanation of symbols displayed on the indoor unit or outdoor unit

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

2. Unit Location Considerations

2.1 Inspect Units

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

All units should be stored in the factory shipping carton with internal packaging in a dry place until installation. Carefully remove the packaging and inspect for hidden damage. Any hidden damage should be recorded and the factory should be notified. The gauge port can be used to check the refrigerant charge has been retained during shipment.

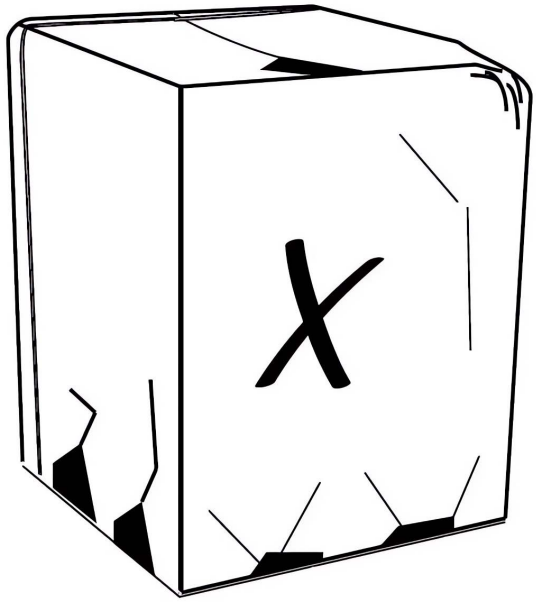


Fig 2-1 Check damage

2.2 Unit Dimensions

Two models sharing the same chassis are suit for most residential air conditioner and heat pump applications.

Table 2-1 Condensing unit dimensions

Unit Dimensions	
Model	H x W x D (Inches)
2436	24-1/4 x 29-1/8 x 29-1/8
4860	32-1/2 x 29-1/8 x 29-1/8

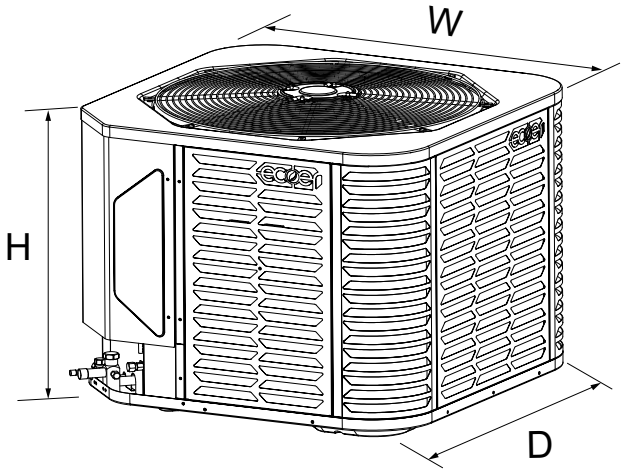


Fig 2-2 External dimensions

2.3 Location Restrictions

⚠ WARNING

Flammable refrigerant!

Appliance shall be installed, operated in a room that meets special requirements and has an area limit as shown in Section 2.4

⚠ WARNING

Flammable refrigerant!

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.

Exposure to a corrosive environment may shorten the life of the equipment, corrode metal parts, and/or negatively affect unit performance. Corrosive elements include, but are not limited to: sodium chloride, sodium hydroxide, sodium sulfate, and other compounds commonly found in ocean water, sulfur, chlorine, fluorine, fertilizers, and various chemical contaminants from industry/manufacturing plants. If installed in areas which may exposed to corrosive environments, special attention should be given to the equipment placement and maintenance.

- Lawn sprinklers/waste water should not spray directly on the unit cabinet for prolonged periods.
- In coastal areas: The outdoor unit should be installed at a location that is at least 1000 feet away from the coast and on the side of the building that is farthest from the coast.

Installation Clearance Requirement

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

Do not locate condensing unit near bedrooms because normal operational sounds may be annoying. Position unit to allow adequate space for unobstructed airflow, wiring, refrigerant lines, and serviceability.

Allow a minimum of 12 in. clearance on one side of access panel to a wall and a minimum of 24 in. on the adjacent side of access panel. **Maintain a distance of 24 in. between units.**

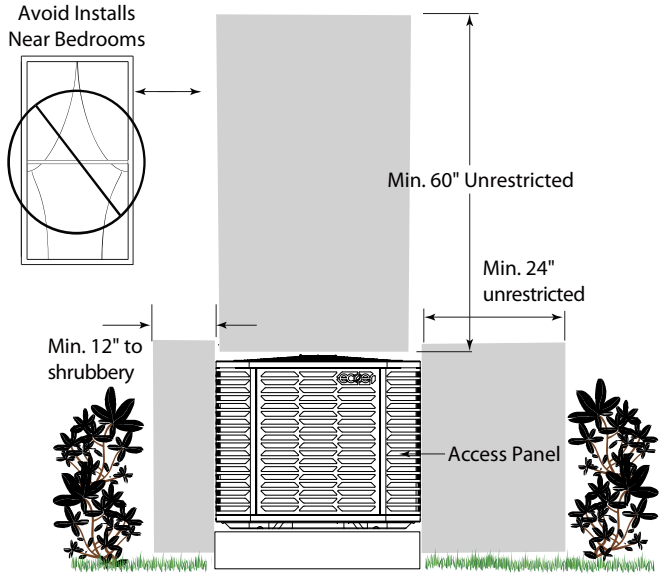


Fig 2-3 Clearance requirement

Position unit so water, snow, or ice from roof or overhang cannot fall directly on unit.

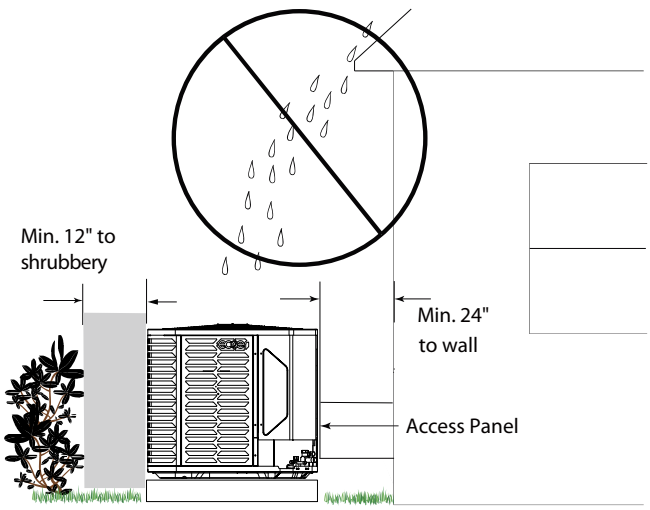


Fig 2-4 Unit location

Cold Climate Considerations

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

Elevate unit per local climate and code requirements.

- Where snowfall is anticipated, raise the unit above the base pad to prevent ice buildup and coil damage. Mount the unit high enough to be above the average accumulated area snowfall.
- If unit must be elevated because of anticipated snowfall, secure unit and elevating stand such that unit and/or stand will not tip over or fall off.

A snow drift barrier should be installed around the unit to prevent a build-up of snow on the unit sides.

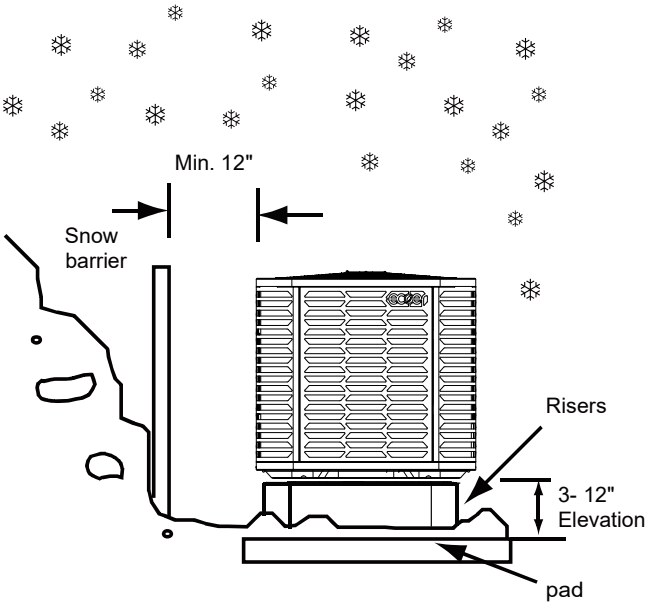


Fig 2-5 Consideration to prevent refreezing

Snow Guard Kit Cautions

No kit shall damage the top panel of condensing unit.

- Main control board (MCB) will be damaged due to the rainwater flow into the control box.
- The condensing coil will be broken resulting in refrigerant leak.

In areas prone to blizzards and freezing rain, it is advisable to install a snow guard for added protection.

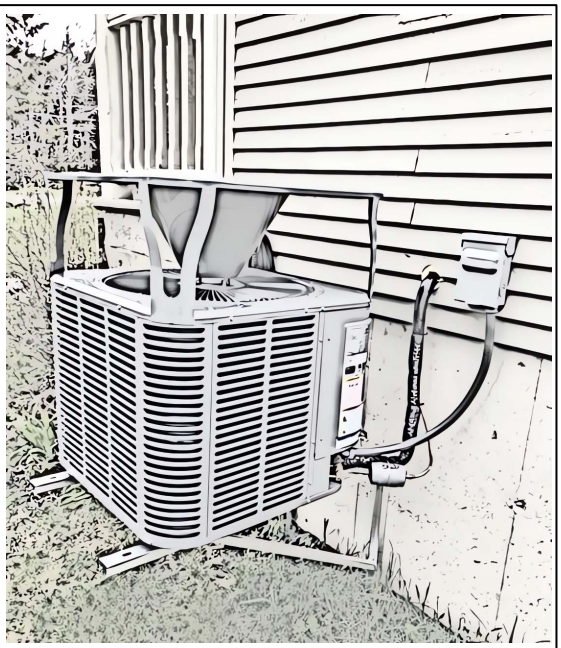


Fig 2-6 Snow Guard Kit

2.4 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.

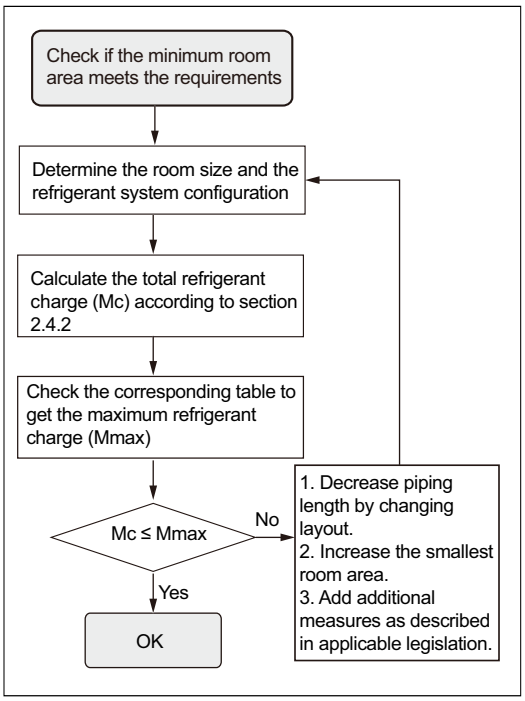


Fig 2-7

The terms in this section are explained as follows:

- Mc: The actual refrigerant charge in the system.
- A: the actual room area where the appliance is installed.
- Amin: The required minimum room area.
- Mmax:The allowable maximum refrigerant charge in a room.
- Qmin: The minimum circulation airflow.
- Anvmin:The minimum opening area for connected rooms.
- TAmin: The total area of the conditioned space (For appliances serving one or more rooms with an air dut system).
- TA: The total area of the conditioned space connected by air ducts.

2.4.1 The Room Area Calculation Requirements

⚠ CAUTION

Flammable refrigerant!

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 / or doors between occupied spaces, including gaps between the wall and the floor, can be considered a single room when determining compliance to Amin, provided all of the following conditions are met as shown in Fig 2-7.

Low level opening:

1、The opening shall not be less than Anvmin in Table 2-2.

2、The area of any openings above 11-13/16 inches from the floor shall not be considered in determining compliance with Anvmin.

3、At least 50% of the opening area of Anvmin shall be below 7-7/8 inches from the floor.

4、The bottom of the opening is not more than 3-15/16 inches from the floor.

5、The opening is a permanent opening that cannot be closed.

6、For openings extending to the floor the height shall not be less than 25/32 inches above the surface of the floor covering.

High level opening:

1、The opening shall not be less than 50% of Anvmin in Table 2-2.

2、The opening is a permanent opening that cannot be closed.

3、The opening shall be at least 59 inches above the floor.

4、The height of the opening is not less than 25/32 inches.

Room size requirement:

1、The room into which refrigerant can leak, plus the connected adjacent room(s) shall have a total area not less than Amin. Amin is shown in Table 2-4.

2、The room area in which the unit is installed shall be not less than 20% Amin. Amin is shown in Table 2-4.

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

The minimum opening for natural ventilation (Anvmin) in connected rooms is related to the room area (A), the actual refrigerant charge of refrigerant in the system (Mc) , and the allowable MAXIMUM REFRIGERANT CHARGE in the system (Mmax), Anvmin can be determined according to Table 2-2.

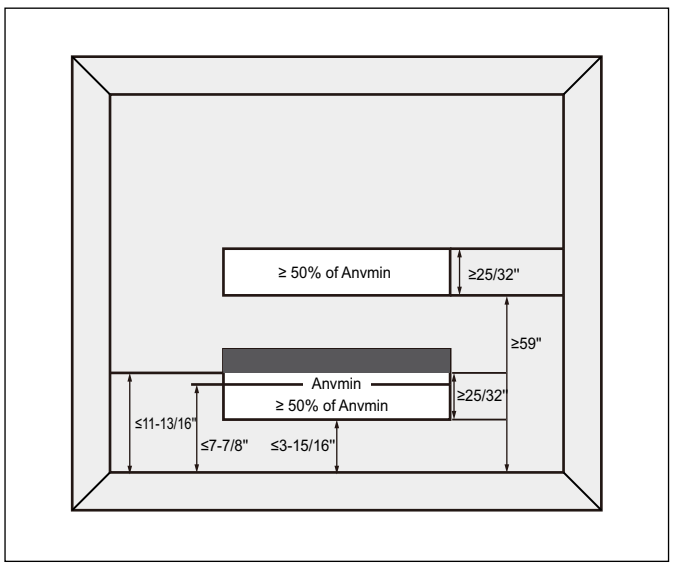


Fig 2-8

Table 2-2 The minimum opening area for connected rooms:
Note: Take the Mc=17 lbs 3 oz as an example.

A (ft2)	Mc (lbs/oz)		Mmax (lbs/oz)		Anvmin (ft2)
	lbs	oz	lbs	oz	
100	17	3	6	10	1.3
110	17	3	7	5	1.2
120	17	3	8	0	1.1
130	17	3	8	10	1.0
140	17	3	9	5	1.0
150	17	3	10	0	0.9
160	17	3	10	10	0.8
170	17	3	11	5	0.7
180	17	3	12	0	0.6
190	17	3	12	10	0.5
200	17	3	13	5	0.5
210	17	3	14	0	0.4
220	17	3	14	10	0.3
230	17	3	15	5	0.2
240	17	3	16	0	0.1
250	17	3	16	10	0.1
260	17	3	17	5	0.0

Installation Instructions

For appliances serving one 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.

2.4.2 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 (Mmax) and the required minimum room area (Amin/TAmin) is shown in Table 2-3 and Table 2-4.

Table 2-3 The allowable maximum refrigerant charges:

A/TA (ft2)	Mmax (lbs/oz)		A/TA (ft2)	Mmax (lbs/oz)	
	lbs	oz		lbs	oz
40	2	10	160	10	10
50	3	5	170	11	5
60	4	0	180	12	0
70	4	10	190	12	10
80	5	5	200	13	5
90	6	0	210	14	0
100	6	10	220	14	10
110	7	5	230	15	5
120	8	0	240	16	0
130	8	10	250	16	10
140	9	5	260	17	5
150	10	0	-	-	-

Table 2-4 The required minimum room area:

Mc (lbs/oz)		Amin/TAmin (ft2)	Mc (lbs/oz)		Amin/TAmin (ft2)
lbs	oz		lbs	oz	
4	6	66.1	11	0	165.3
4	13	72.7	11	7	171.9
5	4	79.3	11	14	178.5
5	11	86.0	12	5	185.1
6	2	92.6	12	12	191.7
6	9	99.2	13	3	198.4
7	0	105.8	13	10	205.0
7	7	112.4	14	1	211.6
7	15	119.0	14	8	218.2
8	6	125.6	14	15	224.8
8	13	132.2	15	6	231.4
9	4	138.8	15	14	238.0
9	11	145.5	16	5	244.6
10	2	152.1	16	12	251.2
10	9	158.7	17	3	257.9

Table 2-5 The minimum circulation airflow:

Mc (lbs/oz)		Qmin(CFM)	Mc (lbs/oz)		Qmin (CFM)
lbs	oz		lbs	oz	
4	6	119	11	0	298
4	13	131	11	7	310
5	4	143	11	14	322
5	11	155	12	5	334
6	2	167	12	12	346
6	9	179	13	3	358
7	0	191	13	10	370
7	7	203	14	1	382
7	15	215	14	8	394
8	6	227	14	15	406
8	13	239	15	6	418
9	4	251	15	14	430
9	11	263	16	5	442
10	2	275	16	12	454
10	9	287	17	3	466

⚠ CAUTION

Min. room area and airflow required!
The allowable maximum refrigerant charge of the Table 2-3 or the required minimum room area of the Table 2-4 is available only if the following conditions are met:
Minimum velocity of 3.28ft/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 2-5, which is related to the actual refrigerant charge of the system (Mc). R454B refrigerant leakage sensor is configured.

⚠ CAUTION

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 2-3 or Table 2-4.

⚠ CAUTION

Min. room area and airflow required!
If the actual room area, air outlet height, and refrigerant charge amount are not reflected in the above table, more severe cases need to be considered according to the data in the tables 2-2, 2-3 ,2-4 & 2-5.

3. Position the Unit

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

Properly selected isolation is recommended to prevent sound or vibration transmission to the building structure. If elevating a unit on a flat roof, use 4" x 4" or equivalent stringers positioned to distribute unit weight evenly and prevent noise and vibration.

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

- The pad must be 1~2" 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.

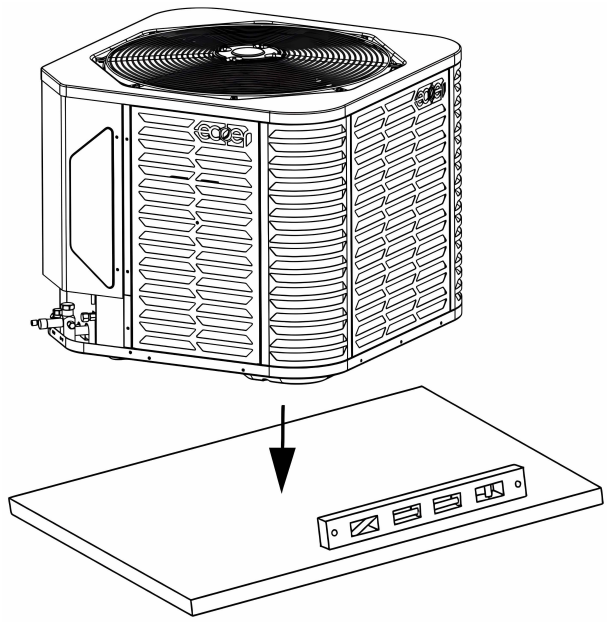


Fig 3-1 Position the unit on pad

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

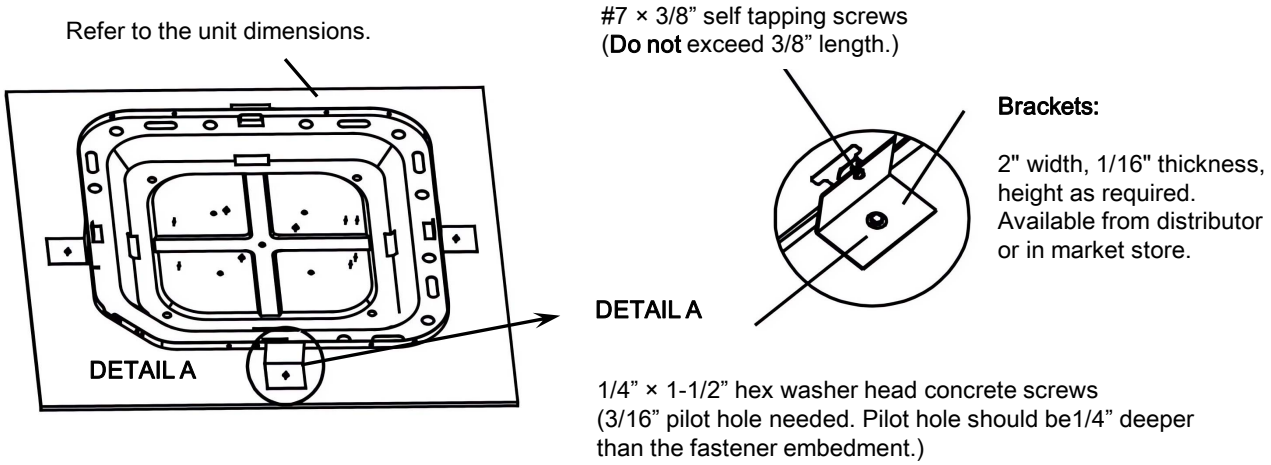


Fig 3-2 Fasten the condensing unit

4. Refrigerant Line Considerations

4.1 Refrigerant Line Limits

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

Table 4-1 Line sizes and maximum lenghth

Model	Liquid Line	Suction Line	Total Equivalent Length (FT)					
			25	50	75	100	125	150
	Dimensions in inches		Maximum Elevation Difference (FT)					
2Ton	3/8 Std.	3/4 Std.	25	50	45	40	30	25
	1/4 Opt.	5/8 Opt.	25	50	40	30	30	25
3Ton	3/8 Std.	3/4 Std.	25	50	50	50	35	25
	1/4 Opt.	5/8 Opt.	25	50	45	40	35	25
4Ton	3/8	7/8 Std.	25	50	50	40	30	25
		3/4 Opt.	25	50	50	40	30	25
5Ton	3/8	7/8 Std.	25	50	50	40	30	25
		3/4 Opt.	25	50	50	40	30	25
		1-1/8 Opt.	25	40	N/A	N/A	N/A	N/A

Std.: Standard line size; **Opt.**: Optional line size; **N/A**: Application not recommended

• Maximum line length = 150 feet.

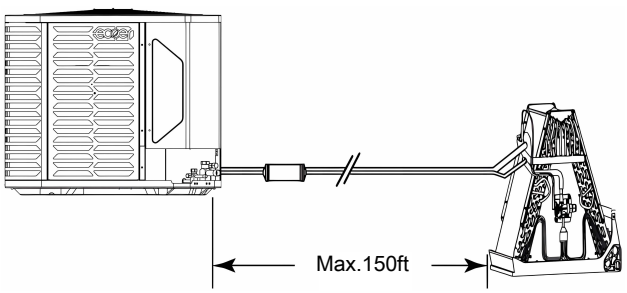


Fig 4-1 Line length limit

• Maximum elevation difference = 50 feet.

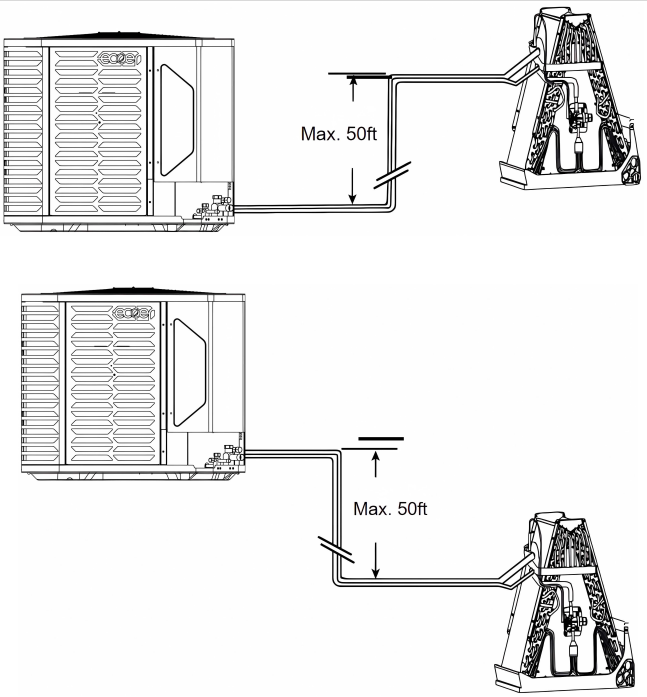


Fig 4-2 Elevation difference limit

4.2 Refrigerant Line Insulation

The suction line must always be insulated.

DO NOT allow the suction line and liquid line to come in direct (metal to metal) contact.

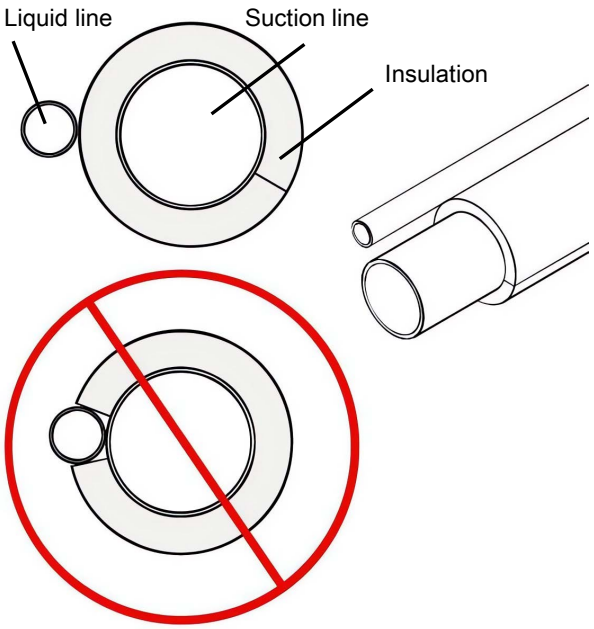


Fig 4-3 Line insulation

4.3 Reuse Existing Refrigerant Lines

⚠ CAUTION

If you using existing refrigerant lines, ensure that all joints are brazed, not soldered.

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

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

- Ensure that the refrigerant lines are **free of leaks, acid and mineral oil.** When replacing R-22 system with a new R-454B system, be sure the existing lines can endure R-454B pressure which is 50~70% higher than R-22 system. Use flush (e.g. Rx11) to remove the old mineral oil, sludge, moisture, acid and other contaminants out of the line set.

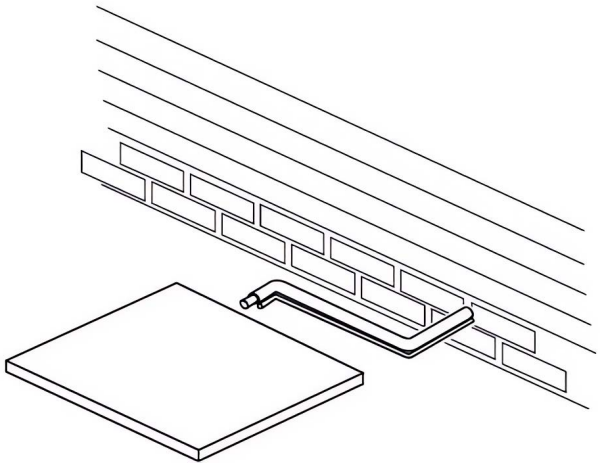


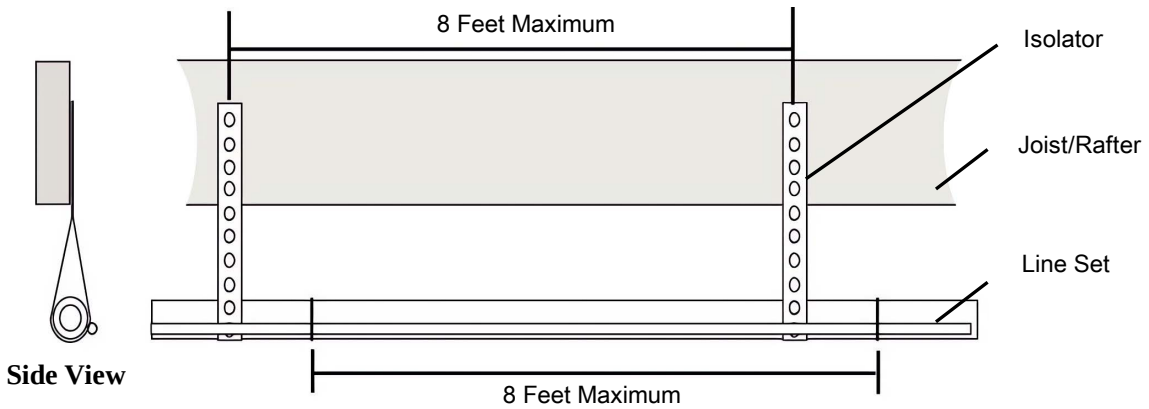
Fig 4-4 Use existing refrigerant lines

IMPORTANT:
It is recommended to equip indoor units with adjustable TXV/EEV for R-454B heat pump.
The model of TXV/EEV should be suitable for the system capacity and should be with internal check valves for heat pump, which can be verified to work properly by checking superheat in cooling.
No micro channel coil shall be used for heat pump.
Micro channel coils are suitable for cooling only system.

5. Refrigerant Line Routing

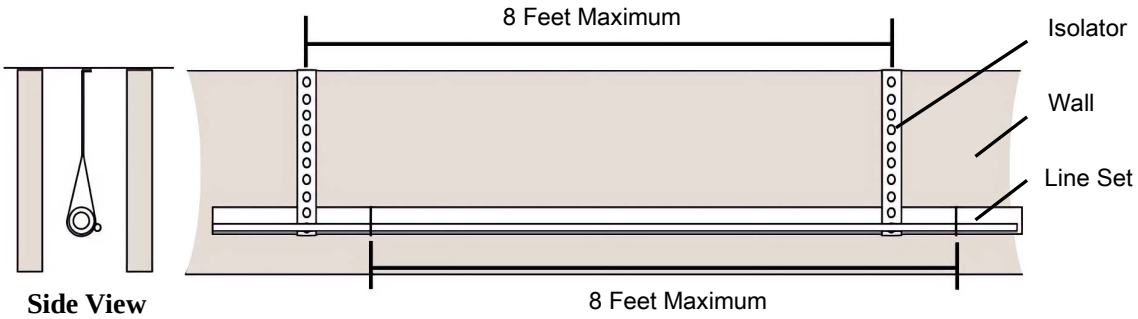
Comply with National, State, and Local Codes when isolating line sets from joists, rafters, walls, or other structural elements. Take precautions to prevent noise within the building structure due to vibration transmission from the refrigerant lines. For Example:

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



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

Fig 5-1 Isolation from Joist/Rafter



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

Fig 5-2 Isolation in wall spaces

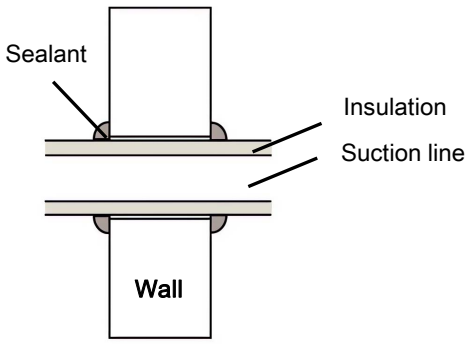


Fig 5-3 Isolation through wall

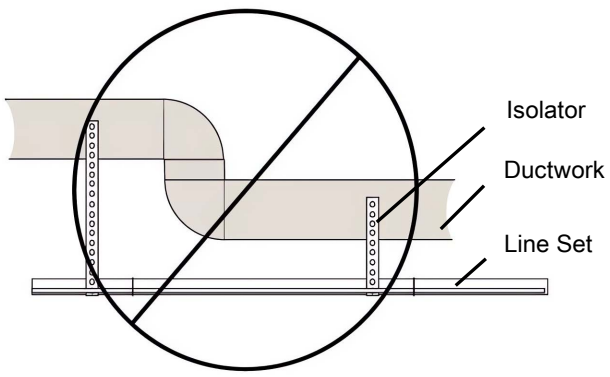


Fig 5-4 DO NOT hang line sets from ductwork

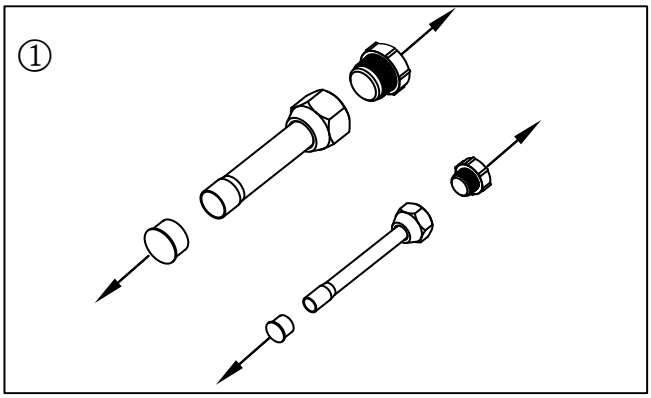
6. Refrigerant Line Connection

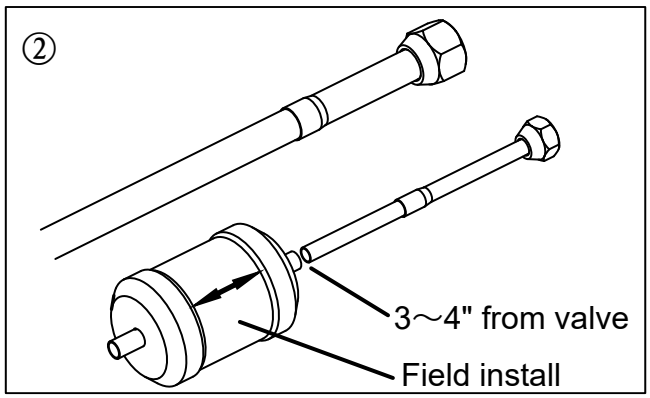
6.1 Refrigerant Line Brazing Connection

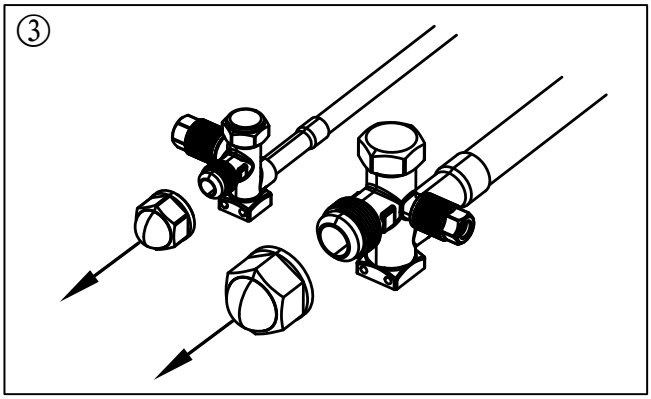
Refer to below figures marked with digital number for line brazing procedures.

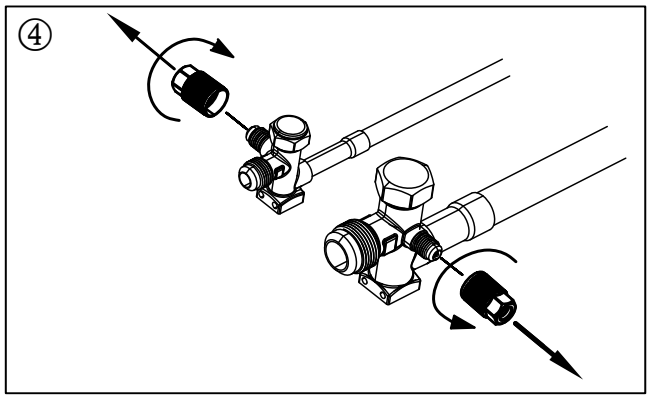
Every figure is corresponding to the following illustrations.

1. Find the plastic bag taped to the outdoor unit that contains the copper adapter tube and brass nut. Remove the dust plugs and plastic threaded joints from both ends.
2. Wrap a wet rag around filter drier body to avoid heat damage and continue the dry nitrogen purge. Braze the refrigerant lines to the adapter tube. Install a bidirectional filter drier (NO active alumina allowed) in liquid line to protect the heat pump. Do not remove the wet rag until all brazing is completed.
3. Remove the brass nut from the service valve.
4. Remove the plastic pressure tap caps from both service valves.
5. Attach the brass nut to the service valve. First, use an appropriately sized open-end wrench (Wrench A) to hold the service valve steady. Then, use a torque wrench (Wrench B) to tighten the brass nut. Refer to Table 6-1 for the specifications of the open-end wrench and the tightening torque for the torque wrench. Excessive tightening may damage the threads of the service valve.
6. Evacuate the refrigerant lines.
7. After completing the evacuation, install the pressure tap caps back using a torque of 1.5-2N•m.









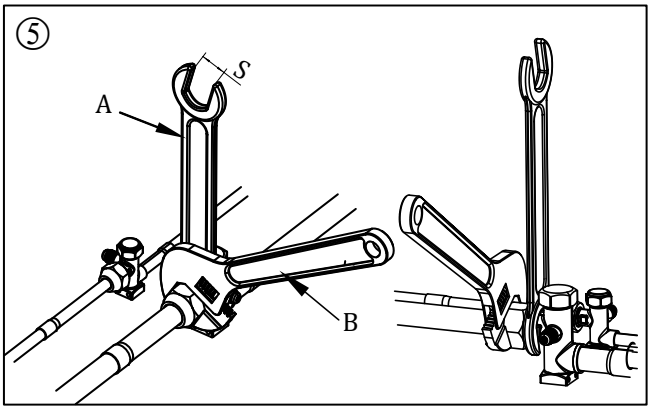


Table 6-1 Torque requirements

Pipe gauge	Tightening torque	Open-end wrench specification "S"
Φ3/8in (Φ9.52mm)	32-39N•m (320-390kgf•cm)	9/16in (14.3mm)
Φ3/4in (Φ19mm)	67-87N•m (670-870kgf•cm)	7/8in (22.2mm)
Φ7/8in (Φ22mm)	75-95N•m (750-950kgf•cm)	Please use torque wrench

Fig 6-1 Refrigerant Line Brazing Connection

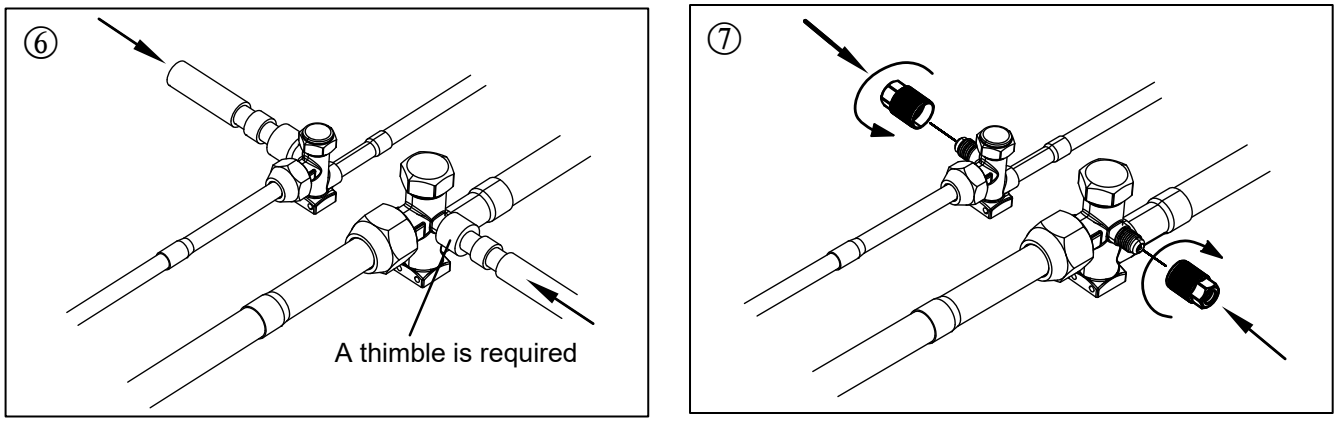


Fig 6-1 Refrigerant Line Brazing Connection

6.2 Refrigerant Line Zoomlock Connection

This ZoomLock connection operation is for reference only. Please follow the official instructions provided by ZoomLock Tools for operation.

1. Use a rotary tube cutter to cut off the flaring structure of the copper tube.
2. Using a reamer or deburing tool, remove all burrs from the cut section of the pipe.
3. Use a pencil type deburrer on internal tube edges.
4. Thoroughly clean the tube end using a general purpose hand pad or sand cloth in a rotating motion.
5. Insert the tube fully into the fitting. Ensure tube is fully inserted prior to pressing
6. Align jaws squarely on the fitting,complete the joint with the approved tool. Press once only.
   The ZoomLock connection has been completed. Please proceed with Steps 3 to 7 in Section 6.1 to complete the refrigerant line connection.

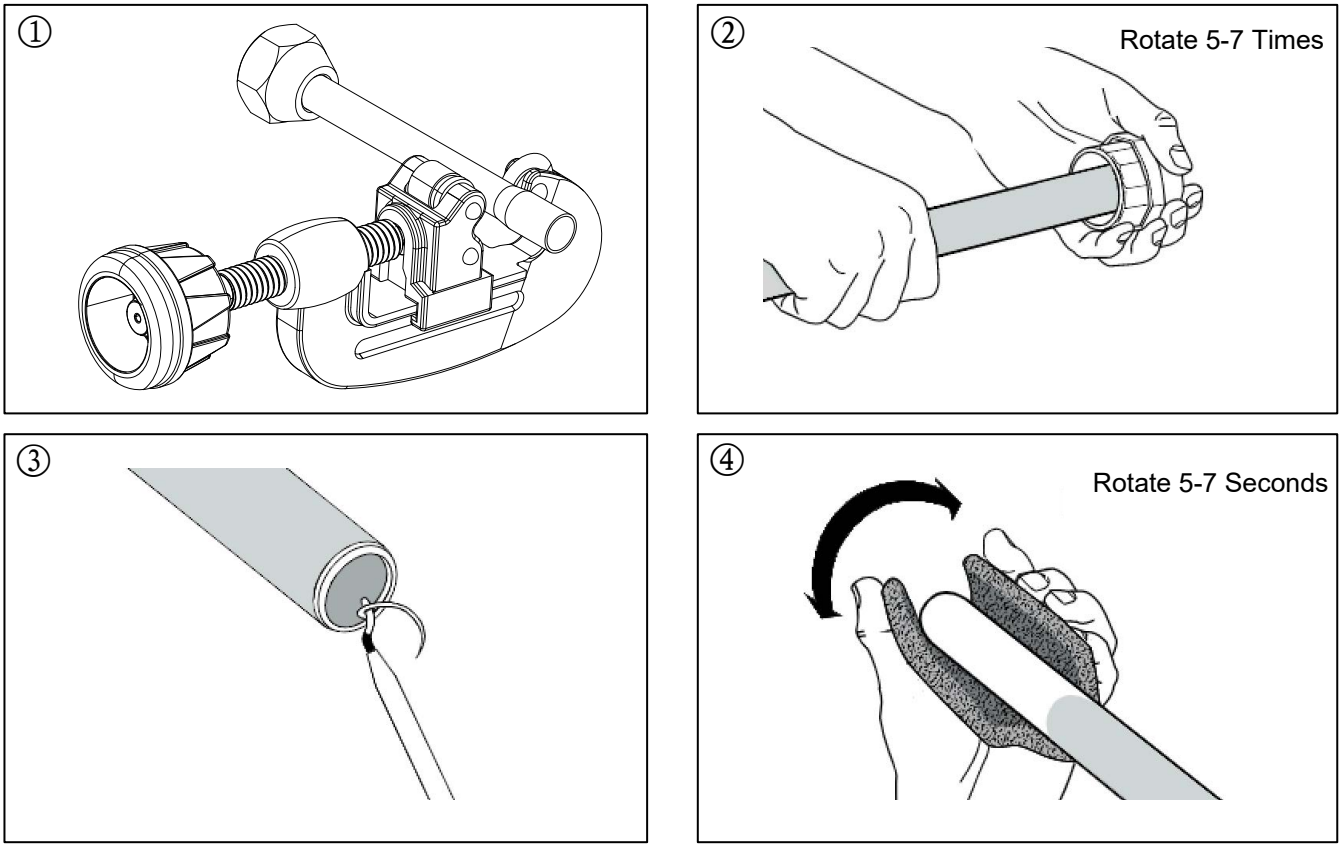


Fig 6-2 Refrigerant Line Zoomlock Connection

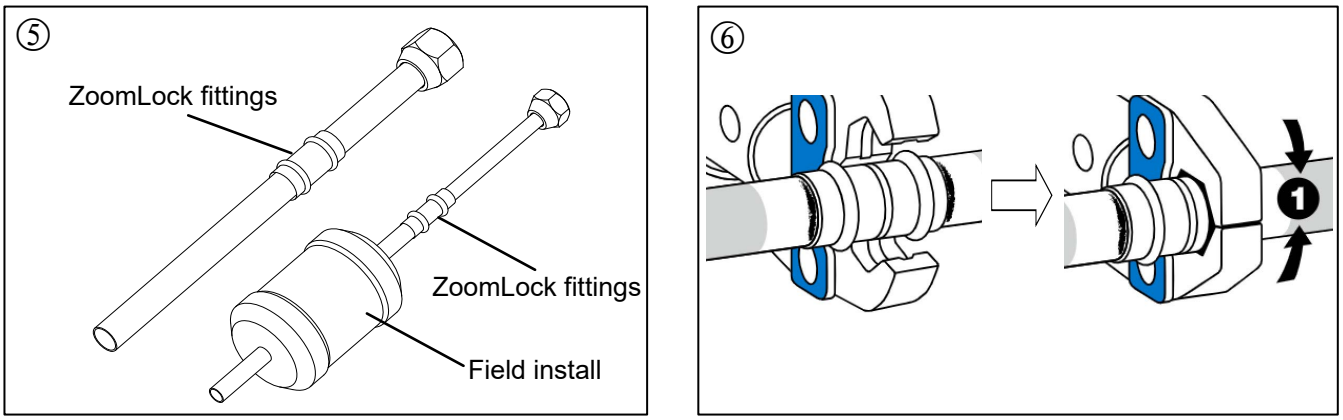


Fig 6-2 Refrigerant Line Zoomlock Connection

6.3 Refrigerant Line Connection

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.

7. System Leak Check

Leak check is required for the brazed line connections.

1. Pressurize the brazed refrigerant lines and indoor coil to at least 450 PSIG using dry nitrogen.
2. Wait for 10 minutes without a drop in pressure.
3. Check for leaks by using a soapy solution or bubbles at each brazed location.

Note: Remove nitrogen pressure and repair any leaks before continuing.

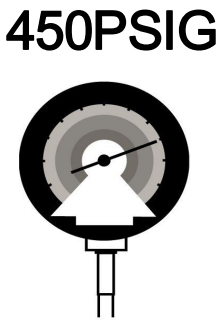


Fig 7-1: Charge the system with dry nitrogen

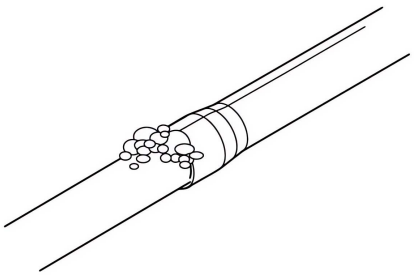


Fig 7-2 Leak check

After completion of field piping for split systems, the field pipework shall be pressure tested with nitrogen and then vacuum tested prior to refrigerant charging, according to the following requirements:

1.The minimum leak test pressure of the lineset and indoor coil 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.

2.The test pressure after removal of pressure source shall be maintained for at least 1 hour with no decrease of pressure indicated by the test gauge, with test gauge resolution not exceeding 5% of the test pressure.

Important: Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks.

Important: The following leak detection methods are deemed acceptable for all refrigerant systems:

• Electronic leak detectors calibrated for R454B

• Bubble method

8. Evacuation and Servicing

8.1 Evacuate the Refrigerant Lines and Indoor Coil

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

1. The vacuum should be pulled for at least 45 minutes.
2. Evacuate until the micron gauge reads less than 350 microns, then close the valve to the vacuum pump.
3. Evacuation is complete if the micron gauge does not rise above 500 microns in 10 minutes.
4. Once evacuation is complete, blank off the vacuum pump and micron gauge, and close the valve on the manifold gauge set.

Under no circumstances shall potential sources of ignotion be used in the searching for or detection of refrigerant leaks.
The following leak detection methods are deemed acceptable for all refrigerant systems:
• Electronic leak detectors calibrated for R454B
• Bubble method
• Fluorscent method agents
If a leakage of refirgerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

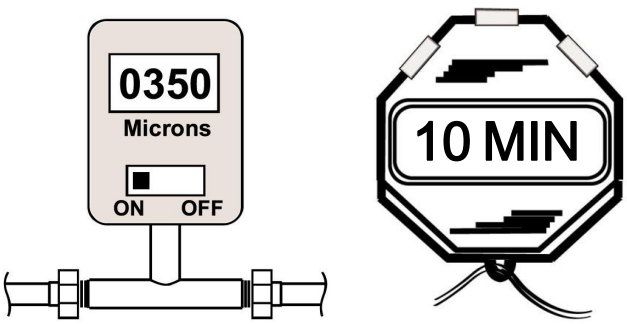


Fig 8-1 Evacuation the refrigerant system

8.2 Servicing

• If repairs must be made after system is charged, properly and safely remove or isolate refrigerant and purge the section of the system needing repair with Nitrogen gas or oxygen free nitrogen prior to opening the circuit.

• The REFRIGERANT CHARGE shall be recovered into the correctly marked recovery cylinders.

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

• 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.

• Ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. Only use cylinders designated for there covered refrigerant and labelled for the refrigerant. Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order.

• A set of caliberated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Ensure any associated electrical components are sealed.

• The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder. Do not mix refrigerants.

• 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.

9. Service Valves

Leak check and evacuation must be completed before opening the service valves.

The gas service valve must be opened BEFORE opening the Liquid Service Valve!

1. Remove service valve cap.
2. Fully insert hex wrench into the stem and counterclockwise until valve stem just touches the rolled edge (approximately five turns.)
3. Replace and tighten the valve stem cap to prevent leaks. Additional 1/6 turn may be required.

Repeat 1 to 3 for Liquid Service Valve.

⚠ WARNING

Extreme caution should be exercised when opening the Liquid Service Valve. Turn counterclockwise until the valve stem just touches the rolled edge. No torque is required.

Failure to follow this will result in abrupt release of system charge and may lead to personal injury and /or property damage.

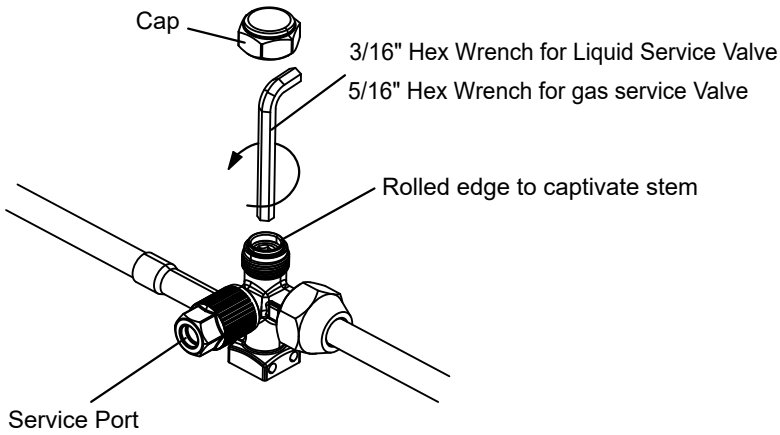


Fig 9-1 Open the service valves

10. Electrical – Low Voltage

10.1 Low voltage wire requirement

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

Table 10-1 Low voltage control wiring requirement

CONTROL WIRING	
Wire Size	Max. Wire Length
18 AWG	150Ft
16 AWG	225Ft

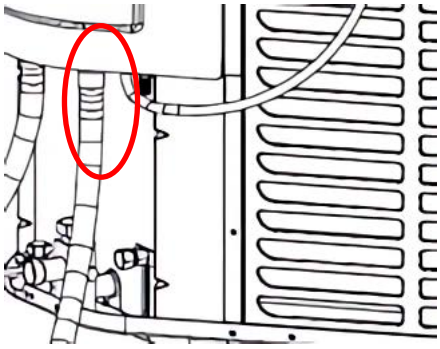


Fig 10-1 Sealing requirement

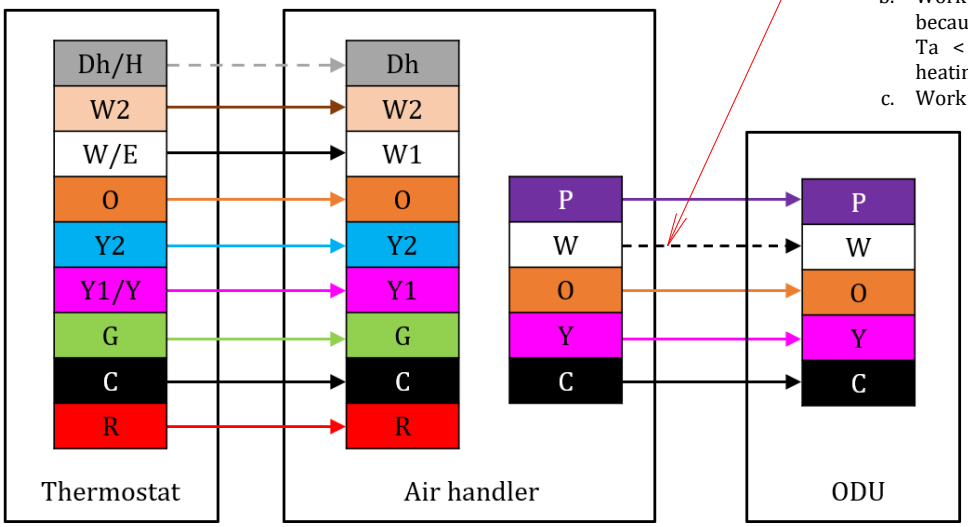
10.2 Low voltage hook-up diagrams

With ECOER AHU:

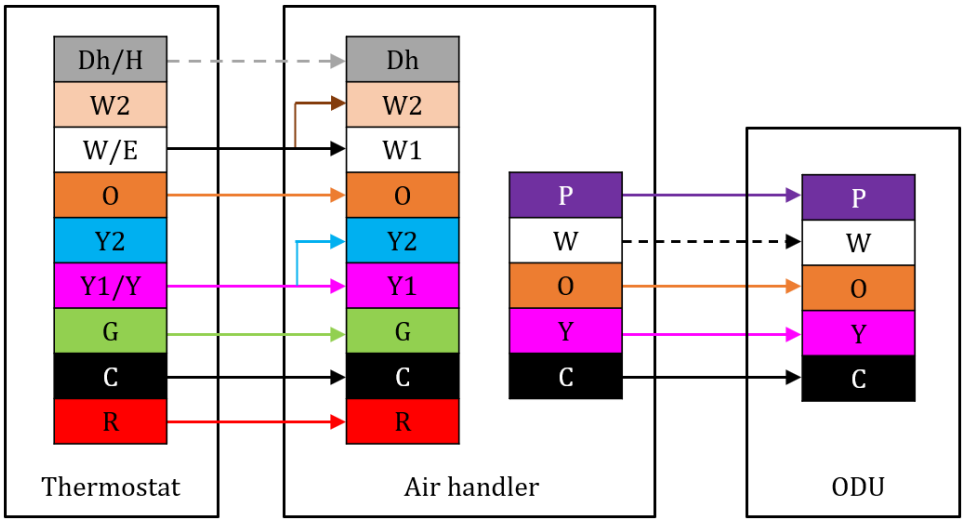
E-heater or Dual fuel

To activate the indoor second heater. Outdoor W terminal outputs 24Vac once the system needs it.

a. Work when the HP cannot to be started because of Ta < the value of n01 setting in heating.
b. Work when the second heater is called because n02 setting is ON (E-Aux) and Ta < the value of n03 setting in heating.
c. Work when the HP is in defrosting.



Wiring for 4H2C thermostat



Wiring for 2H1C thermostat

Fig 10-2 Schematic diagram for control wiring connection

NOTES:

1. Be sure power supply agrees with equipment nameplate.
2. Power wiring and grounding of equipment must comply with local codes.
3. Low voltage wiring to be No. 18 AWG minimum conductor.
4. "- - -" means the electric auxiliary heater connection.

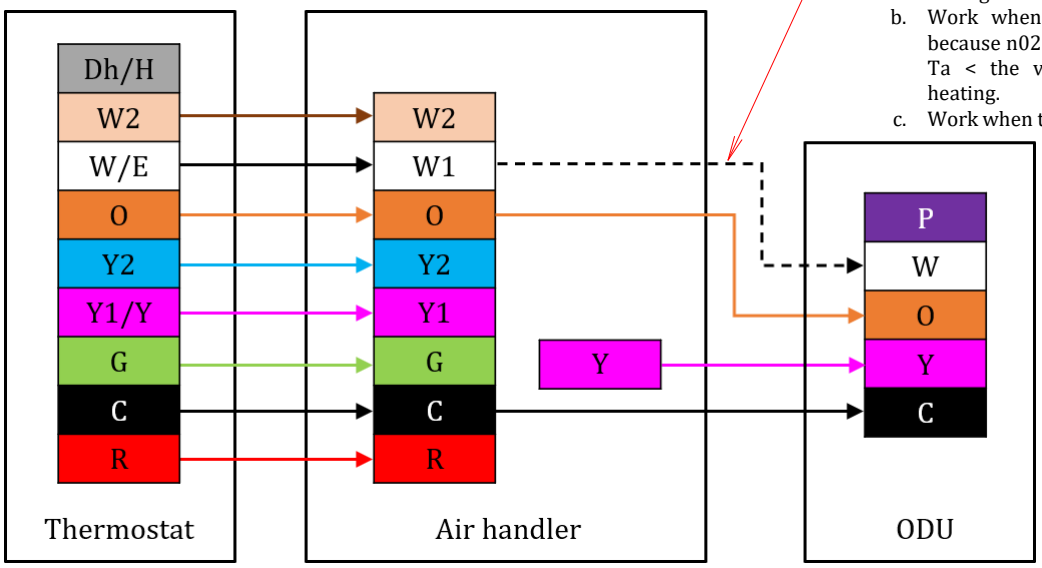
* Some thermostats may use W2/AUX for heat pump.

With the third AHU:

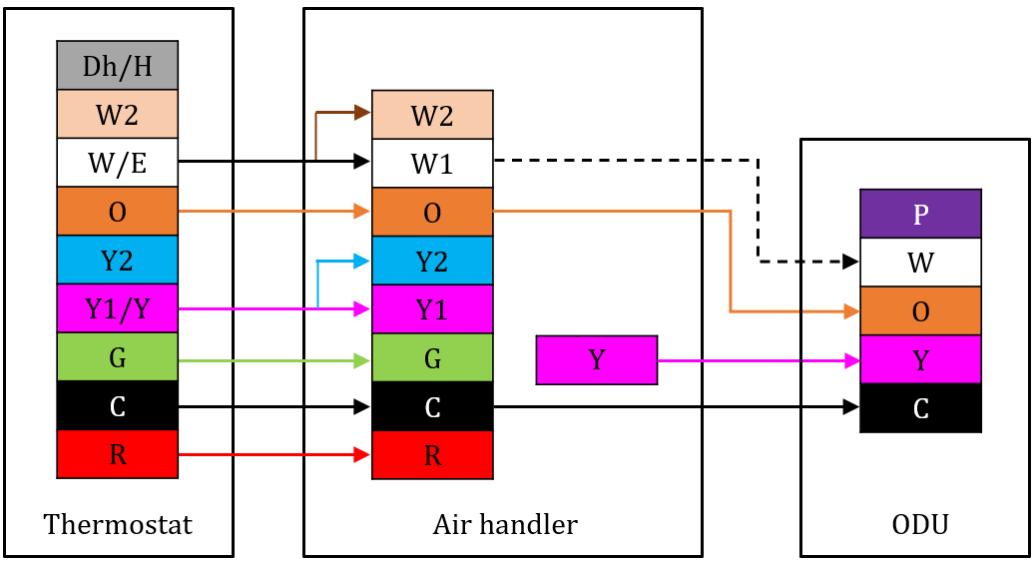
E-heater or Dual fuel

To activate the indoor second heater. Outdoor W terminal outputs 24Vac once the system needs it.

a. Work when the HP cannot to be started because of Ta < the value of n01 setting in heating.
b. Work when the second heater is called because n02 setting is ON (E-Aux) and Ta < the value of n03 setting in heating.
c. Work when the HP is in defrosting.



Wiring for 4H2C thermostat



Wiring for 2H1C thermostat

NOTES:

Fig 10-3 Schematic diagram for control wiring connection

1. Be sure power supply agrees with equipment nameplate.
2. Power wiring and grounding of equipment must comply with local codes.
3. Low voltage wiring to be No. 18 AWG minimum conductor.
4. "- - -" means the electric auxiliary heater connection.

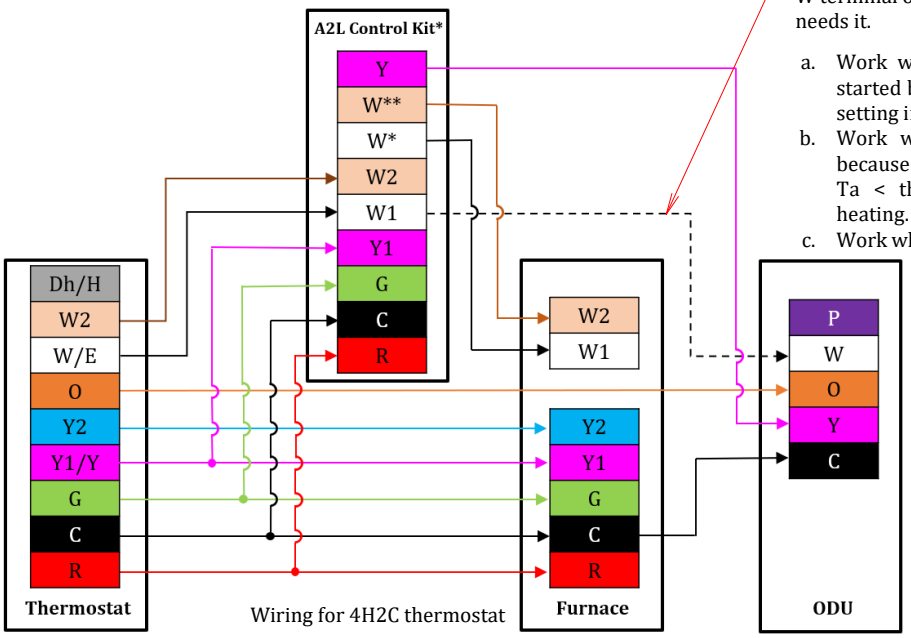
* The wiring diagram is for reference only. For details, see the actual A2L Control Kit wiring diagram.
* Some thermostats may use W2/AUX for heat pump.

With the Furnace:

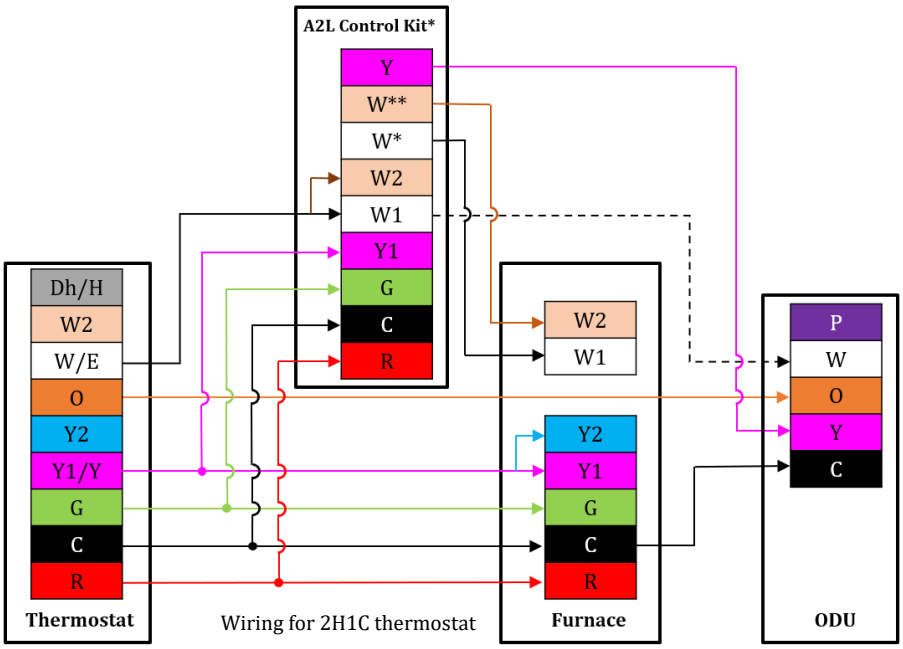
E-heater or Dual fuel

To activate the indoor second heater. Outdoor W terminal outputs 24Vac once the system needs it.

a. Work when the HP cannot to be started because of Ta < the value of n01 setting in heating.
b. Work when the second heater is called because n02 setting is ON (E-Aux) and Ta < the value of n03 setting in heating.
c. Work when the HP is in defrosting.



Wiring for 4H2C thermostat



Wiring for 2H1C thermostat

Fig 10-4 Schematic diagram for control wiring connection

NOTES:

1. Be sure power supply agrees with equipment nameplate.
2. Power wiring and grounding of equipment must comply with local codes.
3. Low voltage wiring to be No. 18 AWG minimum conductor.
4. "– – –" means the electric auxiliary heater connection.

* The wiring diagram is for reference only. For details, see the actual A2L Control Kit wiring diagram.
* Some thermostats may use W2/AUX for heat pump.

11. Electrical – High Voltage

11.1 High voltage power supply

> **⚠ WARNING**
>
> During installation, testing, servicing, and trouble shooting 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.

The high voltage power supply must match the equipment nameplate. Power wiring must comply with National, State and Local codes.

Follow instructions on unit wiring diagram located on the inside of the control box cover.

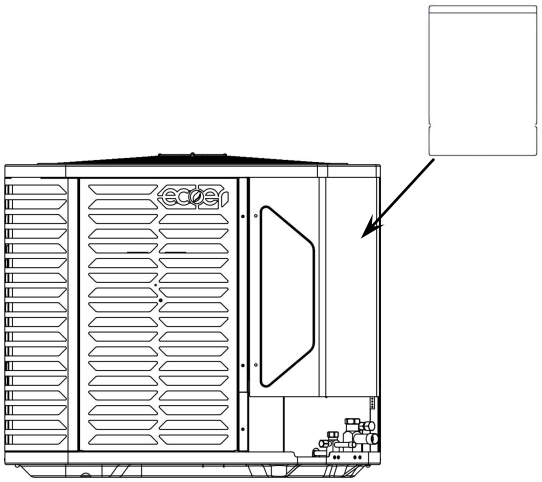


Fig 11-1 Read the Warning Label

Power Supply			
Model	Voltage	MCA	Breaker
2436	208/230V-1Ph-60Hz	24.4A	35A
4860	208/230V-1Ph-60Hz	32.5A	50A

11.2 High voltage disconnect switch

Install a separated disconnect switch at the condensing unit. Field provided **flexible electrical conduit** must be used for high voltage wiring.

In order to get full warranty coverage on the compressor, It is mandatory to install a surge protector to prevent damage to the unit caused by abnormal electrical spikes.

We recommend the Installation of a GFIC (install the GFIC as per your local codes).

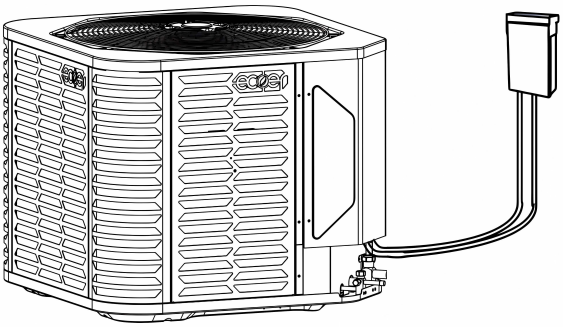


Fig 11-2 Install an independent switch

11.3 High voltage ground

Ground the condensing unit according to National, State, and Local code requirements.

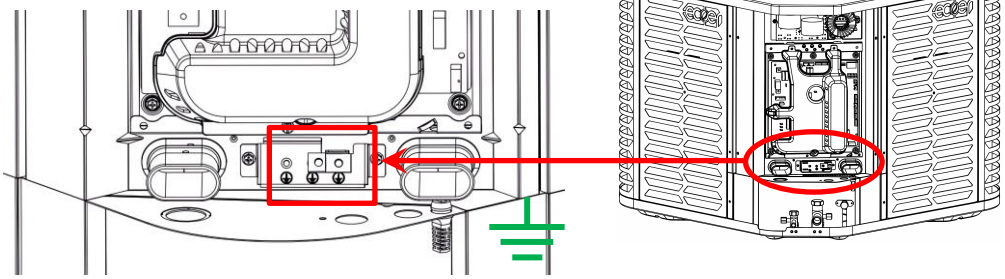


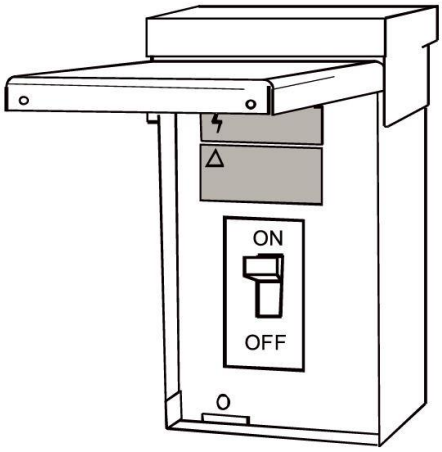
Fig 11-3 Unit grounding

12. Start-up

Prior to start-up the unit, connect IoT device if equipped with. Refer to IoT IM and Registration Guide via ESS Pro App. At the same time, ensure chapters 5 to 11 have been completed.

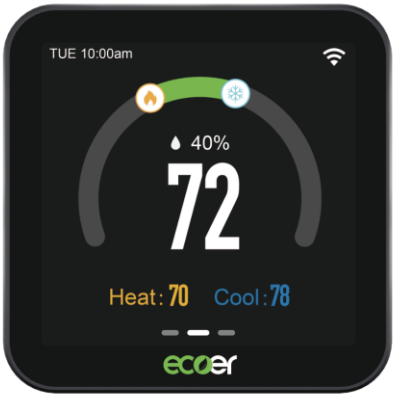
1. Set the thermostat to OFF.

2. Turn on disconnect switch to apply power to the indoor and outdoor units.



3. Wait an hour before starting the unit if the outdoor ambient temperature < 59 °F.

4. Set the thermostat to ON.



NOTE:

It may take up to 45 minutes for the heating operation to exit start-up control the first time. This is normal function to preheat lubricants in the bottom of compressor.

13. System Charge Adjustment

13.1 Weigh-in method

Weigh-in method can be used for the initial installation, or anytime a system charge needs to be replaced. Weigh-in method can also be used when power is not available on the job site or the ambient temperature is improper to use refrigerant coefficient and sub-cooling charge method.

When use weigh-in method in heating mode, be sure the compressor discharge superheat (DSH) meets the target value.
Basically, the liquid line sub-cooling (SC) shall not exceed 30°F.

Use the **gauge port** to charge the system in heating mode and query live data using the BS3 button to calculate DSH (The difference between parameter "11" and "18") or check SC/DSH via ESS Pro App.

Table 13-1 Charge amount table

A	B	C		D
Model	Factory charge	Indoor	Charge amount for ecoer air handler	Charge multiplier for liquid line length *2
2436	The data on nameplate	24K	0	0.6 oz/ft
		36K	0	
4860		36K	0	
		48K	18oz *1	
		60K	18oz *1	

1. **Every condensing unit is factory charged for the smallest rated indoor coil combinations.** An additional amount of refrigerant adjustment is required for a large indoor coil. It's invalid for system with electric heat or other third-party heat source whose capacity is 1.2 times of heat pump nominal capacity.

2. **The charging guideline is calculated in 25ft of standard size line set.** A refrigerant adjustment may be necessary if the line set length is over the pre-charged 25 ft (adding 0.6 oz/ft on 3/8 liquid line respectively).

13.2 Auto charge mode

NOTES:

1. This AUTO charge mode is suitable for ambient temperature between 50°F and 115°F. But for the best results, indoor temperature should be kept between 70°F and 80°F. For outdoor ambient temperature is below 50℉, use weigh-in charge method only.

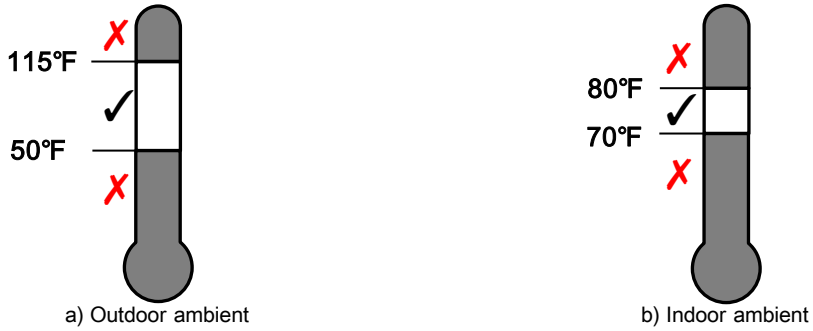


Fig 13-1 Temperature limit for AUTO charge mode

2. Start-up control is enforced to complete prior to activate the AUTO charge mode. It may take 4 to 10 minutes to exit start-up control procedure and fix the compressor speed (RPS).
3. The service valve is usually closed except in charge mode. If you need to know the suction pressure, you can log in to ESS Pro, or read the parameter of "07" from Spot check.

Enter the charge mode

Turn on the power supply for the system, select **cooling mode** at thermostat. Make sure the setting temperature is lower than indoor temperature for at least 5℉ to finish this charge mode ***NOTE1**.
Press and hold BS4 button for five (5) seconds until SEG1 displays blinking 7. After one minute, the system will go into AUTO charge mode *NOTE2.

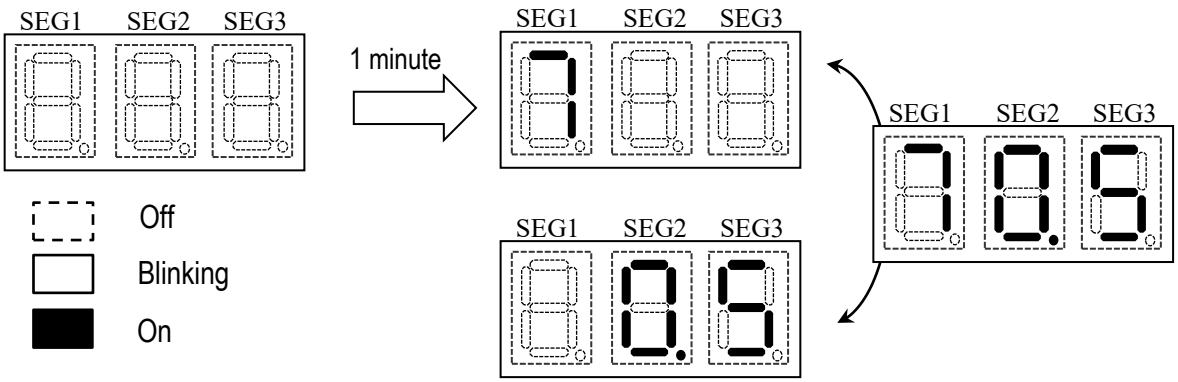
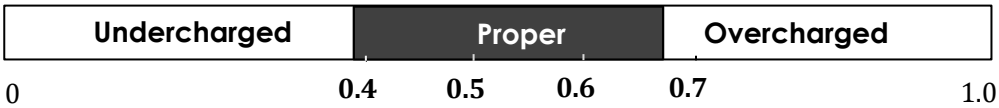


Fig 13-2 LED display in AUTO charge mode

Run the system for 15~20 minutes and check **refrigerant coefficient** number (here short for "X", 0 < X <1) from the LED display. If X ≥ 0.7, remove refrigerant; or X < 0.4, add more refrigerant. Then wait for 5 minutes to allow system pressure balanced. Check the new coefficient number to make sure you get 0.5-0.7.Basically,0.4 to 0.7 is acceptable if 7°F ≤ SSH ≤ 20°F.
When the LED displays "--" for more than 20 minutes, stop charging and check that the evaporator throttle valve of the indoor unit is working correctly.

Refrigerant coefficient

The refrigerant coefficient is used to evaluate the refrigerant level in the ecoer system.



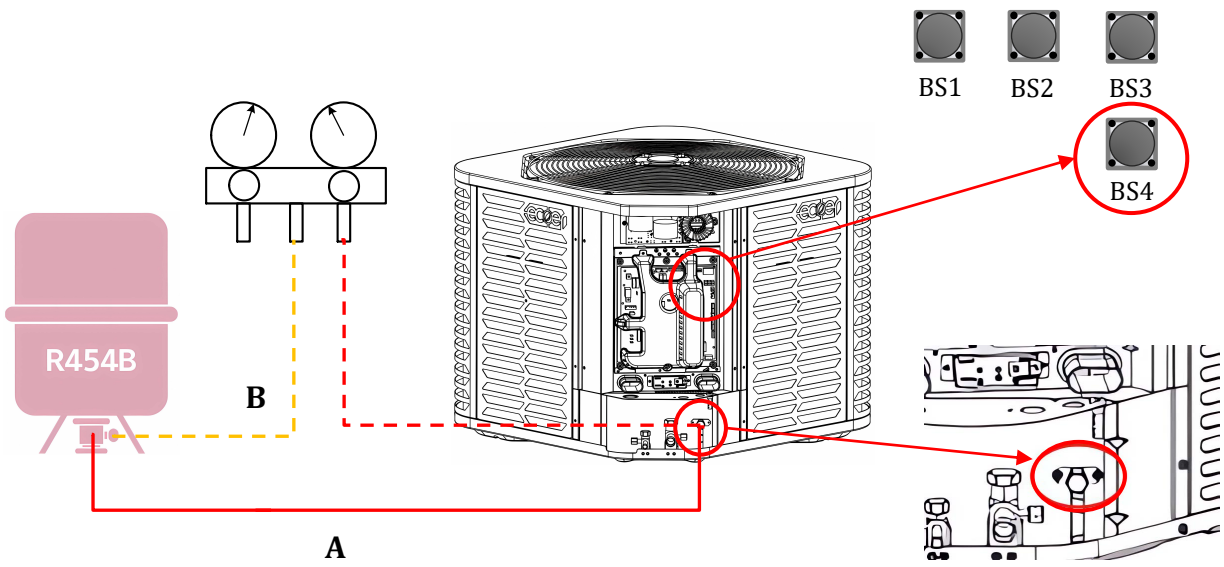
Use either way below to end AUTO charge mode

Press **BS4 once/** After 2 hours running (Automatically EXIT)/ Turn off the system at thermostat

Fully automatic refrigerant charging:

Refrigerant charging if the unit is undercharged:

1. Connect the refrigerant tank to the service gauge port of the unit and open all the service valves.
2. Power on the system and set the thermostat to the cooling mode.
3. Press and hold the BS4 button for 5 seconds until the display starts blinking "7.".
4. Wait for at least 1 hour, and the system will automatically charge the refrigerant to the appropriate level.
5. Remove the refrigerant tank.



Note:

1. Prior to opening the service valves, ensure to purge all the hoses.
2. Make sure to place the refrigerant tank upside down before connecting it.
3. Only one hose (Connection A) is needed for the refrigerant charge. If you want traditional connection, you can also use a pressure gauge (Connection B).

13.3 Sub-cooling charge

Refer to the following steps to charge refrigerant by sub-cooling degree in cooling mode.

STEP1 CALCULATE SUPERHEAT ON SUCTION VALVE

Measured suction line temperature = _____℉

Measured suction line pressure = _____PSIG

Calculated superheat value = _____℉

Table 13-2 Superheat calculation on gas service valve

Suction line TEMP (℉)	Final Superheat (℉)							
	8	10	12	14	16	18	20	22
	Suction Gauge Pressure (PSIG)							
40	91	88	84	80	77	74	71	67
42	95	91	88	84	80	77	74	71
44	99	95	91	88	84	80	77	74
46	103	99	95	91	88	84	80	77
48	107	103	99	95	91	88	84	80
50	111	107	103	99	95	91	88	84
52	116	111	107	103	99	95	91	88
54	120	116	111	107	103	99	95	91
56	125	120	116	111	107	103	99	95
58	129	125	120	116	111	107	103	99
60	134	129	125	120	116	111	107	103
62	139	134	129	125	120	116	111	107
64	144	139	134	129	125	120	116	111
66	149	144	139	134	129	125	120	116
68	154	149	144	139	134	129	125	120
70	160	154	149	144	139	134	129	125
72	166	160	154	149	144	139	134	129

STEP2 CALCULATE SUB-COOLING ON LIQUID VALVE

Measured liquid line temperature = _____℉

Measured liquid line pressure = _____PSIG

Calculated sub-cooling value = _____℉

Add refrigerant if calculated sub-cooling value is lower than the designed one. Repeat the steps above.

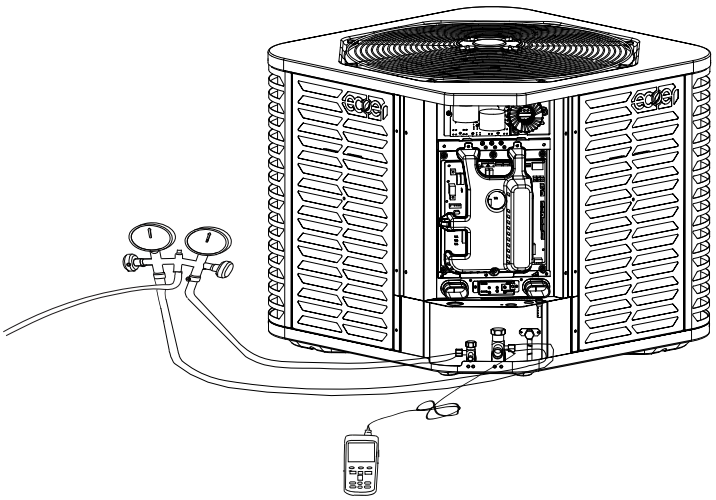


Fig 13-3 Measure the superheat or sub-cooling

Table 13-3 Sub-cooling calculation on liquid service valve

Liquid line TEMP (℉)	Final Sub-cooling (℉)							
	6	7	8	9	10	11	12	13
	Liquid Gauge Pressure (PSIG)							
55	164	167	170	173	176	178	182	184
60	178	182	184	188	191	194	197	200
65	194	197	200	203	207	210	213	216
70	210	213	216	220	224	227	231	234
75	227	231	234	238	242	245	249	252
80	245	249	252	256	261	264	268	271
85	264	268	271	276	280	284	288	292
90	284	288	292	296	301	305	310	313
95	305	310	313	318	323	327	332	336
100	327	332	336	341	346	351	356	360
105	351	356	360	366	371	376	381	385
110	376	381	385	390	396	400	406	411
115	400	406	411	417	423	428	434	439
120	428	434	439	445	451	456	463	468
125	456	463	468	474	481	486	493	498

Table 13-4 Designed sub-cooling degree

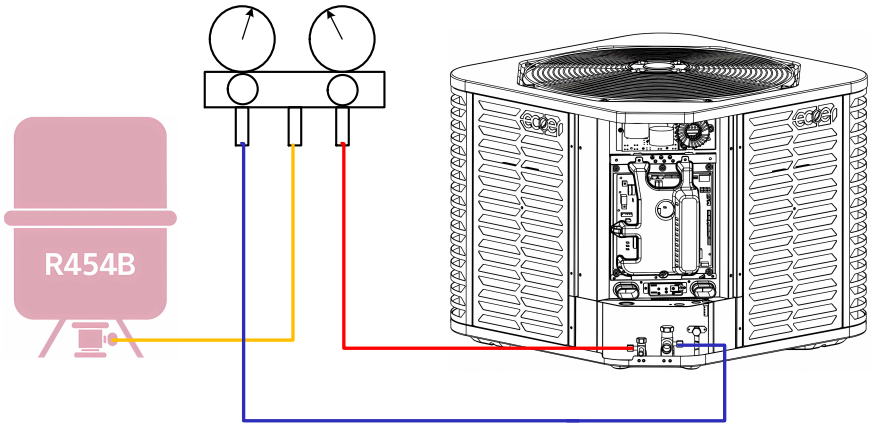
Model	Designed sub-cooling degree (SC)
24	8℉ (±2℉)
36	10℉ (±2℉)
48	10℉ (±2℉)
60	10℉ (±2℉)

STEP3 ADJUST REFRIGERANT LEVEL TO ATTAIN PROPER GAUGE PRESSURE

Add refrigerant if the sub-cooling is lower than the chart value.

1. Connect gauge hoses to refrigerant tank and liquid/gas service valves (Use gauge port instead of gas service valve for charge in heating. Note: The gauge port is normally closed, please enter the auto charge mode for charging).
2. Purge all hoses.
3. Stand the refrigerant tank upside-down and charge.
4. Stop adding refrigerant when sub-cooling matches the charging chart.

Remove refrigerant if the sub-cooling is higher than the chart value.



STEP4 STABILIZE THE SYSTEM

1. Wait five (5) minutes for the unit to stabilize between adjustments. When the sub-cooling matches the chart, the system is properly charged.
2. Remove gauge hoses.
3. Replace and tighten service port caps to prevent leaks. Plus an additional 1/6 turn may be required.

STEP5 RECORD SYSTEM INFORMATION FOR FURTHER REFERENCE

Condensing unit model	
Indoor unit model	
Measured outdoor ambient temperature	℉
Measured indoor ambient temperature	℉
Liquid gauge pressure	PSIG
Suction gauge pressure	PSIG
Measured suction line temperature	℉
Measured liquid line temperature	℉

14. System Operation

14.1 Default display

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

SEG1: Normally blank, but it displays codes "0 to 9" accordingly if there is damaged sensor and command response.

SEG1 Code	Description
0	Software is updating through IoT device
1	High pressure sensor (HP) fault backup running
2	Low pressure sensor (LP) fault backup running
3	Compressor discharge temperature sensor (TD) fault backup running
4	IPM module temperature sensor (TF) fault backup running
5	Ambient temperature sensor (TA) fault backup running
6	Defrost sensor (TH) fault backup running
7	Compressor suction temperature sensor (TS) fault backup running
8	Liquid line temperature sensor (TL) fault backup running
9	IoT command response

SEG2: Normally blank, but it will display code accordingly as below if outdoor unit is running under limited condition.

SEG2 Code	Description
0	Running under high pressure limit
1	Running under low pressure limit
2	Running under discharge temperature limit
3	Running under IPM module temperature limit
4	Running under compressor current limit

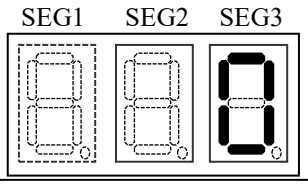
SEG3: It displays outdoor unit's operation mode.

SEG3 Code	Description
0	Stop (Y signal de-energized)
1	Ready to start-up ***NOTE**
2	Cooling
3	Heating
4	Oil return
5	Defrost
6	Manual defrost
7	AUTO charge mode in cooling
8	Pump down

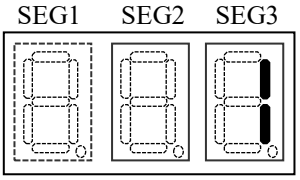
NOTE: Compressor waits three to eight (8) minutes to restart.

Mode list (SEG3 Display)

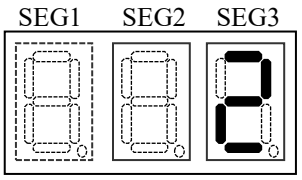
Stop or standby



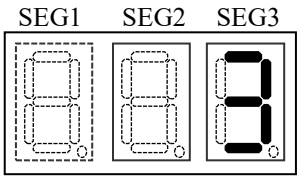
Ready to start-up



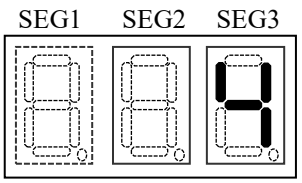
Cooling



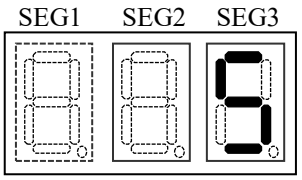
Heating



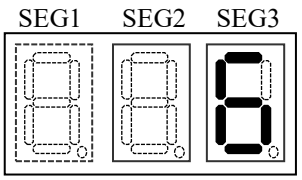
Oil return



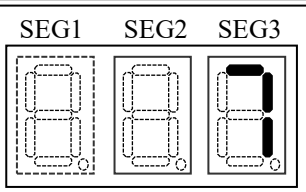
Defrost



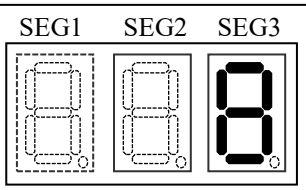
Manual defrost



AUTO charge mode in cooling



Pump down

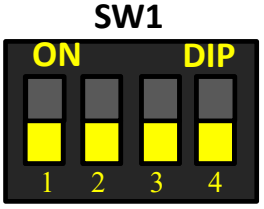


14.2 Field setting

Outdoor condensing units' functions can be applied by dipping switch and pressing buttons.

14.2.1 Setting by dip switches

SW1 Dip switch		Description	
NO.	Setting item	Status	Content
1	Snow Sensor Control	ON	Disable
		OFF (factory)	Enable
2	Capacity selection	ON	2 or 4 Ton
		OFF (factory)	3 or 5 Ton
3	AC only / Heat pump	ON	AC only
		OFF (factory)	Heat pump
4	Command [*a] response for IoT	ON	Disable
		OFF (factory)	Enable

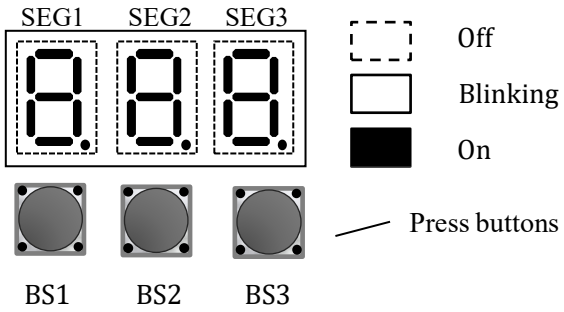


Use minor straight screwdriver to dip switch. Must power off the unit for at least two minutes to activate the change.

a. Remote field setting, troubleshooting, software programming etc.

14.2.2 Setting by pressing buttons

Query and setting operation can be done by pressing buttons on main control board.

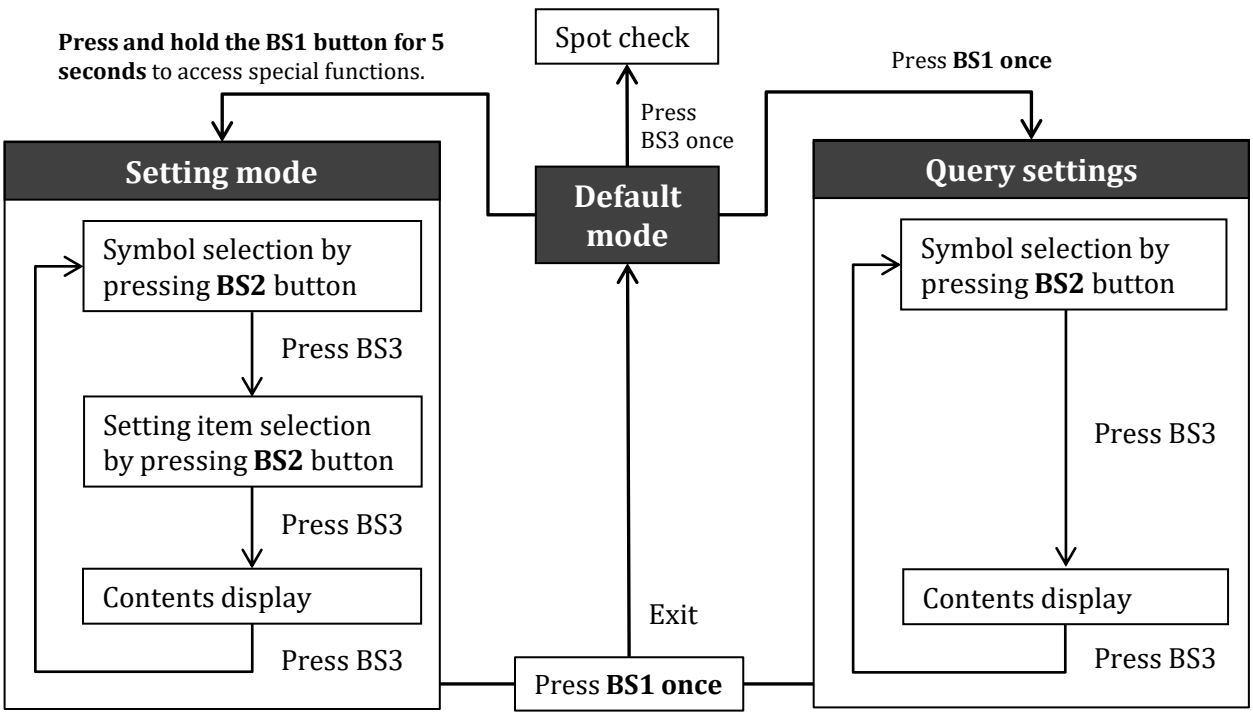


BS1: Menu or back button

BS2: UP button

BS3: Spot check and confirm button

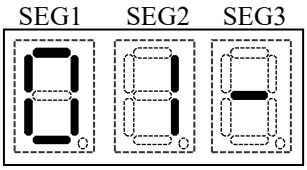
Remarks:
Press or tip any directions are valid.



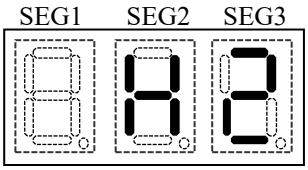
Default mode (Spot check)

System states can be showed on the 7 segments display (LED) of outdoor unit. Press the **BS3** button to obtain the code number and corresponding information at one-second intervals.

Example: Code number



Detailed information



No.	Number content	Example	Description
Default	Refer to default display instructions	902	9: Command/Troubleshooting 0: Running under high pressure limit 2: Cooling mode
01-	Outdoor unit type and capacity	H3	H: Heat pump C: AC only 3: 3Ton
02-	Liquid line sub-cooling	10	10℉
03-	Compressor suction superheat	18	18℉
04-	Compressor speed	56	56RPS
05-	Electronic expansion valve opening	360	360pls
06-	Step of fan	8	The 8th step
07-	Low pressure (LP sensor)	145	145psig
08-	High pressure (HP sensor)	350	350psig
09-	Outdoor ambient temp. (TA)	95	95℉
10-	Compressor suction temp. (TS)	70	70℉
11-	Compressor discharge temp. (TD)	170	170℉
12-	Defrost sensor temp. (TH)	80	80℉
13-	Liquid line temp. (TL)	70	70℉
14-	Inverter module temp. (TF)	150	150℉
15-	Target evaporating temp. (Tes)	43	43℉
16-	Current evaporating temp. (Te)	45	45℉
17-	Target condensing temp. (Tcs)	104	104℉
18-	Current condensing temp. (Tc)	112	112℉
19-	Compressor DC current	10.1	10.1A
20-	Undercharged refrigerant signal	1	0: None 1: Level 1 2: Level 2
21-	Main software version	610	Ver 610
22-	Inverter software version	38	Ver 38
23-	Current fault	E1	Display up to 5 * codes
24-	The last fault	F1	--: none
25-	Fault before the last fault	F2	--: none
26-	Product series	4	TDi Pro 2 series

Remarks: When multi-error codes exist at the same time, each code will be displayed one by one with an interval of one (1) second.

Setting mode

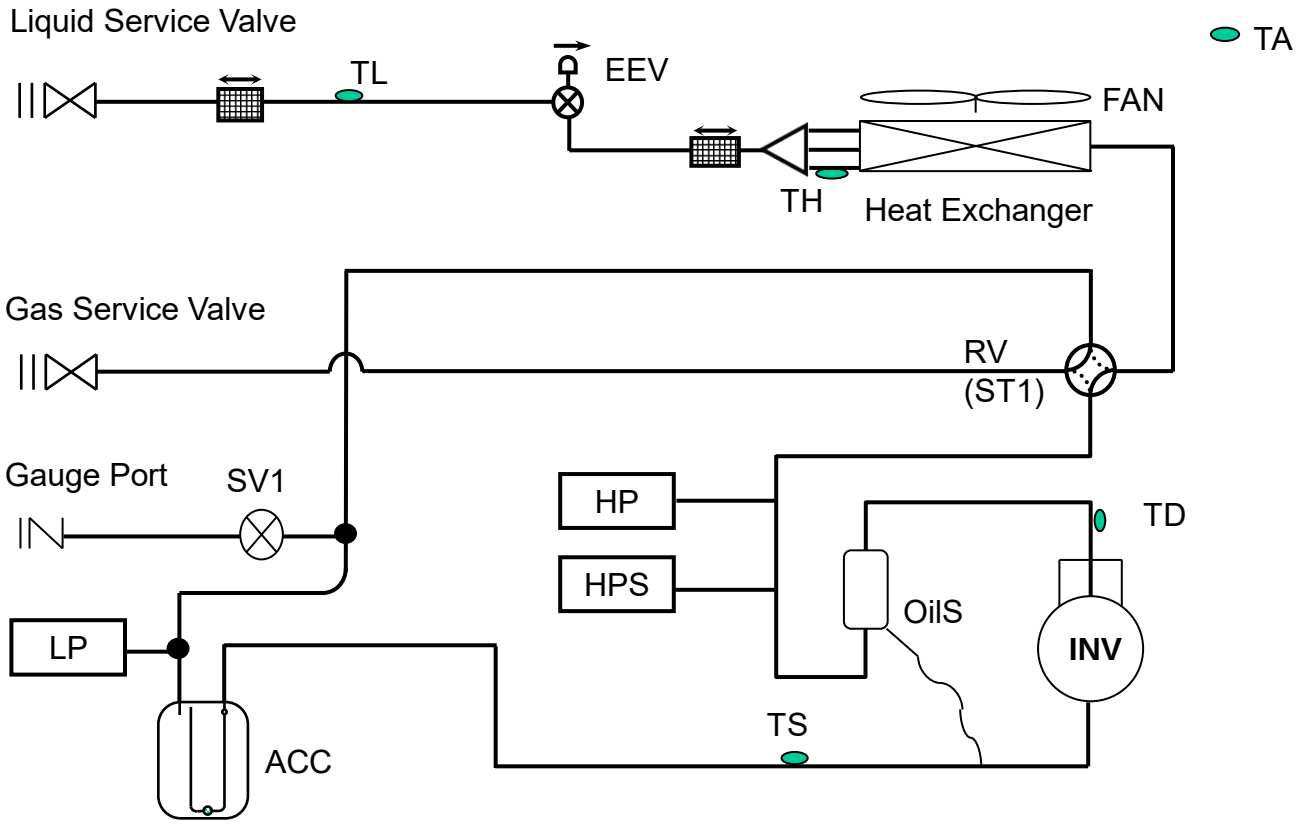
Press and hold **BS1** button for five (5) seconds to enter the parameter setting interface. The latest setting will be taken as the final one.

Symbol	Function	Item	Description
n00	Mode choice	0 (factory)	Normal (Energy Saving) mode
		1	Dry mode *1
		2	High capacity mode *2
n01	Forced heat pump stop when ambient temperature is lower than specified value. Switching to heat by gas furnace or boiler in cold winter.	0	Stop heat pump when TA<-22°F
		1 (factory)	Stop heat pump when TA<-3°F
		2	Stop heat pump when TA<15 °F
		3	Stop heat pump when TA<30 °F
		4	Stop heat pump when TA<40°F
n02	Indoor second heater for outdoor unit outputs 24VAC at W terminal (CN5).	0 (factory)	ON (Electric auxiliary heater)
		1	OFF (Furnace or Boiler)
n03	Outdoor unit outputs 24VAC at W terminal (CN5) when ambient temperature is lower than specified value to start indoor electric auxiliary heater.	0 (factory)	TA<15°F (24VAC output)
		1	TA<30°F (24VAC output)
		2	TA<40°F (24VAC output)
		3	TA<-3°F (24VAC output)
		4	OFF
n04	Defrost mode setting *3	0	Defrost in heavy snow area
		1 (factory)	Standard mode
		2	Defrost in light snow area
n05	Silent mode setting	0 (factory)	None silent mode
		1	Silent mode (level 1)
		2	Super silent mode (level 2)
		3	Night silent mode (level 1)
		4	Night super silent mode (level 2)
n06	Night silent setting- start time	0	17:00
		1 (factory)	18:00
		2	19:00
		3	20:00
		4	21:00
n07	Night silent setting- end time	0	5:00
		1 (factory)	6:00
		2	7:00
		3	8:00
		4	9:00
n08	Forced defrost	0 (factory)	OFF
		1	ON *4
n18	Product Series setting	4	TDi Pro 2 series

Remarks:

1. The evaporating temperature of indoor coil can drop down to 28°F.
2. The evaporating temperature of indoor coil can drop down to 28°F in cooling mode, and the condensing temperature can go up to 122°F in heating mode.
3. Reduce about 10% heating time for heavy snow area, increase about 10% heating time for light snow area.
4. System enters defrost after the heating start-up and an extra five minutes.

14.3 Major components function



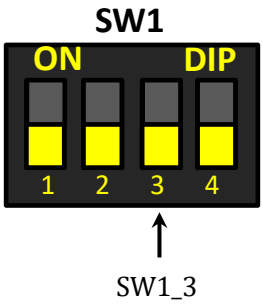
Name	Symbol	Function
Inverter compressor	INV	Adjusts refrigerant flow rate by changing the speed (RPS) based on objective pressure.
Oil separator	OilS	The compressor oil is collected and returned to the compressor.
Outdoor fan	FAN	Outputs heat exchanger capacity by adjusting the motor rotation speed based on operating pressure.
Electronic expansion valve	EEV	1) Fully open in cooling mode and defrost operation. 2) Control compressor discharge superheat in heating mode.
Reversing valve	RV (ST1)	Switches the operation mode between heating and cooling (including defrost control).
Solenoid valve 1	SV1	(Normally close) Control charging on and off when in charging mode.
Temperature sensor	TH	Uses to control defrost during heating operation.
	TA	Uses to detect outdoor air temperature and control fan speed.
	TS	Uses to detect compressor suction temperature and calculate compressor suction superheat (SSH).
	TL	Uses to detect liquid line temperature and calculate sub-cooling (SC).
	TD	Uses to detect compressor discharge temperature and calculate discharge superheat (DSH).
	TF	Uses to detect heat sink temperature of inverter module.
High pressure sensor	HP	Uses to detect high pressure.
Low pressure sensor	LP	Uses to detect low pressure.
Accumulator	ACC	Uses to store excess refrigerant.

14.4 Control logic description

14.4.1 Operation mode

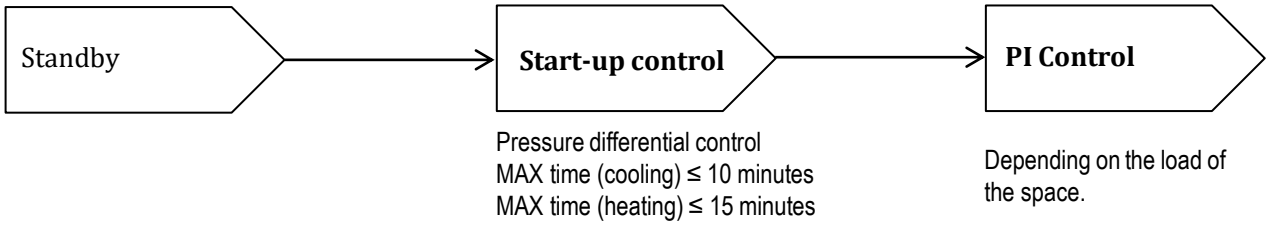
SW1_3=OFF (factory), Ecoer system uses Y/O/C signal to operate heat pump function.

SW1_3=ON has been set, Ecoer system uses Y/C signal to run cooling only.



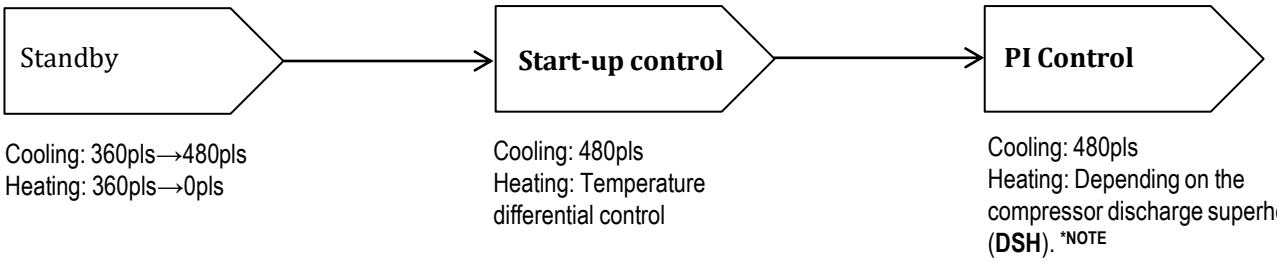
Normal operation:
Compressor control / EEV control / Fan motor control / Protection control
More detailed information can be found on Ecoer Decades Pro service manual.

14.4.2 Compressor control



Outdoor Capacity	2ton	3ton	4ton	5ton
Cooling/Heating Min RPS	20	20	20	20
Cooling Max RPS	76	90	70	80
Heating Max RPS	98	112	94	104

14.4.3 Outdoor electronic expansion valve (EEV) control



NOTE: Heating DSH should be between 25°F and 60°F with proper refrigerant level.

- **Overcharged:** DSH is less than 18 °F with EEV opening < 72pls.
- **Undercharged:** DSH is higher than 60 °F with EEV opening ≥ 460pls

14.4.4 Defrost control

This system carries out demand defrost control if any one of the following conditions is satisfied.

I. The calculated temperature difference between ambient temperature (TA) and defrost temperature (TH) is called Delta T. After Delta T is achieved and continues for 5 minutes.

a) TA is between 41℉ and 59℉: TH ≤ 30℉, Delta T = 18℉
b) TA is between 19℉ and 41℉ : TH ≤ 30℉, Delta T = 12~18℉
c) TA is less than 19℉ : TH < 9℉, accumulative compressor run time ≥ 80 minutes

TH back-up running: TA < 59℉ and LP ≤ 90PSIG, accumulative compressor run time ≥ 60 minutes

II. After "Minimum Run Time" (MRT) is achieved.

a) MRT is 3.5 hours if TA is less than 23℉
b) MRT is 2 hours if TA is between 23℉ and 43℉

III. The high pressure drops below 245PSIG for 20 minutes if TA is between 14℉ and 28℉.

EXIT:

Defrost will be terminated once defrost temperature sensor (TH) reaches 64℉ for one (1) minute or the defrost time has exceeded eight (8) minutes.

SETTING:

Defrost mode setting (n04) offers termination options for different geographical conditions.

a) Defrost in heavy snow area will extend defrost for one (1) minute, but reduce the heating time to execute more defrost cycles.
b) Defrost in light snow area will reduce defrost for 30 seconds.

14.4.5 Manual Defrost

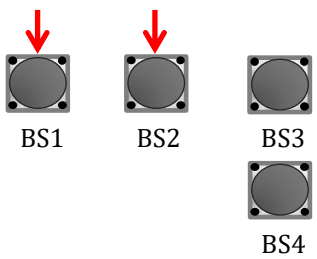
Manual defrosting mode can be used when verifying defrosting or forcing defrosting.

Note: After 5-10 minutes of continuous heating operation, the unit can respond to manual defrosting in time; otherwise, the unit will enter after meeting the requirements.

Enter in either way:

a. n08 setting;

b. Hold on BS1+BS2 for more than 5 seconds, release and wait about 1 minute.



Exit in either way:

Defrost exit automatically/Heating demand off/Power off

15. Troubleshooting

If the system does not operate properly or if there are any malfunctions. Check the system based on the following procedures.

Symptoms	Possible causes	Solutions
System does not start-up but the digital tube shows normally	• No 24 VAC for Y signal from thermostat. • Incompatible thermostat	• Be sure Y/O/C wirings are connected correctly and the cooling/heating setting temperature at thermostat is proper • Use other traditional 24VAC thermostats
System operates mode reversely	• Incorrect O/B signal selection	• Choose **O for cooling** at thermostat
System cannot cool well	• Outside temperature is too high • Outside temperature is too low • Dirty air filter or blocked duct • Lack of refrigerant • Refrigerant has been blocked in the condenser coil	• Normal protection control to limit RPS • Ensure the cooling loads • Replace the air filter and eliminate any obstacles. • Check refrigerant amount or any leaks. • Counterclockwise the TXV (Make sure the refrigerant coefficient is 0.6)
System cannot heat well	• Outside temperature is too low but no third-party heat inside • The outdoor coil is dirty or has been covered by heavy snow • Dirty air filter • Micro channel coil has been used for heat pump • Lack of refrigerant	• Install auxiliary heat for backup ***Dual-heating** is recommended • Clean the outdoor coil • Replace the air filter • No micro channel coils shall be used for heat pump • Check refrigerant amount or any leaks

Remarks:
Ecoer systems are compatible with most traditional 24VAC thermostats.

⚠ CAUTION

Reversing valve is energized (208/230VAC) in heating mode.

Error codes List for Condensing Unit

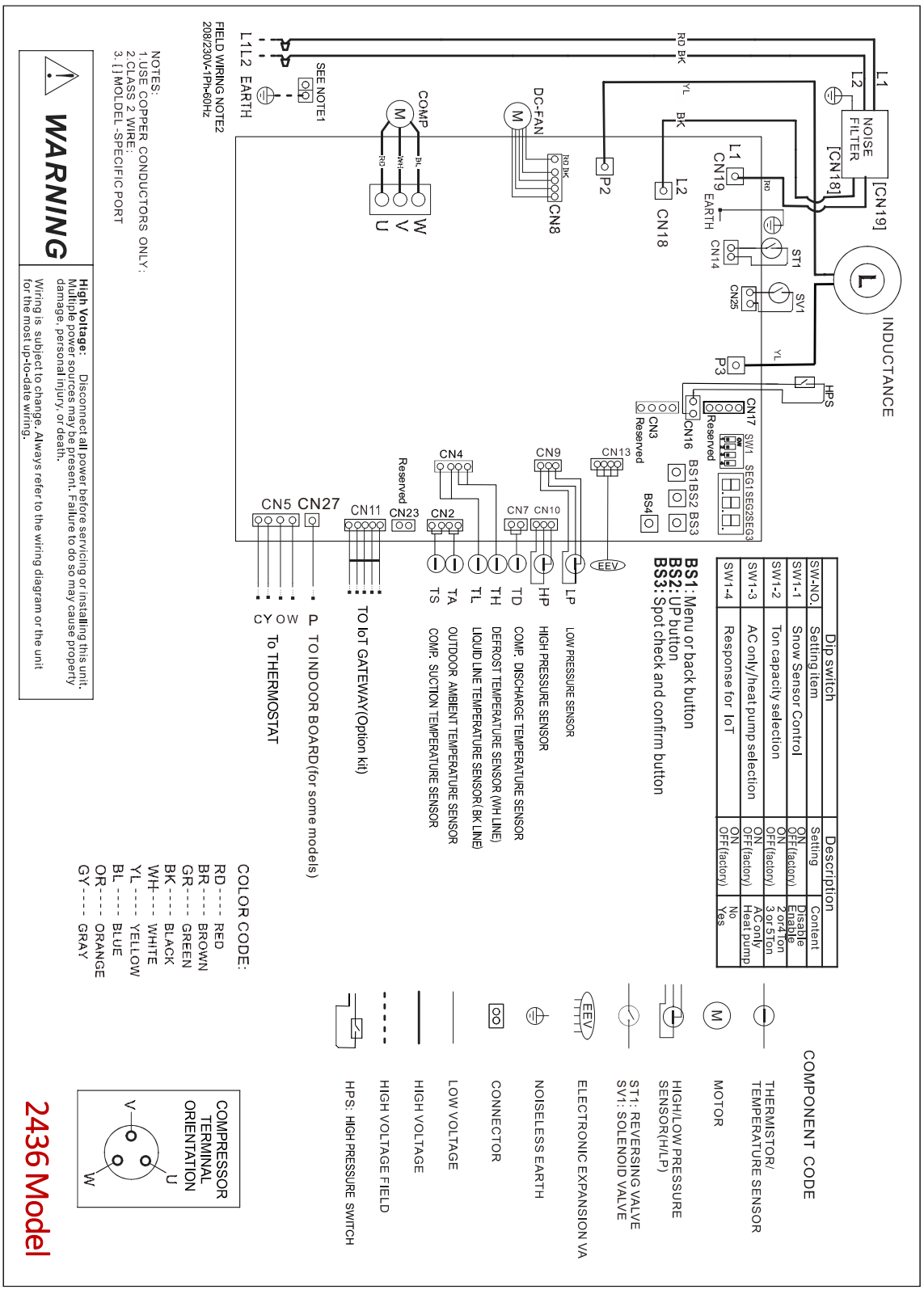
Error codes can be inquired by BS3 button, and seen on Ecoer Smart Service Pro App. **Sign in App >Files >Service, refer to Ecoer Decades Pro service manual for troubleshooting details.**

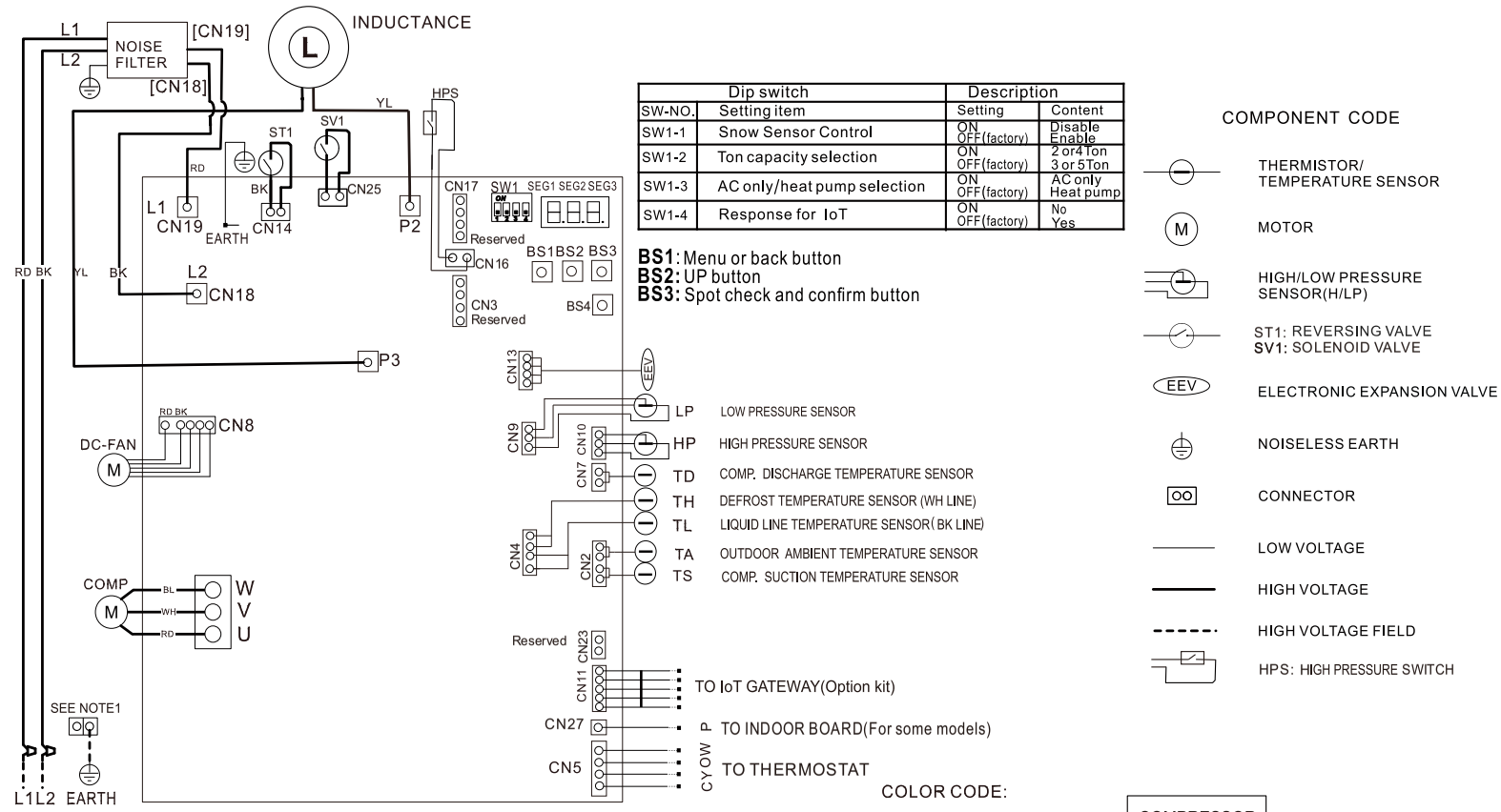
Code	Description	Legend
P1	High pressure protection	
E1	System locks up when P1 has occurred six times in 3 hours.	Cannot restart *1
P2	Low pressure protection in cooling mode	
E2	System locks up when P2 has occurred six times within 3 hours.	Cannot restart *1
P3	Compressor discharge temperature (TD) protection	
E3	System locks up when P3 has occurred six times within 3 hours.	Cannot restart *1
P4	Compressor discharge temperature (TD) sensor error	
P5	Inverter module temperature (TF) protection	
E5	System locks up when P5 has occurred six times within 3 hours.	Cannot restart *1
P6	Compressor over-current protection	
E6	System locks up when P6 has occurred six times within 3 hours.	Cannot restart *1
P7	Liquid slugging protection	
E7	System locks up when P7 has occurred three times within 5 hours.	Cannot restart *1
P8	Low compressor voltage protection	
E8	System locks up when P8 has occurred three times within an hour.	Cannot restart *1
P9	Incorrect compressor line sequence	Cannot restart *1
PA	DC fan motor over-load protection	Cannot restart *1
F1	Ambient temperature (TA) sensor fault	Backup running*2
F2	Compressor suction temperature (TS) sensor fault	Backup running*2
F3	Liquid line temperature (TL) sensor fault	Backup running*2
F4	Defrost temperature (TH) sensor fault	Backup running*2
F5	Compressor discharge temperature (TD) sensor fault	Backup running*2
F6	Inverter module temperature (TF) sensor fault	Backup running*2
F7	High pressure (HP) sensor fault	Backup running*2
F8	Low pressure (LP) sensor fault	Backup running*2
E4	Communication fault between main chip and INV drive chip	Cannot restart *1
H0	Heavy undercharge limit operation	
H1	Ambient temperature limit operation in cooling	
H2	Ambient temperature limit operation in heating	
H3	Abnormal switch alarm for reversing valve	Alarm
H4	Defrost temperature (TH) sensor error	
H5	EEPROM fault	
H6	Low voltage alarm	
HF	Abnormal function control	Alarm
H8	Indoor refrigerant leakage alarm	
C0-CC	Compressor INV module protection	
E0	System locks up when C0~CA has occurred three times within an hour.	Cannot restart *1

Remarks:

1. Disconnect power supply switch for 5 minutes to reset, then turn on power supply for the unit.
2. Unit goes to backup running under sensors fault varies from 7 to 120 days. Allow up to two (2) sensors backup running at the same time.

16. Wiring Diagram





Dip switch		Description	
SW-NO.	Setting item	Setting	Content
SW1-1	Snow Sensor Control	ON OFF(factory)	Disable Enable
SW1-2	Ton capacity selection	ON OFF(factory)	2 or4 Ton 3 or 5Ton
SW1-3	AC only/heat pump selection	ON OFF(factory)	AC only Heat pump
SW1-4	Response for IoT	ON OFF(factory)	No Yes

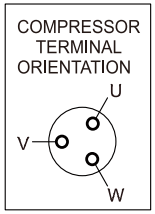
BS1: Menu or back button
BS2: UP button
BS3: Spot check and confirm button

COMPONENT CODE

- THERMISTOR/ TEMPERATURE SENSOR
- MOTOR
- HIGH/LOW PRESSURE SENSOR(H/LP)
- ST1: REVERSING VALVE
  SV1: SOLENOID VALVE
- EEV: ELECTRONIC EXPANSION VALVE
- NOISELESS EARTH
- CONNECTOR
- LOW VOLTAGE
- HIGH VOLTAGE
- HIGH VOLTAGE FIELD
- HPS: HIGH PRESSURE SWITCH

COLOR CODE:

RD - - - RED
BR - - - BROWN
GR - - - GREEN
BK - - - BLACK
WH - - - WHITE
YL - - - YELLOW
BL - - - BLUE
OR - - - ORANGE
GY - - - GRAY



NOTES:
1.USE COPPER CONDUCTORS ONLY;
2.CLASS 2 WIRE;
3. [ ] MOLDEL -SPECIFIC PORT

WARNING

High Voltage: Disconnect all power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury, or death.

Wiring is subject to change. Always refer to the wiring diagram or the unit for the most up-to-date wiring.

4860 Model

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