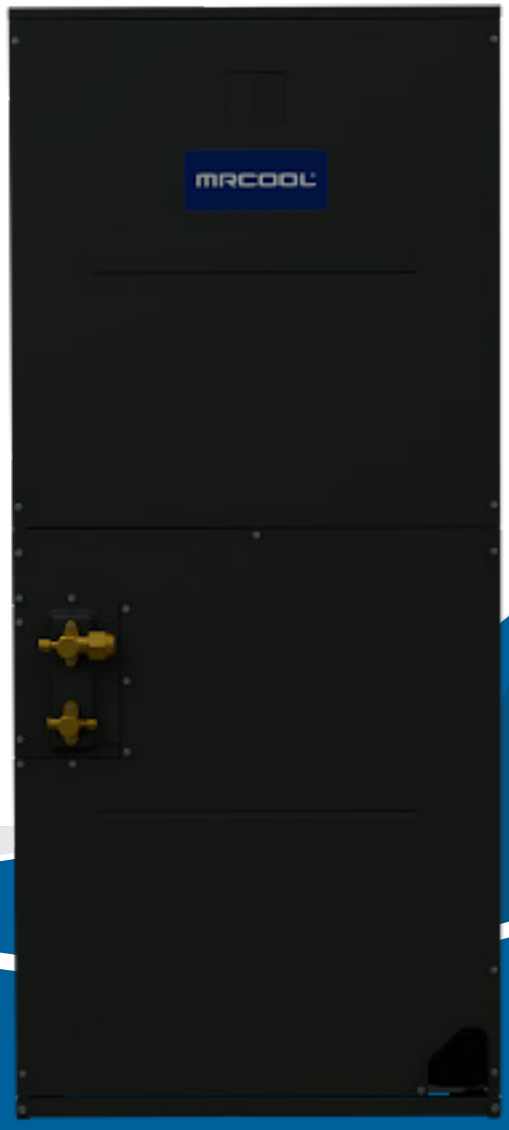
This product utilizes **R-454B** *refrigerant*

MRCOOL® Signature Series TruInverter™ Air Handler

INSTALLATION & OWNER'S MANUAL

MODELS:

MCAEAMPVT*D21BA
MCAEAMPVT*F21BA



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

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

Version Date: February 5, 2025
Please visit www.mrcool.com/documentation to ensure you have the latest version of this manual.

MRCOOL®
COMFORT MADE SIMPLE

CONTENTS

Safety Precautions

Read Before Using

Incorrect usage may cause serious damage or injury.

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

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

SAFETY PRECAUTIONS

1. Read this maual before installing and using the appliance.
2. During the installation of the indoor and outdoor units, access to the working area should be prohibited to children as unforeseeable accidents could happen.
3. Make sure the base of the outdoor unit is firmly fixed before use.
4. Check that air cannot enter the refrigerant system and check for refrigerant leaks when turning on the unit.
5. Carry out a test cycle after installing the unit and record the operating data.
6. Protect the unit with a fuse of suitable capacity for the maximum input current or with an alternate overload protection device.
7. Ensure the main voltage corresponds to what is stamped on the rating plate.
8. The unit should be equipped with devices capable of disconnection from the main power supply. Have a contact separation in all poles to provide a full disconnect under the "Over-Voltage Category III Conditions". These devices must also be incorporated into the fixed wiring according to the wiring rules.
9. The unit must be installed by a licensed contractor. Always contact specialized technical personnel for your installation and servicing needs.
10. Do not install the appliance at a distance less than 19.68in (50cm) from flammable substances (alcohol, etc.) or pressurized containers (e.g. spray cans).
11. If the appliance is used in areas without ventilation, precautions must be taken to prevent refrigerant gas leaks from becoming airborne and creating a fire hazard.
12. The packaging materials are recyclable and should be disposed of in separate waste bins. At the time of its disposal, take the unit to a special waste collection center designated for its disposal.
13. Only use the unit as instructed in this booklet. These instructions are not intended to cover every possible condition and situaion. If in doubt, contact the MRCOOL® Customer Service Team at 270-366-0457 or support@mrcool.com for assistance.
14. The appliance must be installed in accordance with applicable national and local regulations.
15. Before accessing the terminals, all the power circuits must be disconnected from the power supply.
16. This appliance should not be used by children ages 8 years and below, along with persons who have reduced physical, sensory, or mental capabilities, or those lacking experience and knowledge in the area, without supervision or instruction about using the appliance sadely and the hazards involved, Children should not play with the appliance. Cleaning and user maintenance should not be done by unsupervized children.
17. Cleaning and maintenance must be carried out by a licensed contractor. Before servicing the unit, disconnect it from the main power supply.
18. This appliance has been made for air conditioning domestic environments and must not be used for any other purpose, such as for drying clothes, cooling food, etc.
19. Always use the appliance with the air filter. Using the unit without an air filter could cause an excessive accumlation of dust/debris, leading to function failure.

SAFETY PRECAUTIONS, CONT.

20. A licensed contractor must check that earthing/grounding is done in accordance with existing regulations and by inserting a thermal magnetic circuit breaker.
21. For disposal of scrap batteries, please discard the batteries as sorted municipal waste at the proper accessible collection point.
22. Don't remain under the flow of cold air for long periods of time, as the direct and prolonged exposure to cold air could be dangerous for your health. Particular care should be taken in the rooms where there are children, immunocompromised, or elderly persons.
23. If the appliance gives off smoke or there is a smell of burning, immediately cut off the power supply and contact MRCOOL® Customer Service Team at 270-366-0457 or support@mrcool.com for assistance. The prolonged use of the device in such conditions could cause fire or electrocution.
24. Repairs should only be carried out by a licensed contractor. Incorrect repair could expose the user to the risk of electric shock, etc.
25. Unhook the automatic switch if you won't be using the device for a long period of time.
26. Ensure the appliance is disconnected from the power supply whenever it will not be in use for long periods of time and before servicing.
27. Select the most suitable temperature to best prevent damage to the appliance.

WARNINGS FOR PRODUCT USE

1. Do not use extensions or gang modules.
2. Do not touch the appliance when barefoot or when parts of the body are wet/damp.
3. Do not obstruct the air inlet/outlet of the indoor or outdoor unit. The obstruction of these openings cause a reduction in the operative efficiency of the unit with possible consequential failures or damages.
4. Do not alter the characteristics of this appliance.
5. Do not install the appliance in environments where the air could contain flammable gas, oil, or sulphur, or near sources of heat.
6. Do not climb onto or place any heavy or hot objects on top of this appliance.
7. Do not leave windows or doors open for long when the air conditioner is operating.
8. Do not direct the airflow onto plants or animals, as direct exposure could have negative effects.
9. Do not put the unit in contact with water. The electrical insulation could become damaged and cause electrocution.
10. Never insert a stick or similar object into the appliance. This could cause injury.
11. Children should be supervised to ensure that they do not play with the appliance. If the supply cord is damaged, it must be replaced by a licensed contractor in order to avoid a hazard.
12. This unit is equipped with a refrigerant leak detector for safety. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.
13. The refrigerant sensor should only be replaced with a sensor approved by MRCOOL®. If the sensor is replaced only as part of the component assembly, the component should be labeled.
14. The appliance should be installed according to MRCOOL®'s instructions, and the ventilation pipe should not exceed the maximum length and number of turns specified by MRCOOL®.
15. Appliances that can be installed in different locations should be tested in all locations permitted by MRCOOL®. The intake or exhaust openings should not be covered and MRCOOL®'s recommended air filter should be installed according to instructions.
16. A leak detection system should be installed.

SERVICE WARNINGS

1. Check the information in this manual to find out the spatial dimensions needed for proper installation of the device, including the minimum distances allowed relative to adjacent structures.
2. The appliance shall be installed, operated and stored in a room with a floor area larger than 43ft² (4m²).
3. The installation of pipework should be kept to a minimum.
4. The pipework should be protected from physical damage, and shouldn't be installed in an unventilated space if smaller than 43ft² (4m²).
5. Compliance with national and local gas regulations must be observed.
6. Mechanical connections should be accessible for maintenance purposes.
7. Follow the instructions given in this manual for handling, installing, cleaning, maintaining, and disposing of refrigerant.
8. Make sure ventilation openings are clear of obstructions.
9. The appliance should be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
10. The appliance should be stored in a room without continuously operating open flames (an operating gas appliance, etc.) and ignition sources (an operating electric heater, etc.).
11. The appliance should be stored to prevent mechanical damage from occurring.
12. It is appropriate that anyone called to work on a refrigerant circuit should hold a valid and up-to-date certificate from an industry-accredited assessment authority that recognizes their competence to handle refrigerants, and is in accordance with the industrial-recognized assessment specifications. Service operations should only be carried out in accordance with the recommendations of MRCOOL®. Maintenance and repair operations that require the assistance of other qualified persons must be conducted under the supervision of the person licensed in the use of flammable refrigerants.
13. Every working procedure that affects safety should only be carried out by competent persons.
14. Warning:

- Do not use any means to accelerate the defrosting process or clean the frost on your own. Follow the recommended guidelines from MRCOOL®.
- The appliance should be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater).
- Do not pierce or burn.
- Be aware that refrigerants may not be odorous.

15. Information on servicing:

1) **Checks to the Area**

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure the risk of ignition is minimized. For repair to the refrigerating system,the following precautions should be followed prior to conducting work on the system.

2) **Work Procedure**

Work should be undertaken using a controlled procedure to minimize the risk of a flammable gas or vapor being present while the work is being performed.

3) **General Work Area**

All maintenance staff and others working in the local area should be instructed on the nature of work being carried out. Working in confined spaces need to be avoided. The area around the workspace should be sectioned off. Ensure the conditions within the area have been made safe by controlling flammable material

4) **Checking for Presence of Refrigerant**

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

5) **Presence of Fire Extinguisher**

If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment should be readily available. Have a dry powder or CO2 fire extinguisher near the charging area.

FLAMMABLE REFRIGERANT WARNINGS

6) **No Ignition Sources**
No persons carrying out work related to a refrigeration system involving exposed pipework should use any sources of ignition in a manner that 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 into 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 should be displayed.
7) **Ventilated Area**
Ensure the installation area is in the open or adequately ventilated before breaking into the system or conducting any work that will produce heat. A degree of ventilation should continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.
8) **Checks to the Refrigeration Equipment**
Electrical components should be fit for the correct purpose and to the correct specifications when being changed. At all times, MRCOOL®'s maintenance and service guidelines must be followed. If in doubt, contact MRCOOL® for assistance.
The following checks should apply to an installation using flammable refrigerant:
- The charge size is in accordance with the room size where the refrigerant-containing parts are being installed;
- The ventilation machinery and outlets are operating adequately and are not obstructed;
- If an indirect refrigerating circuit is being used, the secondary circuit should be checked for the presence of refrigerant;
- Equipment markings should continue to be visible and legible. Markings and signs that are illegible must be made legible;
- Refrigeration pipe and components are installed in a position where they are unlikely to be exposed to any substance that may corrode refrigerant-containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against corrosion.

9) **Checks to Electrical Devices**
Repair and maintenance to electrical components should include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply should be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution should be used. This needs to be reported to the owner of the equipment so all parties are advised.
Initial safety checks must include:
- That capacitors are discharged: this shall be done in a safe manner to avoid the possibility of sparking;
- That no live electrical components and wiring are exposed while charging, recovering, or purging the system;
- That there is continuity of earth bonding.

16. Repairs to Sealed Components
Sealed electrical components should be replaced.
17. Repair to Intrinsically Safe Components
Intrinsically safe components must be replaced.
18. Cabling
Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects. The check should also take into account the effects of aging or continual vibration from sources such as compressors or fans.
19. Detection of Flammable Refrigerants
Under no circumstances should potential sources of ignition be used in the search for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) should not be used.

FLAMMABLE REFRIGERANT WARNINGS

20. Leak Detection Methods
The following leak detection methods are deemed acceptable for systems containing flammable refrigerants. Electronic leak detectors should be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need recalibration. (Detection equipment should be calibrated in a refrigerant-free area.) Ensure the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment should be set at a percentage of the refrigerant's LFL and should be calibrated to the amount of refrigerant employed when the appropriate percentage of gas (25% maximum) is confirmed. Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine need to be avoided, as the chlorine may react with the refrigerant and corrode the copper pipework. If a leak is suspected, all naked flames shall be removed/extinguished. If a refrigerant leak that requires brazing is found, all of the refrigerant should be recovered from the system, or isolated (by means of shut off valves) in a part of the system apart from the leak. Oxygen free nitrogen (OFN) should then be purged through the system before and during the brazing process.
21. Removal and Evacuation
When breaking into the refrigerant circuit to make repairs or for any other purpose, conventional procedures should be used. However, it is important best practice is followed since inflammability is a consideration. The following procedure should be adhered to:
- Remove refrigerant;
- Purge the circuit with inert gas;
- Evacuate;
- Purge again with inert gas;
- Open the circuit by cutting or brazing.

The refrigerant charge should be recovered into the correct recovery cylinders. The system should be flushed with OFN to render the unit safe. This process may need to be repeated several times and compressed air/ oxygen should not be used for this task. Flushing should be achieved by breaking the vacuum in the system with OFN and continuing to fill until appropriate working pressure is achieved, then venting out to the atmosphere, and finally pulling down to vacuum. This process should be repeated until there is no refrigerant within the system. When the final OFN charge is used, the system should be vented down to atmospheric pressure and enable work to take place. This operation is absolutely vital if brazing operations on the pipework are to take place. Ensure the outlet for the vacuum pump is not close to any ignition sources and ensure there is ventilation available.
22. Decommissioning
Before carrying out this procedure, it is essential 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 should be taken in case analysis is required prior to reuse of reclaimed refrigerant. It is essential that electrical power is available before the task is finished.
1) Become familiar with the equipment and its operation.
2) Isolate system electrically.
3) Before attempting the procedure, ensure that:
- mechanical handling equipment is available, if required, for handling refrigerant cylinders;
- all personal protective equipment is available and being used correctly;
- the recovery process is supervised at all times by a competent person;
- recovery equipment and cylinders conform to the appropriate standards.

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

FLAMMABLE REFRIGERANT WARNINGS

23. Labeling
Equipment should be labled when it has been decommissioned and emptied of refrigerant. The label must be dated and signed. Ensure there are labels on the equipment stating the equipment contains flammable refrigerant.
24. Recovery
When removing refrigerant from a system, either for servicing or decommissioning, it is recommended that all refrigerants are removed safely.
When transferring refrigerant into cylinders, ensure only appropriate refrigerant recovery cylinders are employed. Ensure the correct number of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders should be completed with a pressure-relief valve and associated shut-off valves in good working order.
Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
The recovery equipment should be in good working order with a set of instructions concerning the equipment and should be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales should be available and in good working order. Hoses should be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, ensure it is in satisfactory working order, has been properly maintained, and that any associated electrical components are sealed to prevent ignition, in the event of a refrigerant release. Consult MRCOOL® if in doubt.
The recovered refrigerant should be returned to the refrigerant supplier in the correct recovery cylinder with the relevant waste transfer note arranged. Do not mix refrigerants in recovery units, especiallly not cylinders.
If compressors or compressor coils are to be removed, ensure they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant.
The evacuation process shall be carried out prior to returning the compressor to the suppliers.
Only electric heating to the compressor body should be employed to accelerate this process.
When oil is drained from a system, it should be carried out safely.
25. Safety instructions for transportation and storage
1) No fire source and smoking.
2) According to the local rules and laws.

Symbols Displayed on Indoor & Outdoor Unit		
	**WARNING**	This symbol shows that this appliance uses a flammable refrigerant. If the refrigerant is leaking and exposed to an external ignition source, there is a risk of fire.
	**CAUTION**	This symbol shows the operation manual should be read carefully.
	**CAUTION**	This symbol shows service personnel should be handling this equipment using the installation manual as a reference.
	**CAUTION**	
	**CAUTION**	This symbol shows information is available in the operating manual or installation manual.

Installation Safety Principles:

1. Site Safety

Open Flames Prohibited

Ventilation Necessary

2. Operation Safety

Mind Static Electricity

Must Wear Protective Clothing and Anti-Static Gloves

Do Not Use Your Mobile Phone

3. Installation Safety

- Refrigerant Leak Detector
- Appropriate Installation Location

The left picture is of a refrigerant leak detector.

Note:

1. The installation site should be well-ventilated.
2. The site for installing and maintaining an air conditioner using Refrigerant R-454B should be free from an open fire, welding, smoking, drying oven, or any other heat source higher than 745°F (396°C), which could easily produce an open fire.
3. When installing an air conditioner, it is necessary to take appropriate anti-static measures such as wearing anti-static clothing and/or gloves.
4. It is necessary to choose the site most convenient for installation or maintenance where the air inlet/outlet of the indoor and outdoor units should not be surrounded by obstacles, close to any heat source, or near a combustible and/or explosive environment.
5. If the indoor unit suffers a refrigerant leak during installation, it is necessary to immediately turn the outdoor unit valve off and all personnel should exit the area of the refrigerant leak completely for 15 minutes. If the product is damaged, it must be returned to the maintenance station. It is prohibited to weld the refrigerant pipe or conduct other operation at the installation site.
6. It is necessary to choose the place where the air inlet/outlet of the indoor unit is level.
7. It is necessary to avoid areas where there are other electrical products, power switch plugs and sockets, kitchen cabinets, household furniture, and other valuables right directly under or on either sides of the indoor unit.

2.1 Nomenclature

MCAE S A S 3 T 06 1 1 B A

Brand
MCAE=MRCOOL Air Equipment

Product Category
S = Split System Condenser
P = Package Unit
M = Mini Split Condenser
T = Package Terminal
W = Window Unit
R = Through the Wall

Product Type
A = AC
H = Heat Pump

Compressor Type
S = Single Stage
T = Two Stage
V = Inverter

Efficiency (SEER2)
3 = 13-13.9
4 = 14-14.9
5 = 15-15.9
6 = 16-16.9
7 = 17-17.9
8 = 18-18.9
9 = 19+

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

Nominal Capacity
06 = 0.5 Tons
09 = 0.75 Tons
12 = 1 Ton
18 = 1.5 Tons
24 = 2 Tons
30 = 2.5 Tons
36 = 3 Tons
42 = 3.5 Tons
48 = 4 Tons
60 = 5 Tons

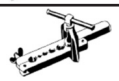
Refrigerant
1 = R410a
2 = R454b
3 = R32

Electrical
1 = 208/230 V, 1 Phase, 60 Hz
2 = 120 V, 1 Phase, 60 Hz

Series
B

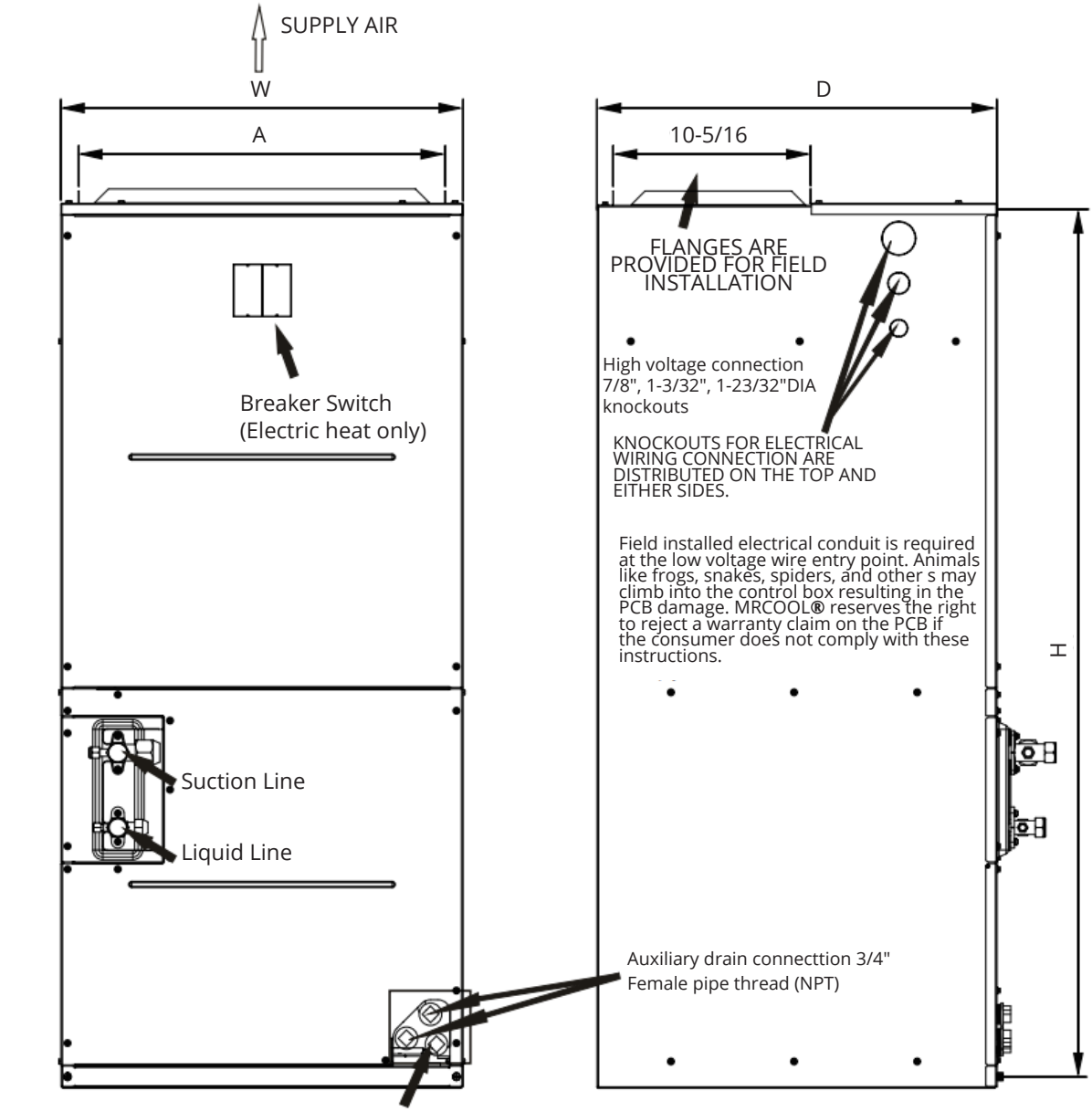
Revision
A

2.2 Suggested Tools

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

2.3 Dimensions

Note: 25" clearance is required in the front of the unit for filter and coil maintenance.



Inlet (Front View) Primary Drain Connection 3/4" Female Pipethread (NPT)

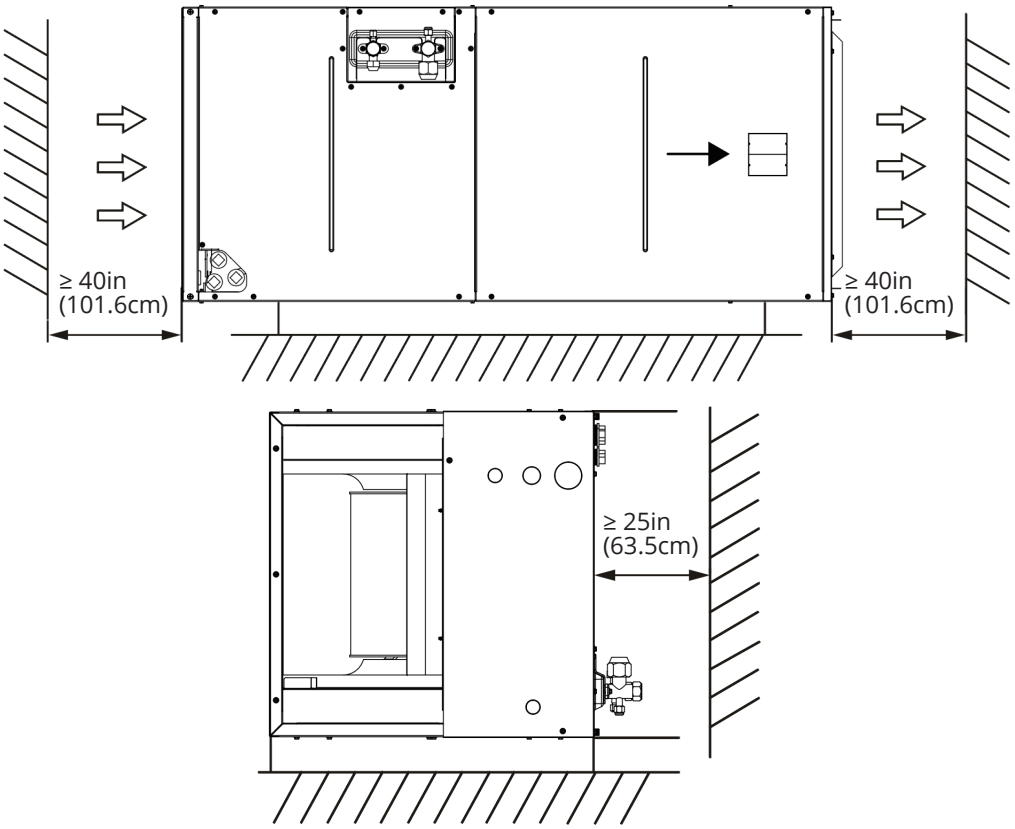
Inlet (Left Side View)

Unit Dimensions

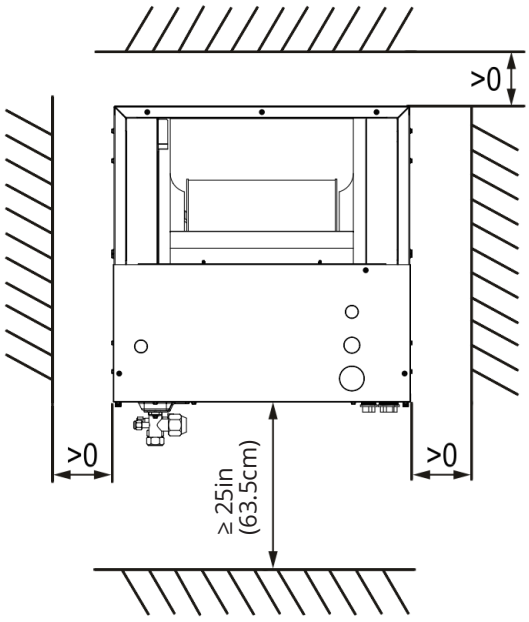
Model	Dimensions in (mm)					
	H	W	D	A	Liquid Line Connection	Suction Line Connection
MCAEAMPVT24D21BA	46-1/2	21	21	19-1/4	3/8	3/8
MCAEAMPVT36D21BA						
MCAEAMPVT48D21BA	56	24-1/2	21	22-3/4	3/8	3/8
MCAEAMPVT60D21BA						

2.4 Location

Select a solid and level installation location ensuring there is enough space surrounding the fixture to accomodate installation and maintenance. Adjust motor speed on the indoor main control board (MCB) to select the correct airflow according to the blower performance table.



A) Horizontal Position



B) Vertical Position

Clearance Requirement

2.5 Refrigerant Charge & Room Area Limitations

! INSTALLATION PRECAUTIONS

1. The air conditioner must be installed by a licensed contractor using the instructions from the installation manual. The installation specifications are subject to service regulations.
2. When filling the combustible refrigerant, be careful as inattentive operations may cause serious injury/ damage to yourself or surrounding objects.
3. A leak test must be done after the installation is complete.
4. An inspection is necessary to ensure safety before performing maintenace or repairs to the unit, as the combustible refrigerant increases the risk of fire.
5. It is necessary to operate this unit using controlled protocol to ensure any risk that arises from the combustible gas or vapors during operation is reduced to a minimum.
6. Requirements for the total weight of filled refrigerant and the area of the room where the air conditioner will be located will be shown in the following tables.

The maximum charge and the required minimum floor area:

m1 = (6 m3) x LFL , m2 = (52 m3) x LFL, m3 = (260 m3)x LFL

Where LFL is the lower flammable limit of kg/ m3, R-454B LFL is 0.296 kg/ m3

For the appliances with a charge amount m1 < M = m2:

The maximum charge in a room should comply with the following:

Mmax= 0.5 x LFL x 2.2 x A

The required minimum floor area Amin to the installed appliance with refrigerant charge M(kg) should comply with the following: Qmin= 30 x mc / LFL

Refrigerant Charge and RoomArea Limitations:

In UL/CSA 60335-2-40, R-454B refrigerant is classified as class A2L, which is mildly flammable. Therefore, R-454B refrigerant is suitable for systems needing additional refrigerant charge and those which will limit the area of the rooms being served by the system. Similarly, the total amount of refrigerant in the system should be less than or equal to the allowable maximum refrigerant charge. The allowable maximum refrigerant charge depends on the area of the rooms being served by the system.

Note:

The 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 duct system).

TA: The total area of the conditioned space connected by air ducts.

The room area calculation requirements:

! CAUTION

The space considered should be comprised of refrigerant-containing parts or be an area into which refrigerant could be release. The room area (A) of the smallest, enclosed occupied space should be used to determine the refrigerant quantity limits.

For determination of room area (A) when used to calculate the refrigerant charge limit, the following will apply:

- The room area (A) should 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 should not be considered a single space.
- Units mounted higher than 70-55/64in (179.98cm) and spaces divided by partition walls that are no higher than 62-63/64in (159.98cm) should be considered a single space.
- Rooms on the same floor that are conected by an open passageway 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 that are connected by a permanent opening in the walls and/or doors, 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 from Fig. 2-1.

1. Low level opening
    1. The opening should not be less than the Anvmin in Table 2-1.
    2. The area of any openings above 11-13/16in (30cm) from the floor should not be considered when determining compliance with Anvmin.
    3. At least 50% of the opening area of Anvmin should be below 7-7/8in (20cm) from the floor.
    4. The bottom of the opening is not more than 3-15/16in (10cm) from the floor.
    5. The opening is a permanent opening that cannot be closed.
    6. For openings extending to the floor, the height should not be less than 25/32in (1.98cm) above the surface of the floor covering.
2. High level opening
    1. The opening should not be less than 50% of Anvmin in Table 2-1.
    2. The opening is a permanent opening that cannot be closed.
    3. The opening should be at least 59in (149.86cm) above the floor.
    4. The height of the opening is not less than 25/32in (1.98cm).
3. Room size requirement
    1. The room into which refrigerant can leak, plus the connected adjacent room(s), should have a total area that is not less than Amin. Amin is shown in Table 2-3.
    2. The room area in which the unit is installed should not be less than 20% Amin. Amin is shown in Table 2-3.

Note:

The requirement for the second opening can be met by drop ceilings, ventillation 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) Anmin can be determined by looking at Table 2-1.

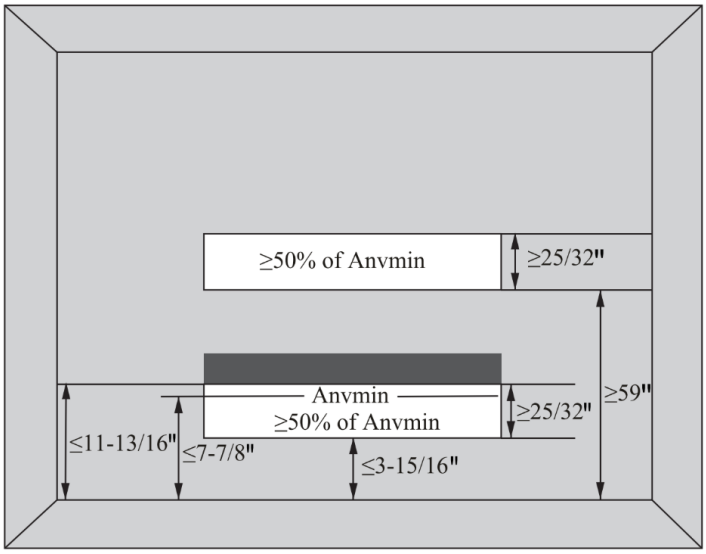


Fig. 2-1 Opening Conditions for Connected Rooms

The minimum opening area for connected rooms:

A(ft²)	Mc(lbs/oz)		Mmax(lbs/oz)		Anvmin(ft²)
	lbs	oz	lbs	oz	
40	9	9	2	10	0.9
50	9	9	3	5	0.8
60	9	9	4	0	0.7
70	9	9	4	10	0.6
80	9	9	5	5	0.6
90	9	9	6	0	0.5
100	9	9	6	10	0.4
110	9	9	7	5	0.3
120	9	9	8	0	0.2
130	9	9	8	10	0.2
140	9	9	9	5	0.1
150	9	9	10	0	0.0
160	9	9	10	10	0.0

Table 2-1

Note: Take the Mc=9 lbs 9 oz as an example.

For appliances serving one or more rooms with an air duct system, the room area calculation should be determined based on the total area of the conditioned space (TA) connected by ducts. Keep in mind, however, that the circulating airflow distributed to all the rooms by the appliance's integral indoor fan will mix and dilute the leaking refrigerant before it enters any room.

The allowed maximum refrigerant charge and required minimum room area:

If the interior unit fan 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 2-2 and Table 2-3.

The allowable maximum refrigerant charge:

A(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 2-2

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	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
7	7	112.4	14	1	211.6
7	15	119	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
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 2-3

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	405
8	13	239	15	6	418
9	4	251	15	14	430
9	11	263	16	5	442
10	2	275	16	12	454
10	9	287	17	3	466

Table 2-4

! CAUTION

The allowable maximum refrigerant charge of Table 2-2 or the required minimum room area of Table 2-3 is availlable 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. The grille area shall not be deducted.
- Minimum airflow rate must meet the corresponding values in Table 2-4, which is related to the actual refrigerant charge of the system (Mc).
- R-454B refrigerant leakage sensor is configured.

Note:

The maximum refrigerant limit described above applies to unventilated areas. If adding additional measures, such as areas with mechanical or natural ventilation, the maximum refrigerant charge can be increased or the minimum room area can be reduced. The R-454B refrigerant leakage sensor is configured for the indoor unit and meets the incorporated circulation airflow requirements, the maximum refrigerant charge or minimum room area can be determined according to Table 2-2 or Table 2-3.

! CAUTION

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

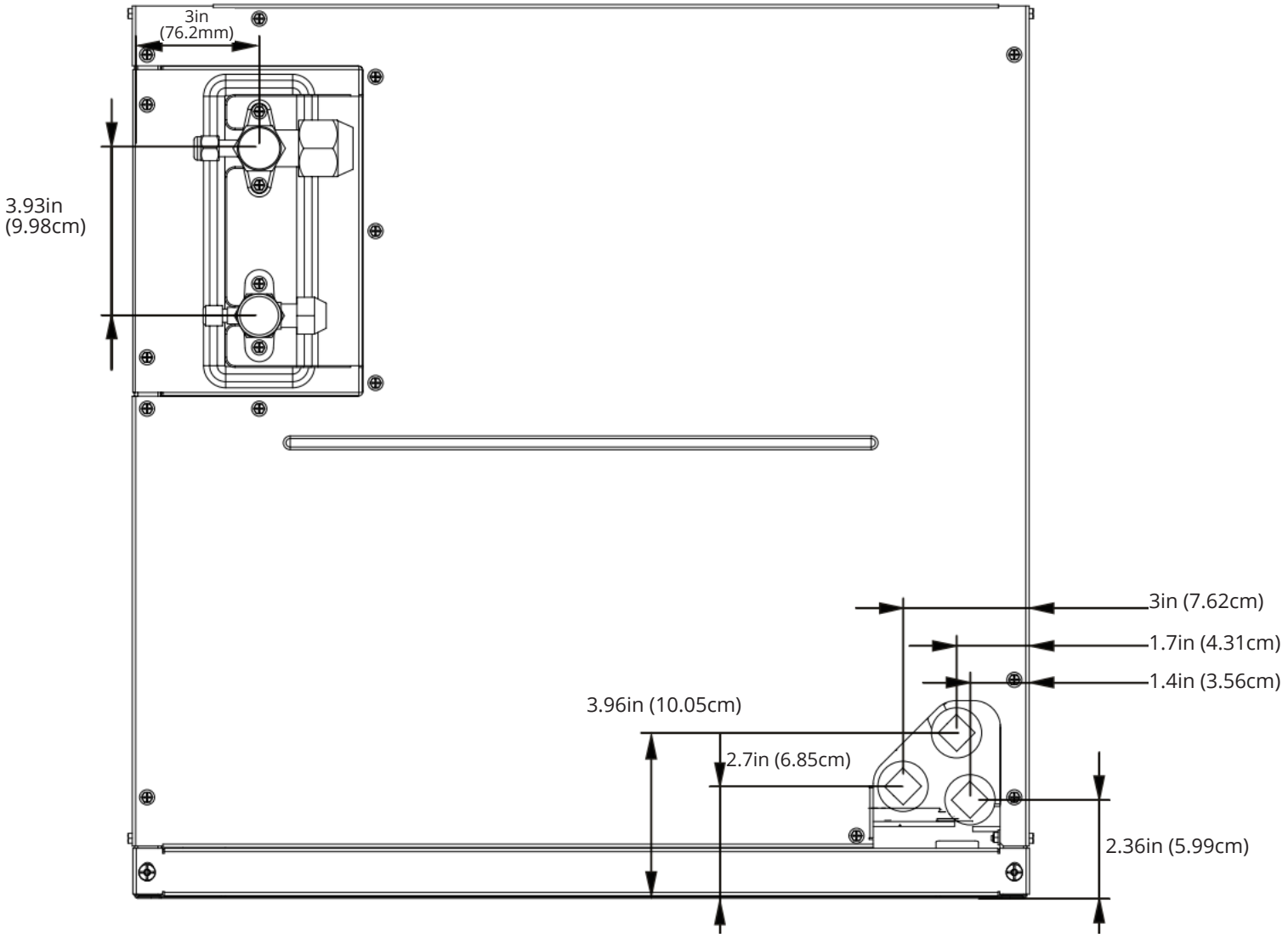
3.1 Applications

Vertical Upflow and Horizontal Flow:

Vertical upflow and horizontal configurations are the factory settings for all models.

If the return air is to be ducted, install the duct flush with the floor. Use a fireproof resilient gasket 1/8"-1/4" thick between the ducts, unit, and floor. Set the unit on the floor atop the opening.

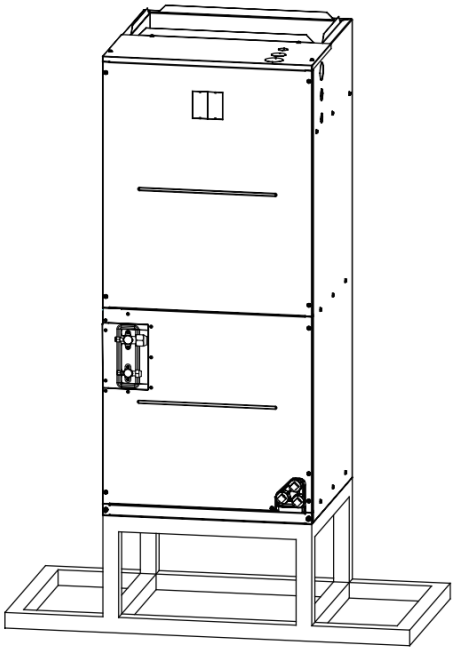
Note: Lightly tighten the drain connections so they do not leak. Using excessive force may cause damage to the drain connections. Torque applied to drain connections should not exceed 10ft/lbs.



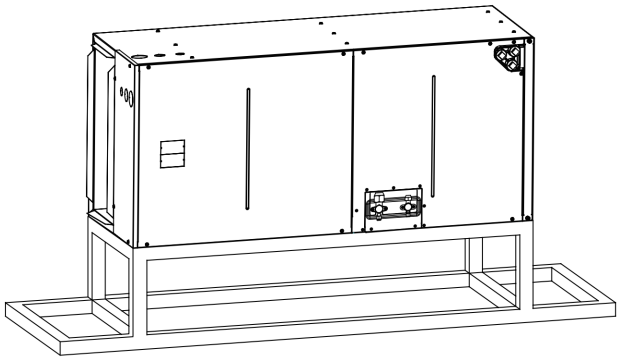
Dimensions for Front Connection Coil

The units can be installed in a vertical (upflow/downflow) and horizontal(right/left) configurations.

Vertical Upflow



Horizontal Left

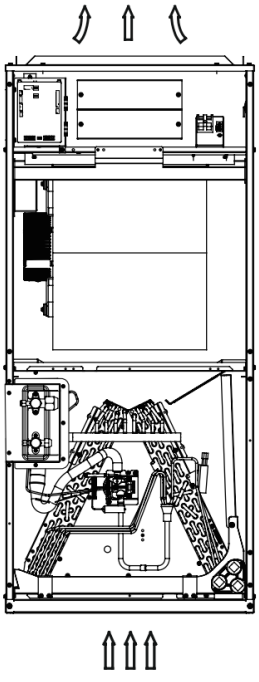


Note: For horizontal installation, a secondary drain pan (not supplied) is suggested for installation under the unit.

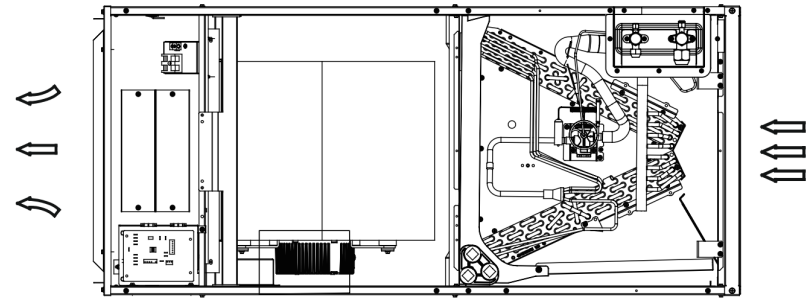
Please follow these steps to perform vertical upflow and horizontal right installations:

1. Open the upper cover.
2. Open the cover of the electronic control box.
3. Connect the wire according to the wiring diagram.
4. Connect the pipes.
5. Install the drainage pipes.

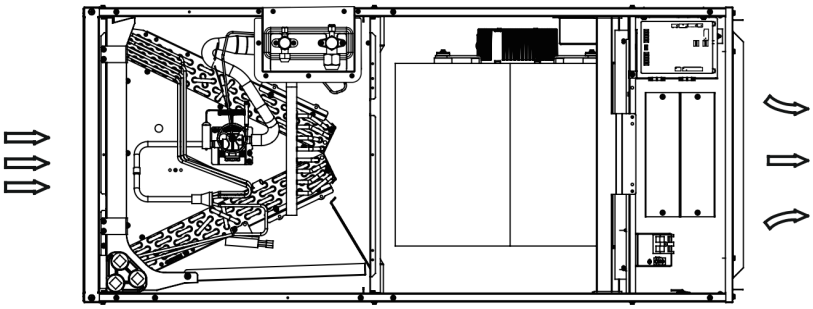
This unit may be installed in the upflow, downflow, horizontal left or horizontal right orientations.



Upflow

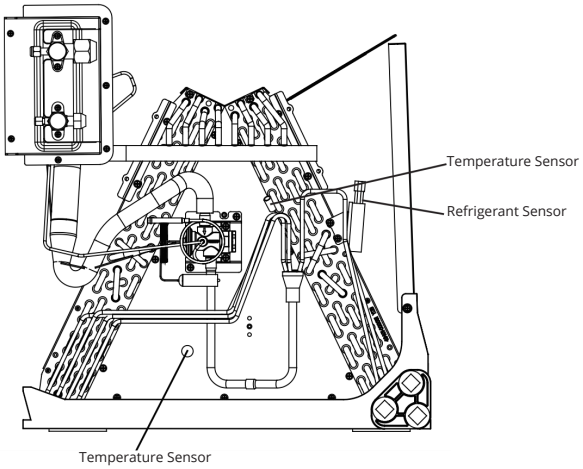


Horizontal Left Flow



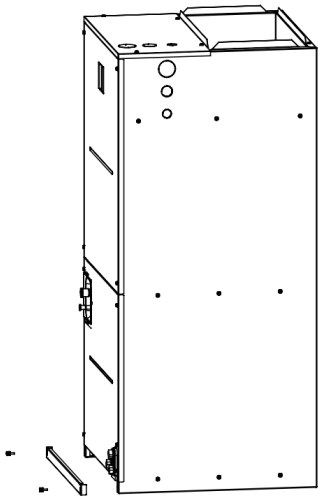
Horizontal Right Flow

Indication of the position of each temperature sensor based on that of the evaporator:

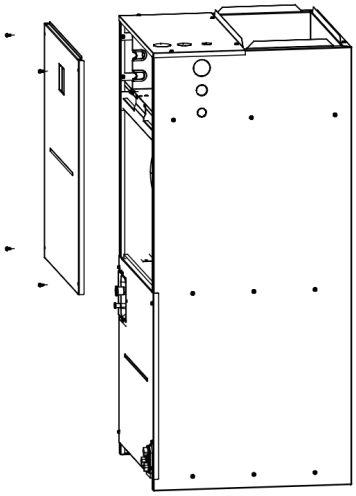


Note: For the horizontal installation, disassemble and reinstall the evaporator assembly.

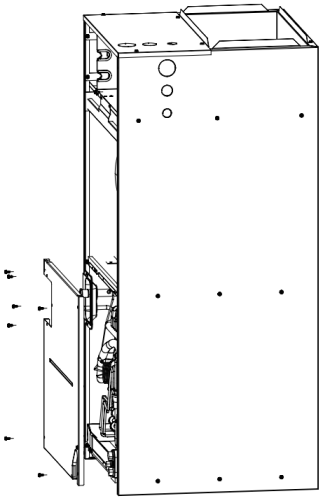
1. Take off the fixed plate covering the filter and remove filter.



2. Remove the upper cover for assembly.



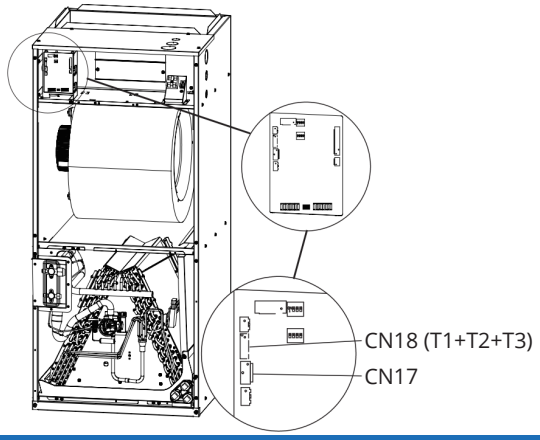
3. Remove the evaporator cover plate.



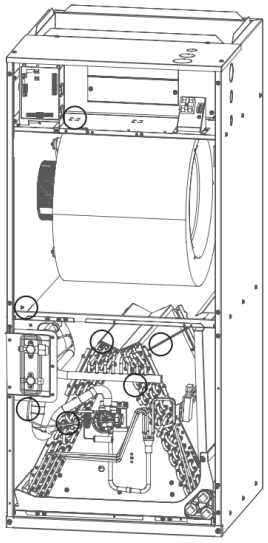
4. Remove the plug of the CN17 refrigerant sensor and the plug of the CN18 temerature sensor.

CN17: Refrigerant Sensor COM

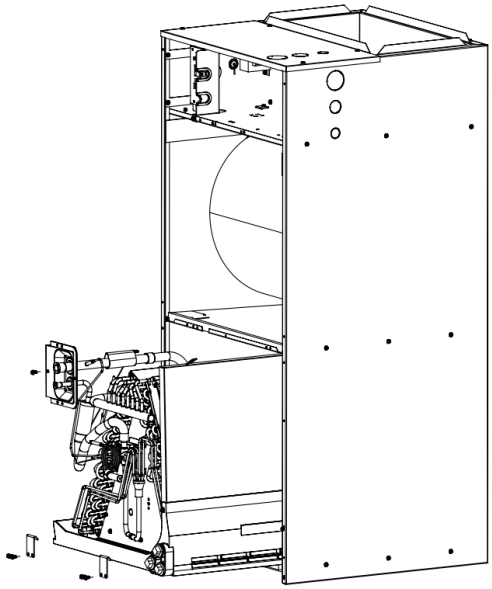
CN18: Temperature Sensor COM



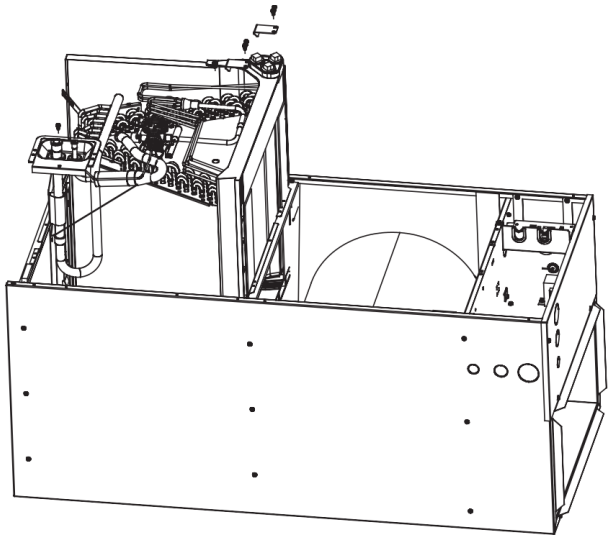
5. Remove the CN17/CN18 cable ties.



6. Remove the evaporator and drain pan, and rotate 180°.

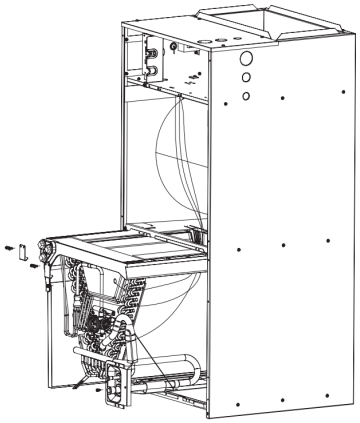


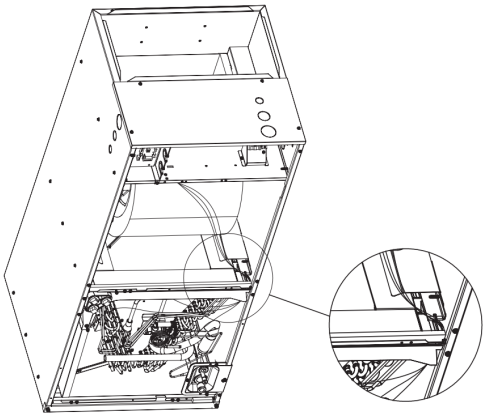
7. Reinstall the evaporator.



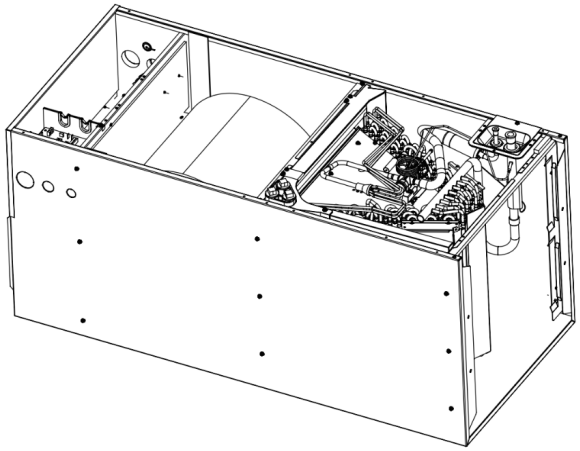
8. Reinstall the CN17/CN18 plug and tie up the sensor wires.

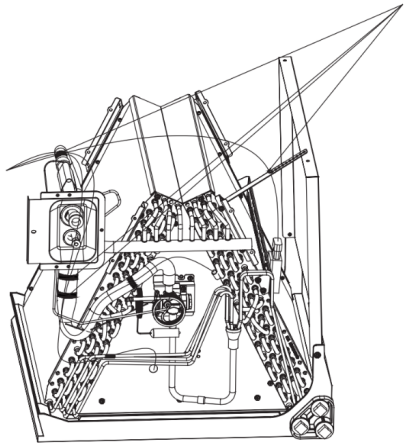
Note: The wire needs to pass through the wire groove from the water-receiving tray and be stuck on the hook of the water-receiving tray.





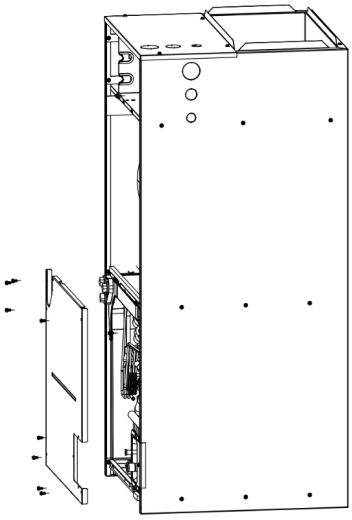
9. Reinstall the fixed drain pan and auxiliary support plate.



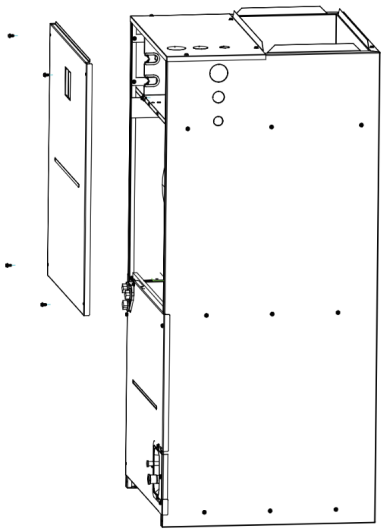


Use cable ties to bind and fix the environmental temperature-sensitive bag as shown in the figure.

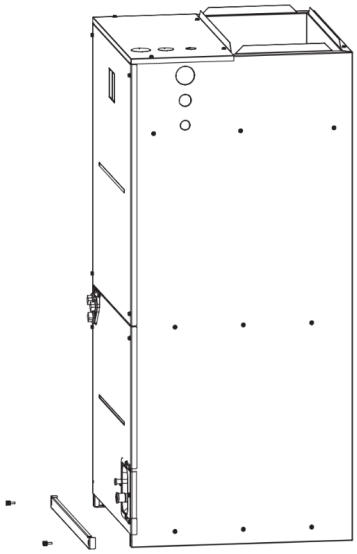
10. Reinstall the evaporator cover plate.



11. Reinstall the upper cover for assembly.



12. Reinstall the filter and filter plate.



13. Connect the wire according to the wiring diagram.

3.2 Refrigerant Line

The unit has been pre-filled with refrigerant (refer to the machine nameplate for the specific refrigerant amount). Ensure the pipes are connected and there is no air inside the connecting pipe before using an Allen wrench to open the shut-off valve.

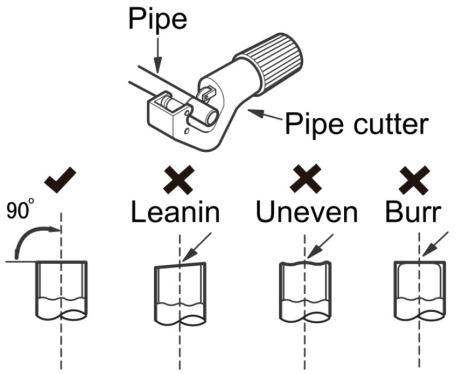
! CAUTION

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

1. Cut Pipes

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

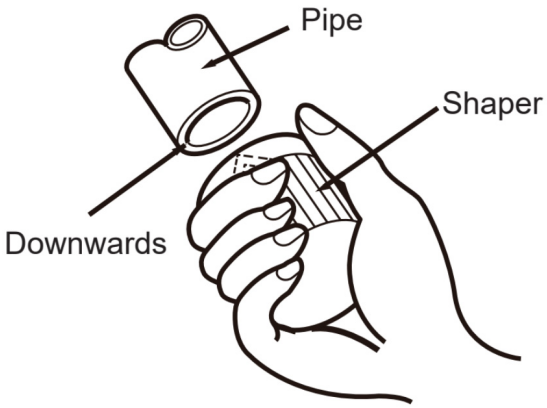
1. Use the piping kit accessory or purchase pipes locally.
2. Measure the distance between the indoor and outdoor unit.
3. Cut the pipes a little longer than the measured distance.



2. Remove Burrs

Burrs can affect the airtight seal of refrigerant piping connection. They must be completely removed.

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

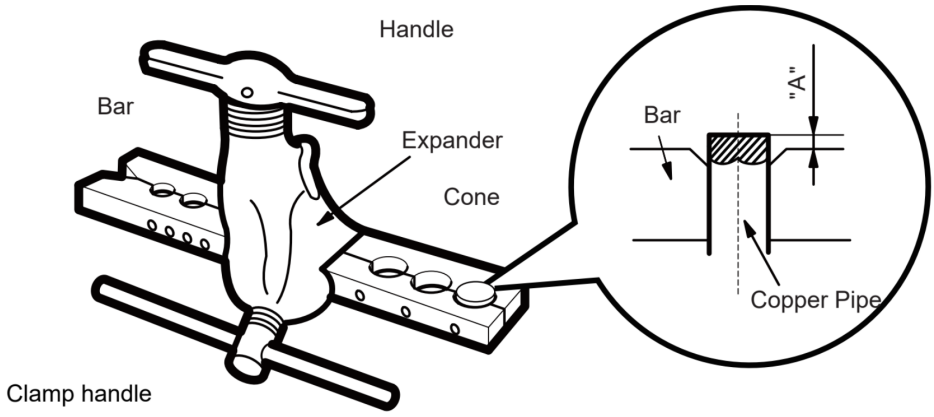


3. Flaring Work

Carry out flaring work using a flaring tool, as shown below.

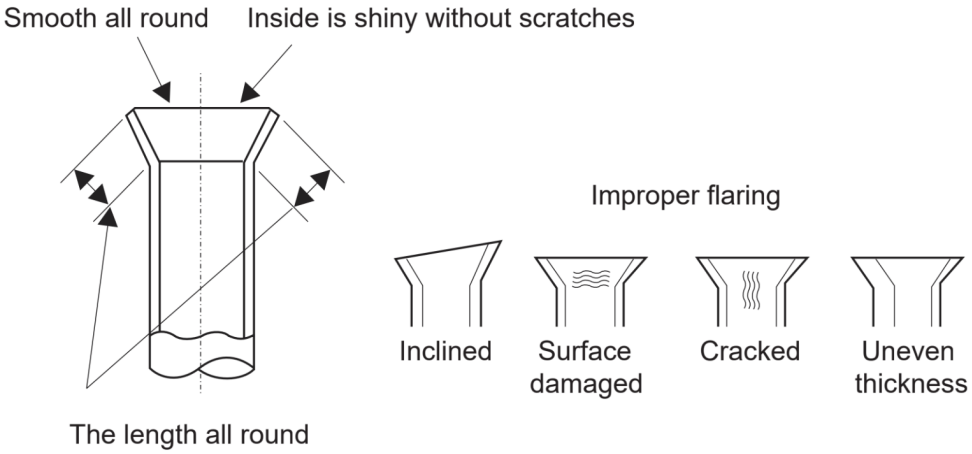
Outside Diameter	A
Inch	Inch
3/8"	0.03"~0.04"
3/4"	0.02"~0.03"
7/8"	0.02"~0.03"

Firmly hold the copper pipe in a die in the dimensions shown in the table above.



4. Final Check

1. Compare the flared work with the figure below.
2. If the flare is defective, cut off the flared section and do the flaring work again.



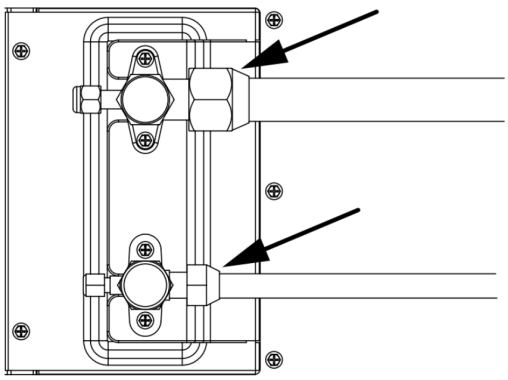
NOTE: Connect the copper pipes to the indoor unit first, then connect it to the outdoor unit.

5. Pipe Connection

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

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

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



4. While firmly gripping the nut, use a torque wrench to tighten the flare nut according to the torque values.

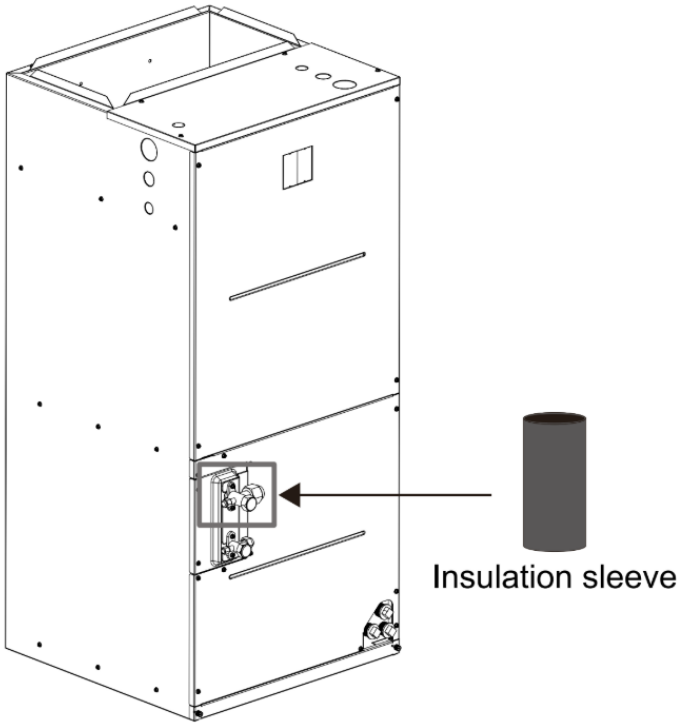
Connecting Pipe Size	Torque Values (lb/ft)
3/8"	27.25-31
3/4"	51.67-55.33
7/8"	57.5-61.25

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

! CAUTION

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

6. Insulate all the piping, including the outdoor unit's gas valve.
7. Open the outdoor unit's stop valves to start the flow of refrigerant between the indoor and outdoor units.
8. After ensuring the unit is running properly, take out the insulation sleeve from the accessory bag and cut it to the appropriate length (in adherence to the actual installation situation) to wrap around the shut-off valve. Secure it with zip ties to reduce the condensation issue at the shut-off valve.

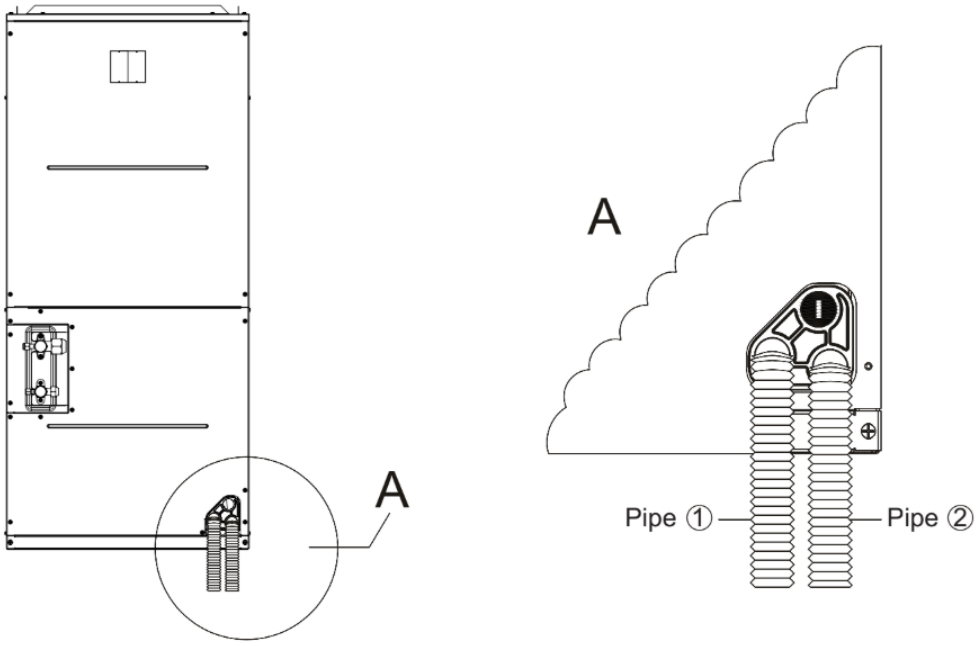


! CAUTION

Check to make sure there are no refrigerant leaks after completing the installation work. If there is a refrigerant leak, ventilate the area immediately and evacuate the system.

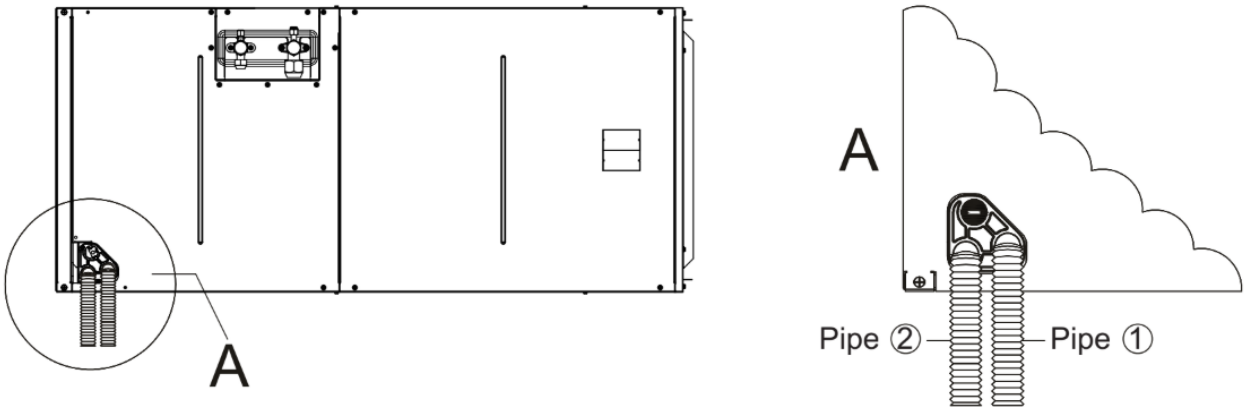
3.3 Drainpipe Installation

1. When the air handler is installed vertically, please block the upper drainage hole with a cover. The lower right of the the drainage hole is connected to the drainage pipe, and the lower left of the drainage hole is connected with the overflow pipe that should be exposed to the air; If the pipe ① is draining, this means pipe ② is blocked. Contact a service technician as soon as possible.



Vertical

2. When installing the air handler horizontally, the upper drainage hole is covered, the lower left of the drainage hole is connected with the drainage pipe, and the lower right of the drainage hole is connected with the overflow pipe that should be exposed to the air. If pipe ① is draining, pipe ② is blocked. Contact a service technician as soon as possible.



Horizontal right

Installation in an Unconditioned Space:

There are two pairs of coil rails in the air handler for default and counter flow applications. If the air handler is installed in an unconditioned space, the two unused coil rails should be removed to minimize air handler surface sweating.

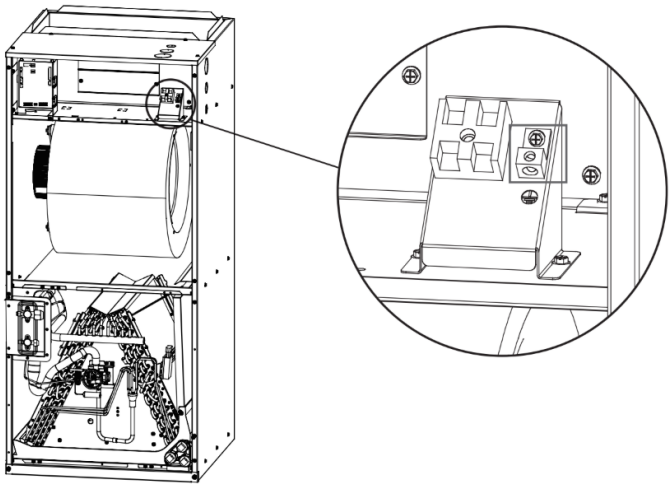
The coil rails can be easily removed by taking off the 6 mounting screws from both sides of the cabinet.

4.1 Electrical Wiring

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

⚠ WARNING

Disconnect all power to unit before installing or servicing. More than one disconnect switch may be required to de-energize the equipment. Hazardous voltage can cause severe personal injury or death. Ground the condensing unit according to National, State, and Local code requirements.



Minimum Cross-Sectional Area of Power and Signal Cables:

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

The ampacities shown apply to appliance wiring materials with insulation rated no less than 194°F (90°C). Supply circuit power wiring must use copper conductors.

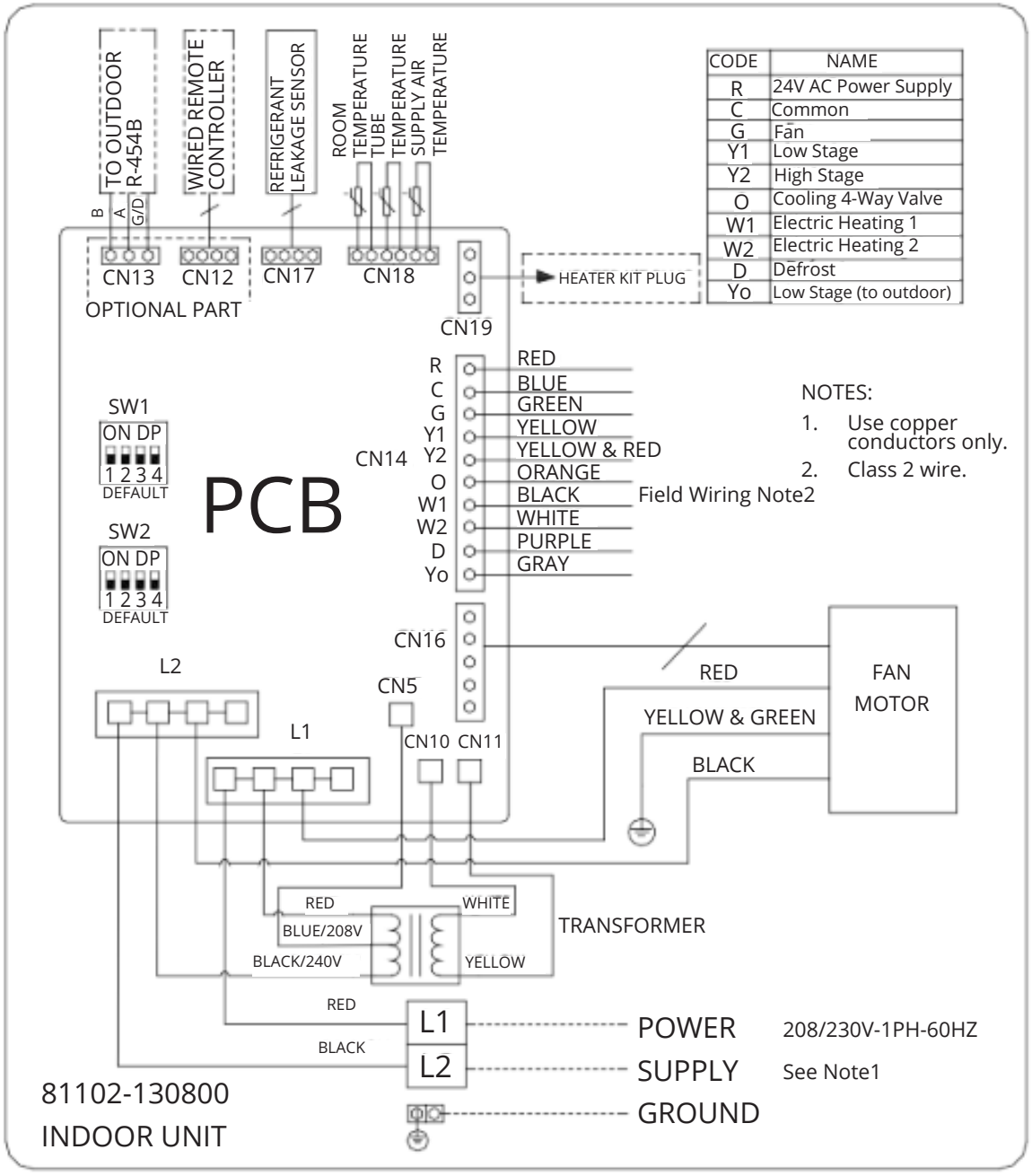
Min. Circuit Ampacity of Air Conditioner (A)	Min. Wire Cross-Sectional Area (mm²)	Specification of Socket or Switch (A)	Fuse Specification (A)
≤8	0.75	15	15
>8 and ≤10	1	15	15
>10 and ≤15	1.5	20	25
>15 and ≤24	2.5	25	40
>24 and ≤28	4	35	45
>28 and ≤32	6	40	55

Note: This table is for reference only, the installation should meet the requirements of local laws and regulations.

4.2 Power Wiring

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

- If required, install a branch circuit disconnect of adequate size, located within sight of, and readily accessible to the unit.
- When the electric heat is installed, units may be equipped with one or two 30~60 amp circuit breakers. These breakers protect the internal wiring in the event of a short circuit and serve as a disconnect site. Circuit breakers installed within the unit do not provide overcurrent protection of the supply wiring and therefore may be sized larger than the branch circuit protection.
- Supply circuit power wiring must be 167°F (75°C) minimum with copper conductors. Refer to electrical data in this section for ampacity, wire size, and circuit protector requirements. Supply circuit protective devices may be either fuses or "HACR" type circuit breakers.



Wiring Diagram

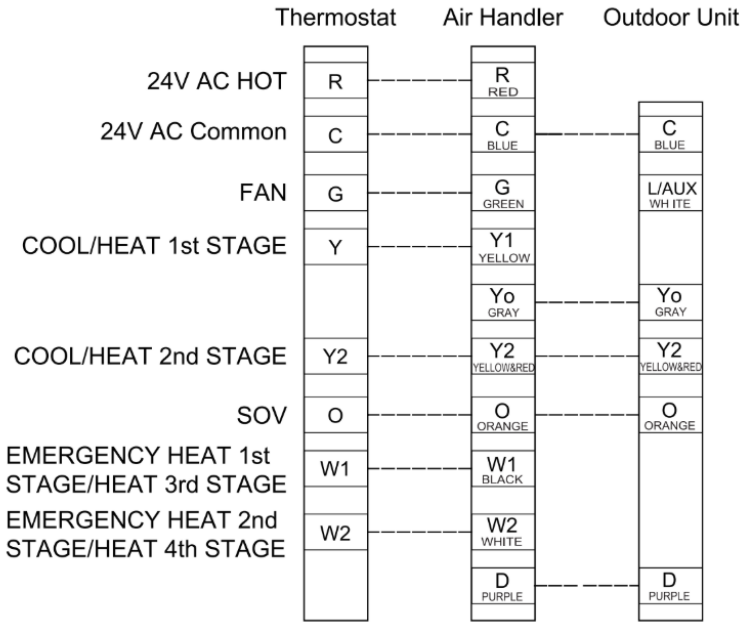
4.3 Control Wiring

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

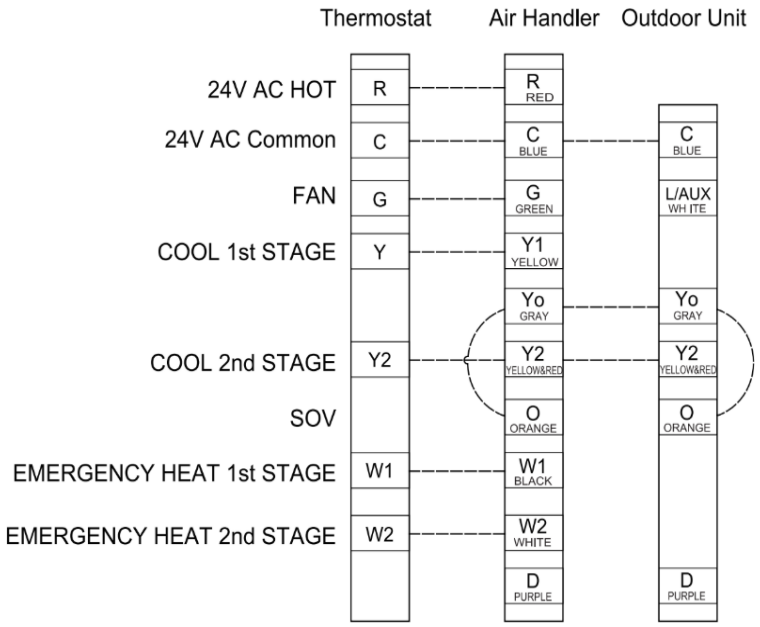
- Low voltage control wiring should be color-coded 18 AWG.
- Refer to wiring diagrams attached to indoor and outdoor sections for connection instruction.
- Make sure separation of control wiring and power wiring has been maintained.

Schematic Diagram for Control Wiring Connection

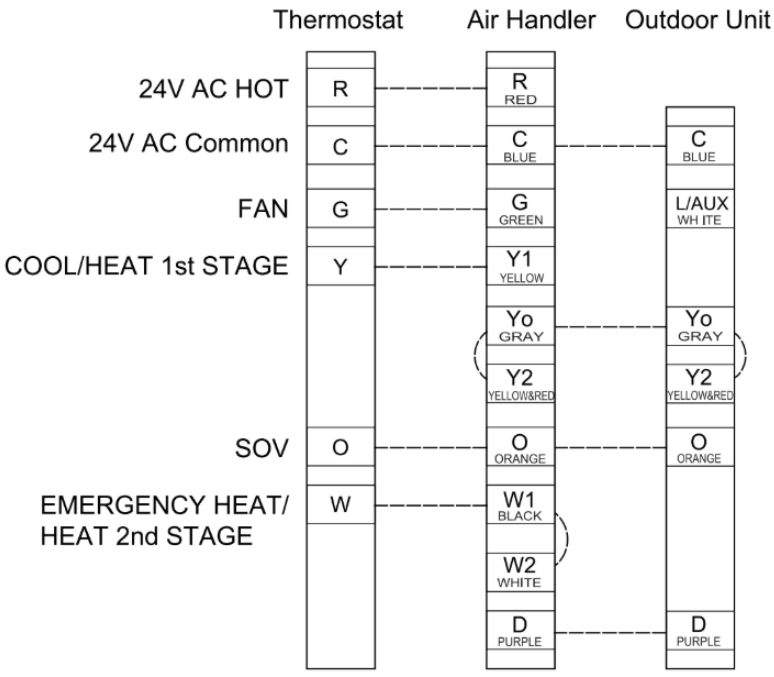
2 Heat/2 Cool, Heat Pump



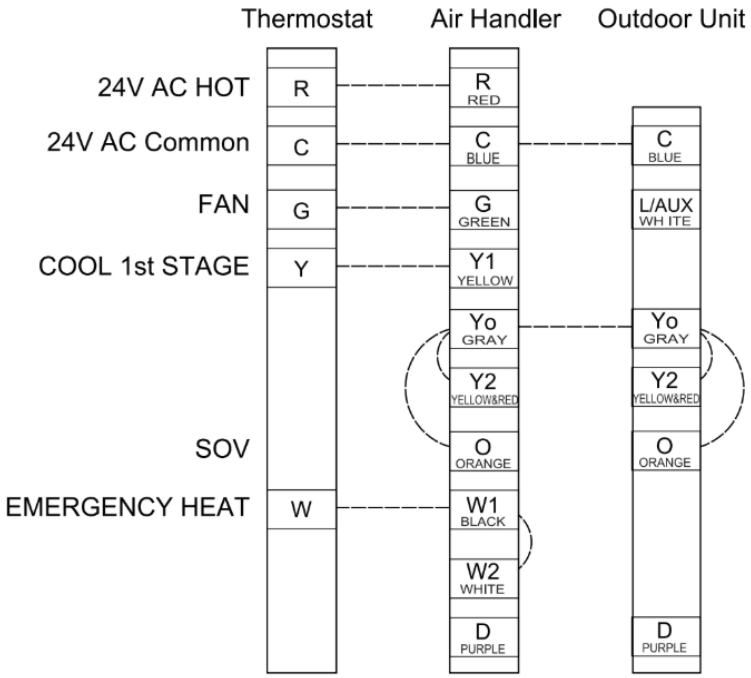
2 Cool/2 Electric Heat, Cooling Only



1 Heat/1 Cool, Heat Pump



1 Cool, Cooling Only



Thermostat Terminal Definition Chart:

Unit Terminal	Terminal Definition
R	24VAC power supply for thermostat from secondary transformer.
C	Common wire.
G	Fan motor relay.
Y1	Compressor stage 1, low-load output control.
Y2	Compressor stage 2, high-load output control.
O	Cooling four-way valve.
W1	Heating stage 1, electrical heater low-loadoutput control.
W2	Heating stage 2, electrical heater high-load output control.
Yo	Outdoor compressor.
D	Defrost signal (receiving the outdoor unit defrost signal).

Notes:

1. Be sure the power supply aligns with the 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. Some thermostats may use W2/AUX for heat pump.
5. The electrical heater may be not avaliable for some model (need to be checked later).
6. For single stage thermostat with Y/Y1 terminal only, place both Y1 and Y2 wire together to Y/Y1 terminal.
7. When the communication method between the indoor and outdoor units is selected as 24V communication, the above wiring method is required.

4.4 Grounding

WARNING

The unit must be grounded. Failure to do so can result in electrical shock causing personal injury or death.

- Grounding may be accomplished by grounding metal conduit when installed according to electrical codes to the unit cabinet. Grounding may also be accomplished by attaching ground wire(s) to ground lug(s) provided in the unit wiring compartment.
- Use of multiple supply circuits require grounding of each circuit to lug(s) provided in the unit.

4.5 Electrical Data

Model	Voltage-Phase-Hz	The diameter of the power cable connecting the terminal block	Motor HP	Motor Steps	Minimum Circuit AMPS	MAX Overcurrent Protection (A)
MCAEAMPVT24D21BA	208/230~ 1Ph-60Hz	14	1/2	5	5	15
MCAEAMPVT36D21BA			1/2		5	
MCAEAMPVT48D21BA			3/4		7	
MCAEAMPVT60D21BA			3/4		7	

5.1 Airflow Performance Data

Airflow performance data is based on cooling performance with a coil and without a filter in place. Check the table to select the appropriate unit size. External static pressure should stay within the minimum and maximum limits shown in the table below in order to ensure proper airflow.

Model	Motor Speed	SCFM								
		External Static Pressure (in. w.c.)								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
18K	Super grade	1173	1130	1065	1021	956	909	838	791	720
	Top grade	1139	1095	1028	983	916	867	795	747	675
	Mid and high grade	1105	1059	990	944	875	826	752	703	629
	Mid-range	1072	1024	953	906	835	785	709	695	583
	Mid and low grade	1038	989	916	868	795	743	666	615	538
	Low grade	1004	954	879	829	754	702	623	571	492
	Mute tone	970	919	842	791	714	661	580	527	446
24K	Super grade	1539	1510	1467	1438	1395	1360	1306	1271	1218
	Top grade	1440	1407	1358	1325	1276	1237	1179	1140	1082
	Mid and high grade	1340	1304	1248	1211	1156	1114	1052	1010	947
	Mid-range	1241	1200	1139	1098	1036	992	924	879	812
	Mid and low grade	1173	1130	1065	1021	956	909	838	791	720
	Low grade	1105	1059	990	944	875	826	752	703	629
	Mute tone	1038	989	916	868	795	743	666	615	538
30K	Super grade	1871	1836	1784	1749	1697	1654	1589	1545	1481
	Top grade	1779	1746	1696	1663	1613	1572	1510	1469	1408
	Mid and high grade	1687	1655	1608	1577	1529	1490	1432	1393	1335
	Mid-range	1502	1474	1432	1404	1362	1327	1275	1241	1188
	Mid and low grade	1410	1377	1329	1296	1248	1210	1154	1116	1060
	Low grade	1317	1281	1225	1189	1133	1093	1032	992	932
	Mute tone	1225	1184	1122	1181	1019	976	911	867	802
36K	Super grade	2056	2017	1960	1922	1864	1817	1745	1698	1627
	Top grade	1871	1836	1784	1749	1697	1654	1589	1545	1481
	Mid and high grade	1687	1655	1608	1577	1529	1490	1432	1393	1335
	Mid-range	1502	1474	1432	1404	1362	1327	1275	1241	1188
	Mid and low grade	1410	1377	1329	1296	1248	1210	1151	1116	1060
	Low grade	1317	1281	1225	1189	1133	1093	1032	992	931
	Mute tone	1225	1184	1122	1081	1019	976	911	867	802

Note: Airflow is based on the cooling performance at 230V without electric heat and a filter. Airflow at 208V is approximately the same as 230V because the multi-tap ECM motor is a constant torque motor. The torque doesn't drop off at the speeds in which the motor operates. The air distribution system has the greatest effect on airflow. For this reason, the contractor should use only industry-recognized procedures to finish ductwork. Heat pump systems require a specified airflow. Each ton of cooling requires between 300-450 cubic feet per minute (CFM). Duct design and construction should be carefully done. System performance can be lowered dramatically through bad planning or workmanship. Air supply diffusers must be selected and located carefully. They must be sized and positioned to deliver treated air around the spatial perimeter. Return air grilles must also be properly sized to carry air back to the blower. Failure to follow these may cause abnormal noise and drafts. The installers should balance the air distribution system to ensure proper quiet airflow to all rooms in the home. This ensures a comfortable living space. An air velocity meter or airflow hood can give an accurate system CFM reading.

5.2 Ductwork

Field ductwork must comply with the National Fire Protection Association NFPA 90A, NFPA 90B, and any applicable local ordinance.

⚠ WARNING

Do not, under any circumstances, connect return ductwork to any other heat-producing devices such as a fireplace insert, stove, etc. Unauthorized use of such devices may result in fire, carbon monoxide poisoning, explosion, personal injury, or property damage.

Sheet metal ductwork running through unconditioned spaces must be insulated and covered with a vapor barrier. Fibrous ductwork may be used if constructed and installed in accordance with SMACNA Construction Standard on Fibrous Glass Ducts. Ductwork must comply with the National Fire Protection Association, as tested by U/L Standard 181 for Class I Air Ducts.

Check local codes for requirements on ductwork and insulation.

- The duct system must be designed within the range of external static pressure that the unit is designed to operate against. It is important that the system airflow be adequate. Make sure the supply and return ductwork, grilles, special filters, accessories, etc. are accounted for when calculating total flow resistance. Refer to the airflow performance table in this manual.
- Design the duct system in accordance with "ACCA" Manual "D" Design for Residential Winter and Summer Air Conditioning and Equipment Selection. Latest editions are available from: "ACCA" Air Conditioning. Contractors of America, 1513 16th Street, N.W., Washington, D.C. 20036. If a duct system incorporates a Xair duct, be sure that the pressure drop Information (straight length plus all turns) shown in the "ACCA" Manual "D" is accounted for within the system.
- Supply plenum is attached to the 3/4" duct flanges supplied with the unit. Attach the flanges around the blower outlet.
- Secure the supply and return ductwork to the unit flanges, using proper fasteners for the type of duct used and taping the duct-to-unit joint as required to prevent air leaks.

Note:

If an elbow is included in the plenum close to the unit, it must not be smaller than the dimensions of the supply duct flange on the unit.

The front flange on the return duct connected to the blower casing must not be screwed into the area where the power wiring is located. Drills or sharp screw points can damage the insulation on the wires inside the unit.

5.3 Air Filter

Filter application and replacement are critical to airflow, which directly affects the system's heating and cooling performance. Reduced airflow can shorten the life of the system's major components, such as the motor, heat relays, evaporator coil, or compressor. Units should be sized for a maximum of 300 ft/min. air velocity or what is recommended for the type of filter installed.

Ensure the air flow is in the range of 300-450 CFM if adding high-efficiency filters or electronic air filtration systems.

Note that the overall performance and efficiency of the unit will be reduced because of air filter pressure drop.

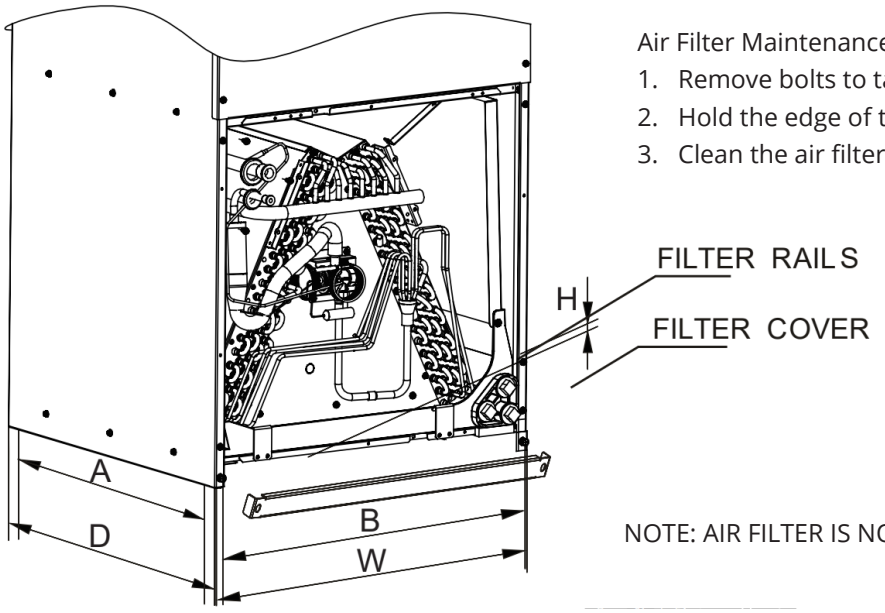
Note:

Do not double filter the return air duct.

Do not filter the supply air duct, as this will change the performance of the unit and reduce airflow.

WARNING

Do not operate the system without filters. A portion of the dust suspended in the air may temporarily lodge in the duct. Any circulated dust particles could be heated and charred by contact with the air handler's elements. This residue could soil ceilings, walls, drapes, carpets, and other articles in the house.
If filters are not used, soot damage may occur when certain types of candles, oil lamps, or standing pilots are burned.



Air Filter Maintenance/Replacement:

1. Remove bolts to take the filter cover away.
2. Hold the edge of the air filter and extract ir.
3. Clean the air filter or replace with a new one.

NOTE: AIR FILTER IS NOT FACTORY-INSTALLED.

Filter Installation and Maintenance

Model	Dimensions in.(mm)					
	Filter Size	W	D	H	A	B
MCAEAMPVT24D21BA	18x20	19-3/4	21	1	16	13-7/8
MCAEAMPVT36D21BA						
MCAEAMPVT48D21BA	22x20	23-1/4	21	1	16	15-1/4
MCAEAMPVT60D21BA						

Note:

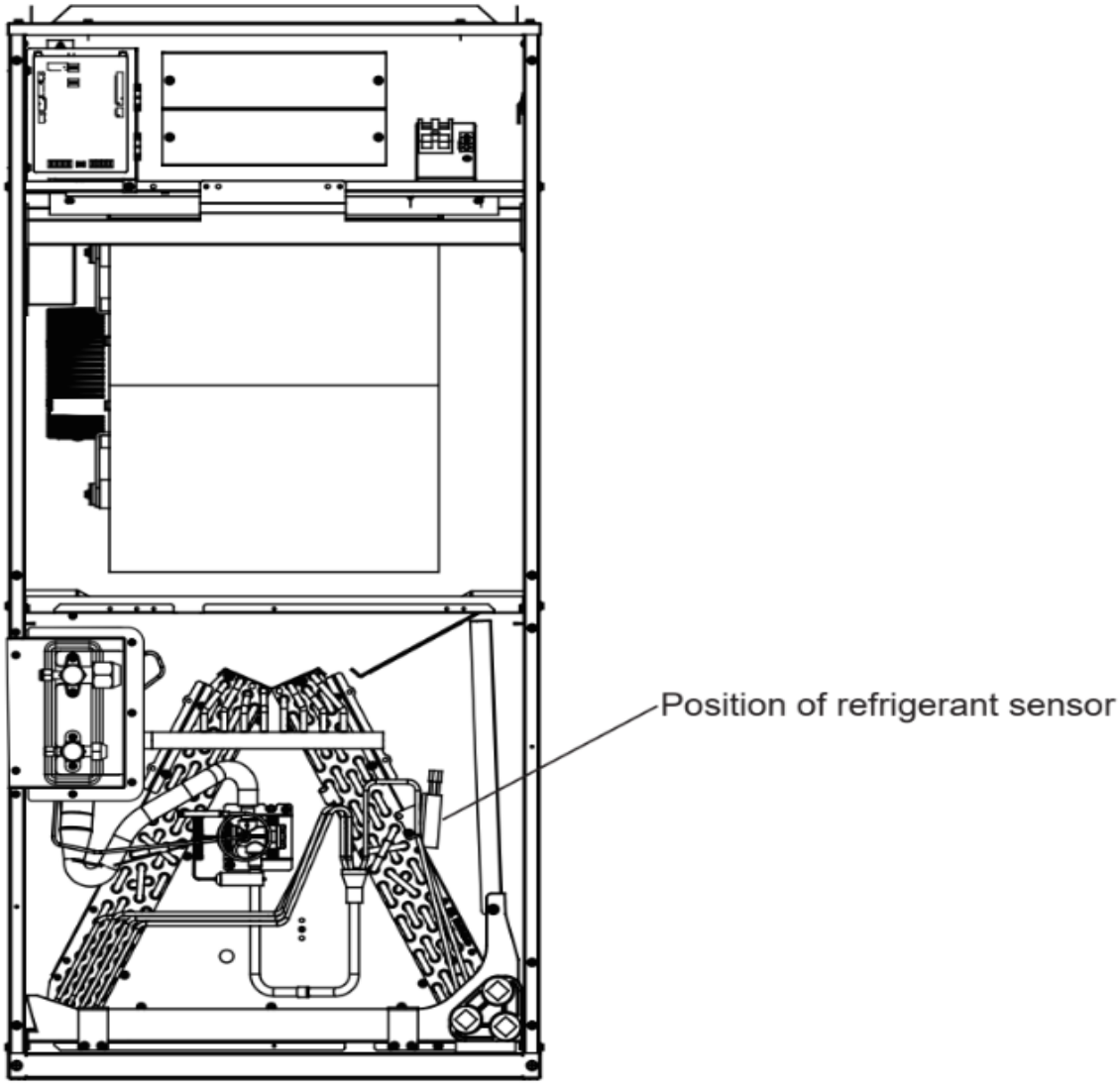
- Refer to the label on the filter cover to install the correct filter size.
- This product does not come pre-equipped with a filter.

5.4 Refrigerant Sensor

1. The refrigerant sensor must be maintained by a professional. Only the specified MRCOOL® sensor can be used as a replacement.
2. The design life of the refrigerant sensor is 15 years, please replace the sensor within the range of the service life.
3. The refrigerant sensor automatically detects the condition of the machine while in operation, and will automatically start the circulating airflow and stop the compressor when the concentration reaches the alarm range.
4. The alarm signal of the refrigerant sensor is as follows:

	24V Communication	485 Communication
Refrigerant Leak Protection	The red light is steadily on.	Display "Hd"
The Refrigerant Sensor's Communication is Abnormal.	The red light blinks once and turns off once.	Display "Fd"

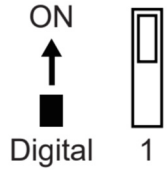
5. The installation position of the refrigerant sensor is shown in the figure below.



Note: Illustrations are for explantory purposes only. The actual cabinet appearance may vary.

5.5 Communication Function DIP Switch

According to the actual installation requirements, you can choose between 24V ON/OFF mode or RS485 communication mode to control the unit.

DIP Bit	DIP Code	Function Description
SW2-1		Factory default, 24V ON/OFF control: Using the 24V thermostat for controlled unit operation.
		RS485 communication control: Purchase wire controllers and communication lines from MRCOOL® to fulfill accessory usage.

5.6 Wind Gear Adjustment DIP Switch

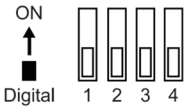
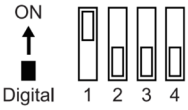
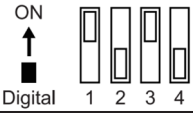
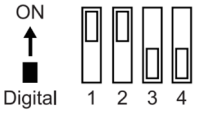
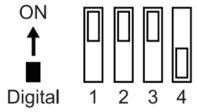
STEP 1:

When the SW1-1 is located at the digital end (factory default), the fan runs at the 5th level for high speed and the 2nd level for low speed. If you want to adjust the fan speed by yourself, you need to change it to the "ON" end.

STEP 2:

Set SW1-1 to the "ON" end, then combine the SW1-2 and SW1-3 to get different fan speeds. The fan speed operation obtained by the combination is shown in the following table.

DIP-switch setting for fan speed:

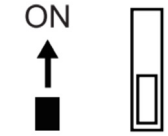
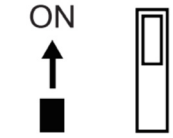
Combination	SW1 Setting	Low Speed	High Speed
1 (Default)		Mid and high grade	Super grade
2		Mid-range	Super grade
3		Mid and low grade	Top grade
4		Low grade	Mid-range
5		Mute tone	Mid-range

Note: The DIP switch of SW1 takes effect only when SW2-1 is on the digital end. When the SW2-1 dip switch is ON, the wind gear is directly controlled and adjusted by the wire controller.

5.7 Anti-Cold Air DIP Switch

In 24V ON/OFF control mode, you can use the SW1-4 DIP switch to adjust whether the anti-cold air function takes effect.

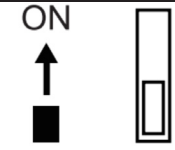
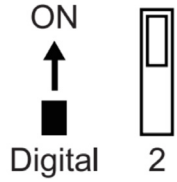
1. The default DIP switch position of SW1-4 is on the digital end. The cold air protection function takes effect. When the heat pump is started, the unit will run in accordance with the lower wind gear for a period of time to prevent the cold air from blowing into the room at the initial stage of the heating operation and affecting user comfort, and then will adjust the speed according to the temperature control wind gear. The unit determines the defrosting status of the outdoor unit according to the signal of terminal D. During the defrosting operation of the outdoor unit, the indoor air conditioner stops running to prevent cold air from blowing into the room during the defrosting process and affecting the indoor temperature. The unit stops the defrosting process and adjusts the rotational speed according to the temperature control air gear after the anti-cold air operation is finished. In the electric heating operation state, the unit will control the fan operation according to the temperature control wind gear, and will not perform the anti-cold wind action.
2. You can turn off the anti-cold air function by switching the SW1-4 dip switch to the ON end. The unit controls the fan operation according to the control wind gear of the thermostat, and does not implement the anti-cold risk control system.

DIP Bit	DIP Code	Function Description
SW1-4		The cold air protection function takes effect.
		The cold air protection function fails.

Note: The DIP switch of SW1 takes effect only when SW2-1 is on the digital end. When the SW2-1 dip switch is located at the ON end, the unit is intelligently controlled and the cold air protection function is always effective.

5.8 Lower Outlet Air Gear Control Function DIP Switch

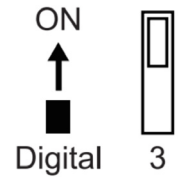
SW2-2 DIP switches are installed at the digital end by default before delivery. When the unit is installed at the bottom air outlet, adjust the SW2-2 DIP switches to ON. The unit will intelligently control the upper limit of the air gear to prevent the condensate from being blown into the air duct due to excessive air volume.

DIP Bit	DIP Code	Function Description
SW2-2		The unit is set to this position when the upper air is discharged or the left and right horizontal air is discharged.
		The unit is set to this position when the air is discharged.

5.9 Cold Air Prevention

In 24V ON/OFF control mode, you can use SW2-3 DIP switches to adjust whether the exhaust air temperature control function takes effect.

1. The default DIP switch position of SW2-3 is on the digital end, and the exhaust air temperature control function takes effect. When the unit is running the heat pump, if the air flow temperature after the heat exchanger is detected to be too high, the electric auxiliary heat will be controlled not to start, but to prevent the electric heating temperature from being too high and triggering overheat protection.
2. If you need to further increase the air temperature of the equipment, you can adjust the SW2-3 dip switch position to the ON end. If the air temperature control function fails, the electric heating in this state runs according to the control of the thermostat and is not affected by the air temperature of the heat pump.

DIP Bit	DIP Code	Function Description
SW2-3		The exhaust air temperature control function takes effect.
		The exhaust air temperature control function fails.

Note: In emergency heating mode, when the external unit of the heat pump is not running, the electric heating runs according to the control of the temperature controller and is not affected by the outlet air temperature of the heat pump.

5.10 Factory Status DIP Switch

SW2-4 DIP switches remain in factory status (digital end). Do not adjust them at will.

6.1 Fault Indication

Blinking definition: The LED light on 200ms and then off 200ms, defined as a LED light flashing.

LED Light Color	LED Light Status	Failure
Green Light	Turn off.	Standby mode.
Green Light	Stay lit.	In operation.
Green Light	Flash 1.	Anti-cold air running (flash once, off for 1s).
Green Light	Flash 2.	Electric auxiliary hot running (flash twice, off for 1s).
Green Light	Flash 3.	Commodity inspection status (flash 3 times, off for 1s).
Green Light	Flash 3.	Self-check status (flash 4 times, off for 1s).
Red Light	Turn off.	Trouble-free.
Red Light	Stay lit.	Refrigerant leak protection
Red Light	Flash 1.	The communication of the refrigerant sensor is abnormal (flash once, and then off for 1s).
Red Light	Flash 2.	Internal fan fault (flashes twice, off for 1s).
Red Light	Flash 3.	Internal coil temperature sensing packet fault (flash 3 times, off for 1s).
Red Light	Flash 4.	The supply air temperature sensing packet is faulty (flashes four times, and then disappears for 1s).
Red Light	Flash 5.	EEPROM fault (flash 5 times, off for 1s).
Red Light	Flash 6.	Indoor/Outdoor 485 Communication failure (flashes six times, off for 1s).
Red Light	Flash 7.	Controller 485 Communication failure (flashes 7 times, off for 1s)

This only works with 24V communication; RS485 Communication is not displayed because the online controller displays the fault code.

6.2 Common Issues

! CAUTION

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

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

The following symptoms are not a malfunction and will not usually require repairs:

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

6.3 Troubleshooting Advice

When trouble occurs, please check the following points before contacting MRCOOL® or your local dealer.

Problem	Possible Cause	Solution
The unit is not working	Power failure	Wait for the power to be restored
	The power switch is off	Turn on the power
	The fuse is burnt out	Replace the fuse
	The unit's 3-minute protection has been activated	Wait three minutes after restarting the unit
Poor cooling performance	Temperature setting may be higher than the ambient room temperature	Lower the temperature setting
	The heat exchanger on the indoor or outdoor unit is dirty	Clean the affected heat exchanger
	The air filter is dirty	Remove the filter and clean it according to instructions
	The air inlet or outlet of either unit is blocked	Turn the unit off, remove the obstruction and turn it back on
	Doors and windows are open	Make sure that all doors and windows are closed while operating the unit
	Excessive heat is generated by sunlight	Close windows and curtains during periods of high heat or bright sunshine
	Low refrigerant due to leak or long-term use	Check for leaks, re-seal if necessary and top off refrigerant
The unit starts and stops frequently	There's too much or too little refrigerant in the system	Check for leaks and recharge the system with refrigerant
	There is air, incompressible gas or foreign material in the refrigeration system	Evacuate and recharge the system with refrigerant
	System circuit is blocked	Determine which circuit is blocked and replace the malfunctioning piece of equipment
	The compressor is broken	Replace the compressor
	The voltage is too high or too low	Install a monostatic system to regulate the voltage
Poor heating performance	The outdoor temperature is lower than 44.5°F (6.94°C).	Check for leaks and recharge the system with refrigerant
	Cold air is entering through doors and windows	Make sure all doors and windows are closed during use
	Low refrigerant due to leak or long-term use	Check for leaks, re-seal if necessary and top off refrigerant

7.1 Electrical Data

Model	Voltage-Phase-Hz	Power Supply Wiring Gauge	Motor HP	Motor Steps	Minimum Circuit AMPS	Fuse (A)
MCAEAMPVT24D21BA	208/230/240~ 1Ph-60Hz	14 AWG	1/2	7	5	15
MCAEAMPVT36D21BA			1/2		5	
MCAEAMPVT48D21BA			3/4		7	
MCAEAMPVT60D21BA			3/4		7	

Note: The parameters in the table do not include data from the electric heat kit.

7.2 Electrical Heat Kit Data

Heat Kit Model	Model	Electric Heat (kW)	MIN. Circuit Ampacity			MAX. Fuse or Breaker (HACR) Ampacity		
			208V	230V	240V	208V	230V	240V
MCAEHFD5X1BA	MCAEAMPVT24D21BA	5	21	23	24	25	30	30
MCAEHFD10X1BA		10	42	46	48	50	60	60
MCAEHFD5X1BA	MCAEAMPVT36D21BA	5	21	23	24	25	30	30
MCAEHFD10X1BA		10	42	46	48	50	60	60
MCAEHFD15X1BA		5+10	21+42	23+46	24+48	25+50	30+60	30+60
MCAEHFD5X1BA	MCAEAMPVT48D21BA	5	21	23	24	25	30	30
MCAEHFD10X1BA		10	42	46	48	50	60	60
MCAEHFD15X1BA		5+10	21+42	23+46	24+48	25+50	30+60	30+60
MCAEHFD20X1BA		10+10	42+42	46+46	48+48	50+50	60+60	60+60
MCAEHFD5X1BA	MCAEAMPVT60D21BA	5	21	23	24	25	30	30
MCAEHFD10X1BA		10	42	46	48	50	60	60
MCAEHFD15X1BA		5+10	21+42	23+46	24+48	25+50	30+60	30+60
MCAEHFD20X1BA		10+10	42+42	46+46	48+48	50+50	60+60	60+60

Note: MCA and Max Fuse Ampacity contains the motor amps.

- Electric heat kits are suitable for an air handler's multi-position installation.
- Means available × means unavailable

! CAUTION

All electric work must be performed by qualified personnel.

MCAEHFD series is designed and aporoved to be installed in the IV 18 or TOP AHU .

- Check the MCAEHFD, MCAEHFD size based on room load under the lowest ambient temperature.
- Inspect all heating elements and the heater element's wiring. Contact local distributor immediately if there is any damage has occurred.

7 AUXILIARY HEAT KIT

⚠ WARNING

- Disconnect all external power supplies before performing installation and servicing. Turn off the accessory heater power switch, if applicable. Failure to do so may cause serious injury.
- The unit must be properly grounded and use copper supply wires. Make sure to follow national and local electrical regulations.
- When installing the unit in an enclosed space, such as a garage, heat elements should have a minimum clearance of 18in (45.72cm) from the floor to ensure the proper ventilation.

When the unit is installed with an electric auxiliary heater, the fan speed selection must meet the following static pressure requirements and the gray boxes indicate a disallowance of heat kit usage.

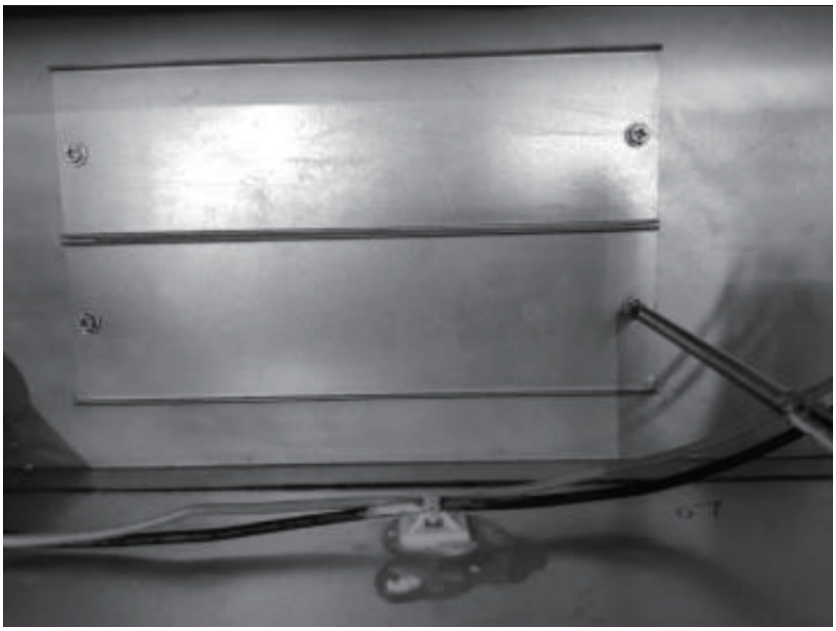
Air Handler Model	Motor Speed/ CFM	Available Electric Auxiliary Heat Kit									
		External Static Pressure-Inches W.C.[Psi]									
		0.0	0.1	0.16	0.2	0.3	0.4	0.5	0.6	0.7	0.8
		[0]	[.003]	[.005]	[.007]	[.010]	[.014]	[.018]	[.021]	[.025]	[.028]
MCEAMPVT24D21BA	Tap(7)	1173	1130	1086	1065	1021	956	909	838	791	720
	Tap(6)	1139	1095	1050	1028	983	916	867	795	747	675
	Tap(5)	1105	1059	1013	990	944	875	826	752	703	629
	Tap(4)	1072	1024	977	953	906	835	785	709	695	583
	Tap(3)	1038	989	940	916	868	795	743	666	615	538
	Tap(2)	1004	954	904	879	829	754	702	623	571	492
	Tap(1)	970	919	868	842	791	714	661	580	527	446
MCEAMPVT36D21BA	Tap(7)	1539	1510	1481	1467	1438	1395	1360	1306	1271	1218
	Tap(6)	1440	1407	1374	1358	1325	1276	1237	1179	1140	1082
	Tap(5)	1340	1304	1267	1248	1211	1156	1114	1052	1010	947
	Tap(4)	1241	1200	1159	1139	1098	1036	992	924	879	812
	Tap(3)	1173	1130	1086	1065	1021	956	909	838	791	720
	Tap(2)	1105	1059	1013	990	944	875	826	752	703	629
	Tap(1)	1038	989	940	916	868	795	743	666	615	538
MCEAMPVT48D21BA	Tap(7)	1871	1836	1801	1784	1749	1697	1654	1589	1545	1481
	Tap(6)	1779	1746	1713	1696	1663	1613	1572	1510	1469	1408
	Tap(5)	1687	1655	1624	1608	1577	1529	1490	1432	1393	1335
	Tap(4)	1502	1474	1446	1432	1404	1362	1327	1275	1241	1188
	Tap(3)	1410	1377	1345	1329	1296	1248	1210	1154	1116	1060
	Tap(2)	1317	1281	1244	1225	1189	1133	1093	1032	992	932
	Tap(1)	1225	1184	1143	1122	1181	1019	976	911	867	802
MCEAMPVT60D21BA	Tap(7)	2056	2017	1979	1960	1922	1864	1817	1745	1698	1627
	Tap(6)	1871	1836	1801	1784	1749	1697	1654	1589	1545	1481
	Tap(5)	1687	1655	1624	1608	1577	1529	1490	1432	1393	1335
	Tap(4)	1502	1474	1446	1432	1404	1362	1327	1275	1241	1188
	Tap(3)	1410	1377	1345	1329	1296	1248	1210	1151	1116	1060
	Tap(2)	1317	1281	1244	1225	1189	1133	1093	1032	992	931
	Tap(1)	1225	1184	1143	1122	1081	1019	976	911	867	802

7.3 Heat Kit Installation

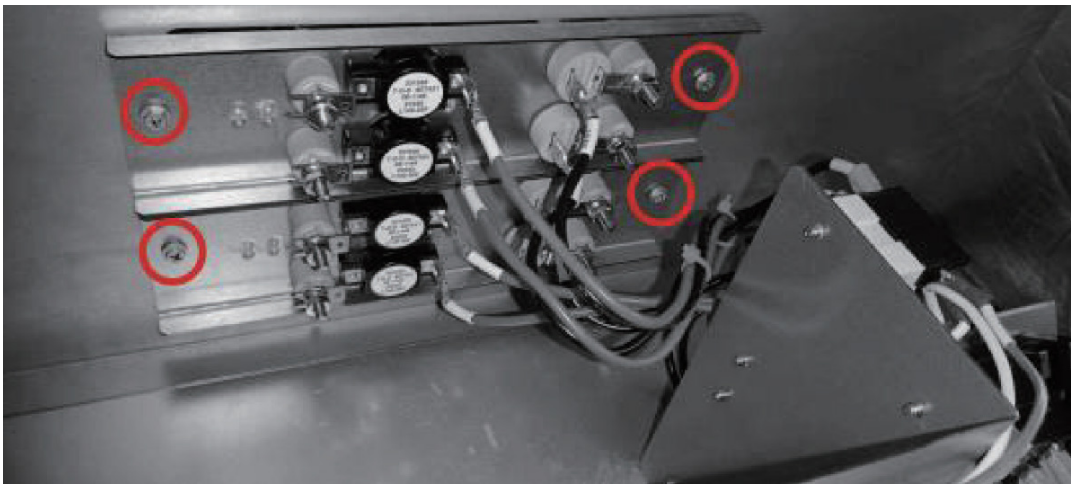
Prior to installation, thoroughly familiarize yourself with this installation manual and observe all safety warnings. During installation or repair, be cautious. It is your responsibility to install the product safely and educate the customer on its safe use post-installation.

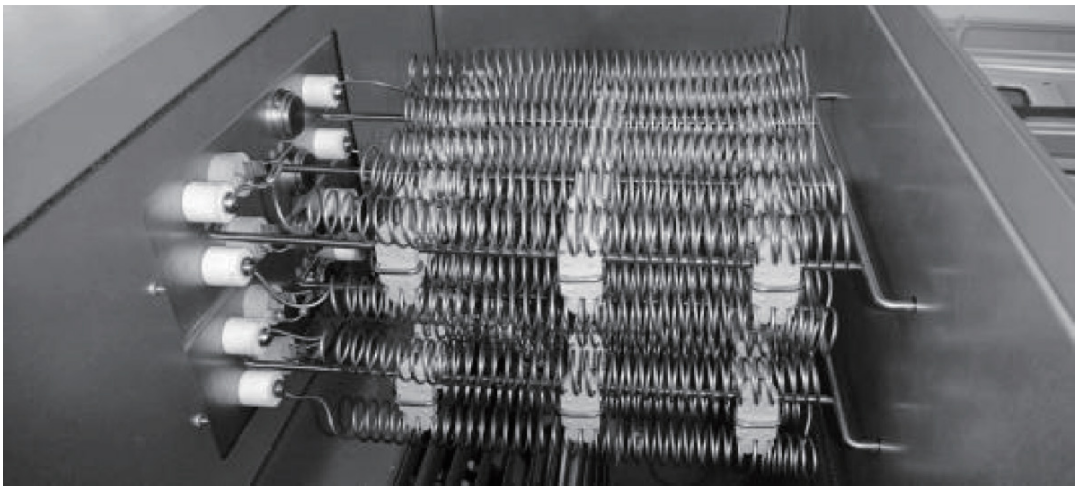
STEP 1: Unfasten the 4 screws to take away the blower access panel of the air handler.

STEP 2: Remove the cover plate from the air handler.



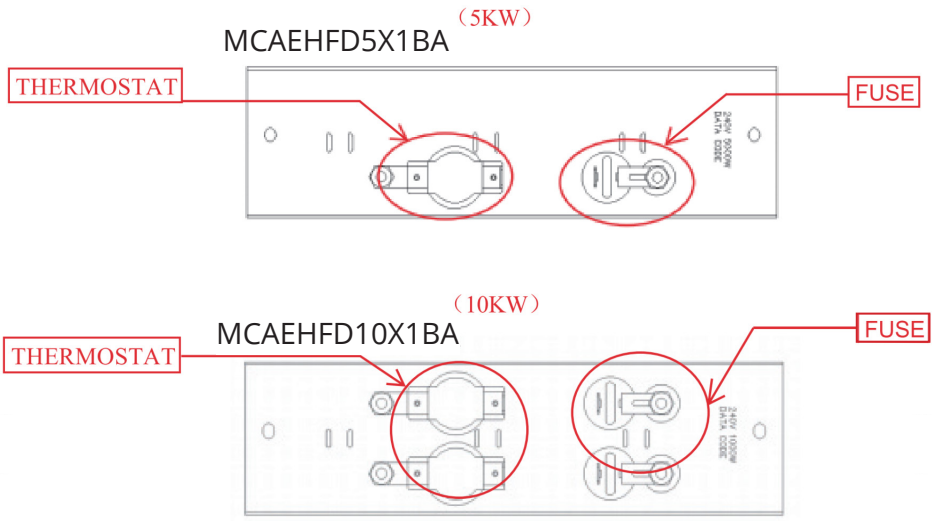
STEP 3: Slide the heat kit into the slot and secure the element plate with the previously removed screws.

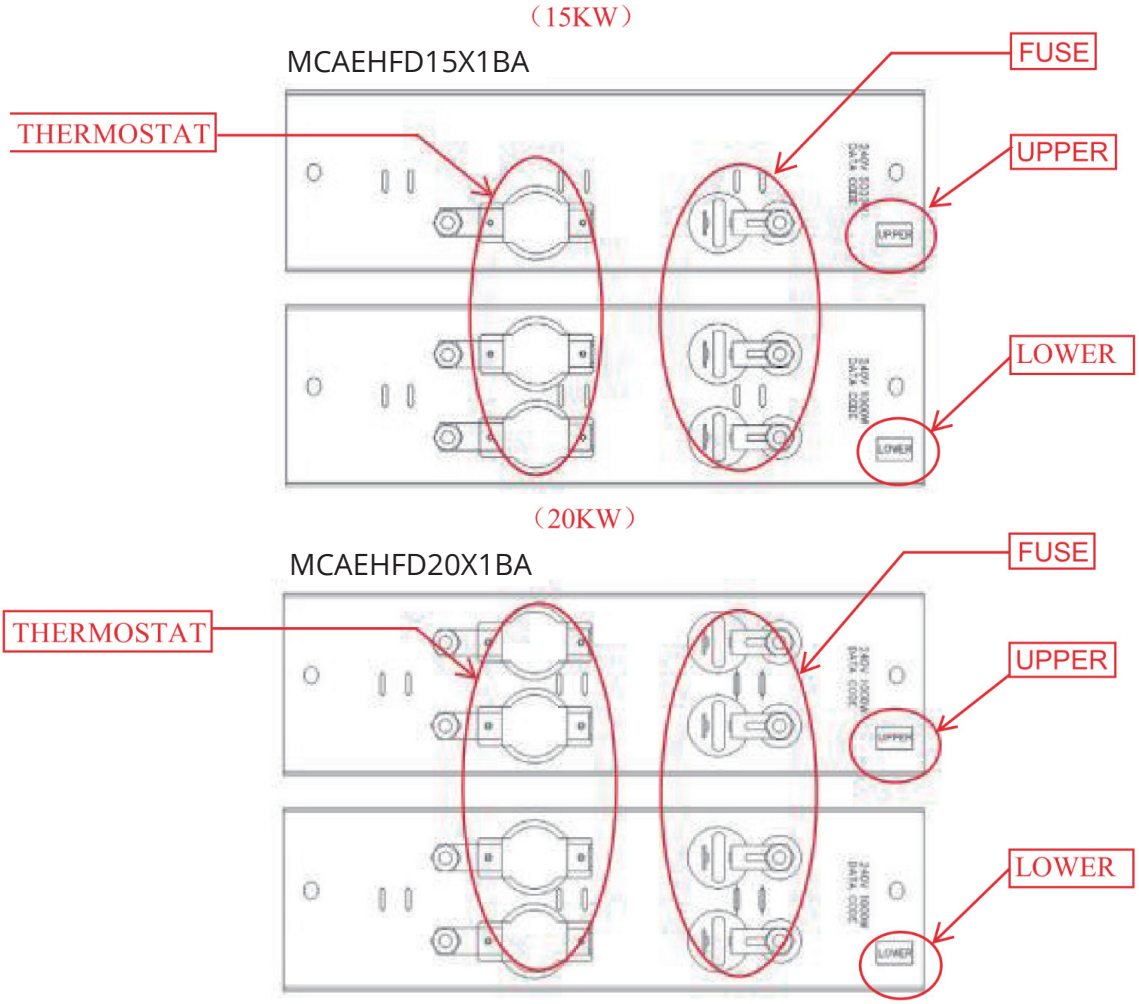




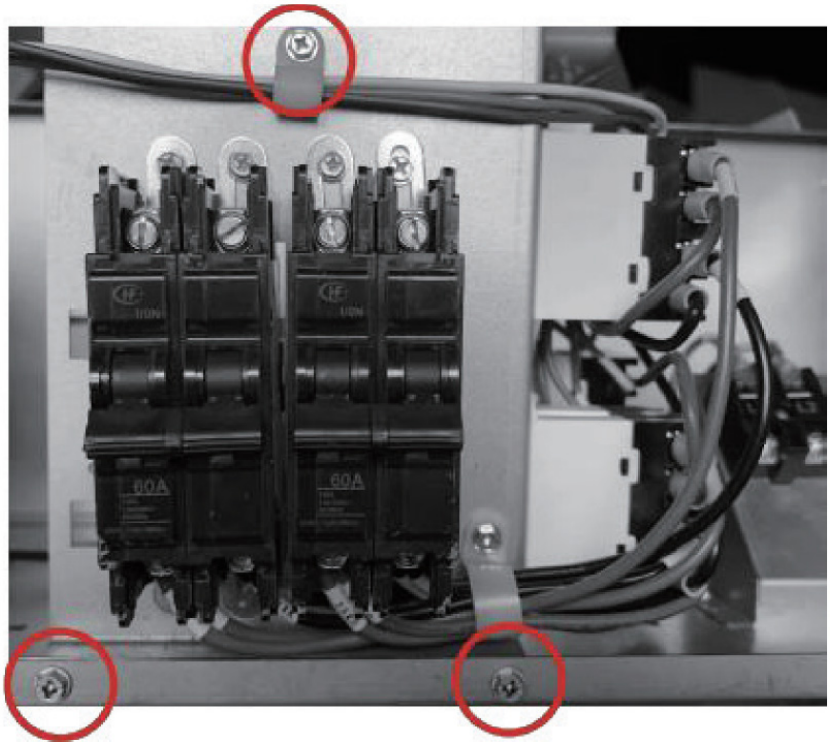
When sliding the heater kit into the slot ensure it is installed in the correct orientation, as described below. The thermostat will be on the left-hand side and the fuse will be on the right-hand side.

When two elements are being used ensure the "UPPER" and "LOWER" elements are installed in the correct slots and orientations.

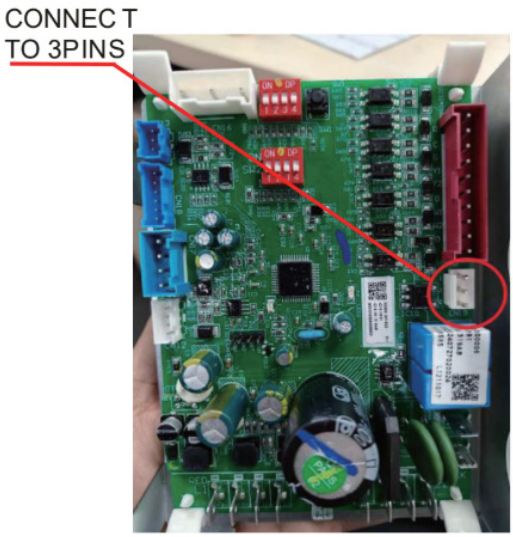


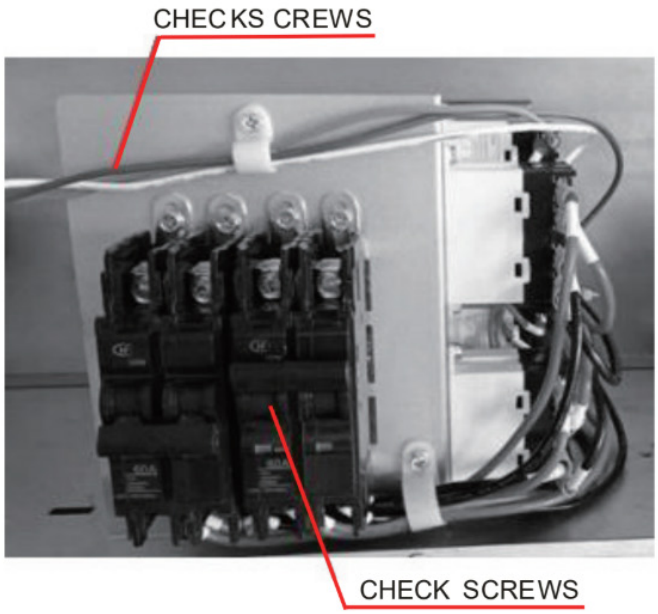


STEP 4: Align the attachment clip and hole, and fasten the loose wires by using a wire tie.

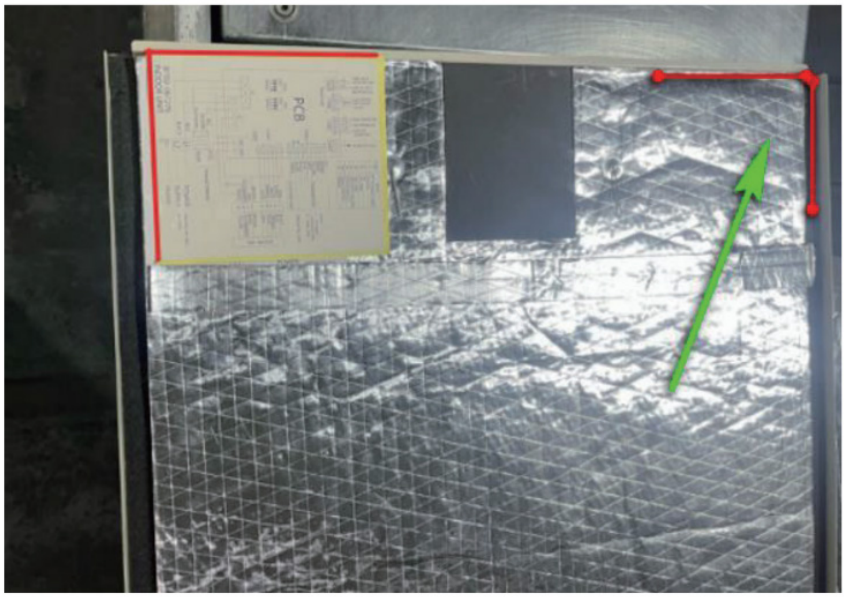


STEP 5: Install the circuit breaker into the mounting rail, and break out the appropriate area of the plastic circuit breaker cover on the air handler's access panel.





STEP 6: The labels for the circuit diagram of the electric heat kit are to be pasted in this area.

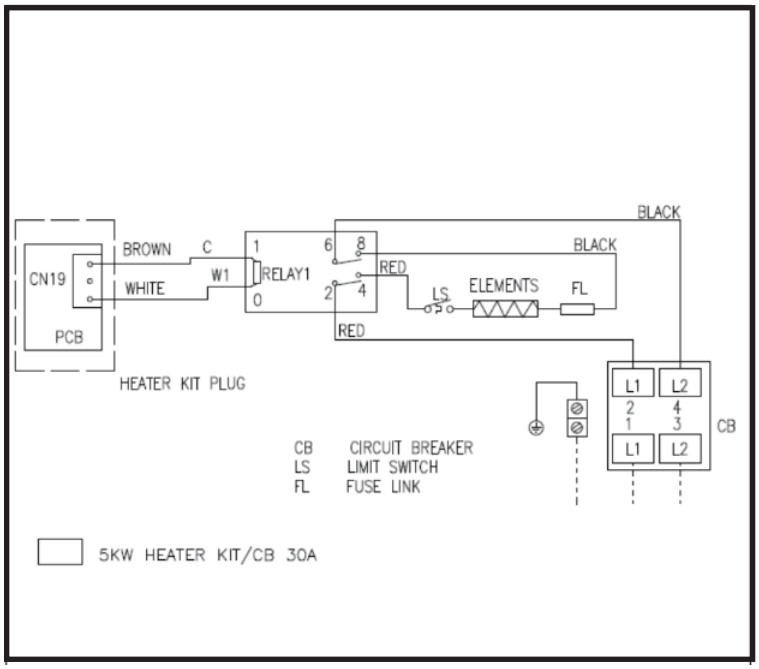


WARNING

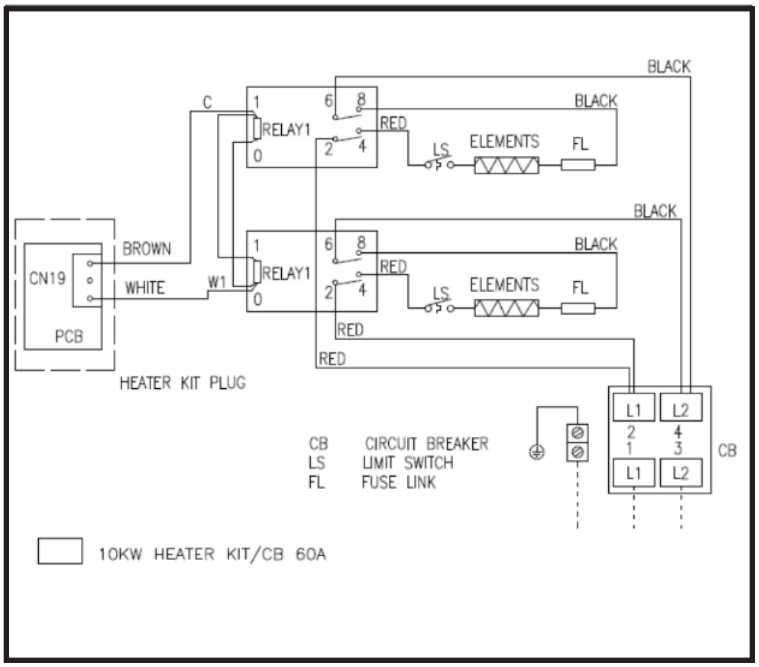
After connecting all wires, check all breaker screws and make sure they are properly tight.
Failure to do so will result in breaker malfunction, fire, death, personal injury, and properly damage.

Note:

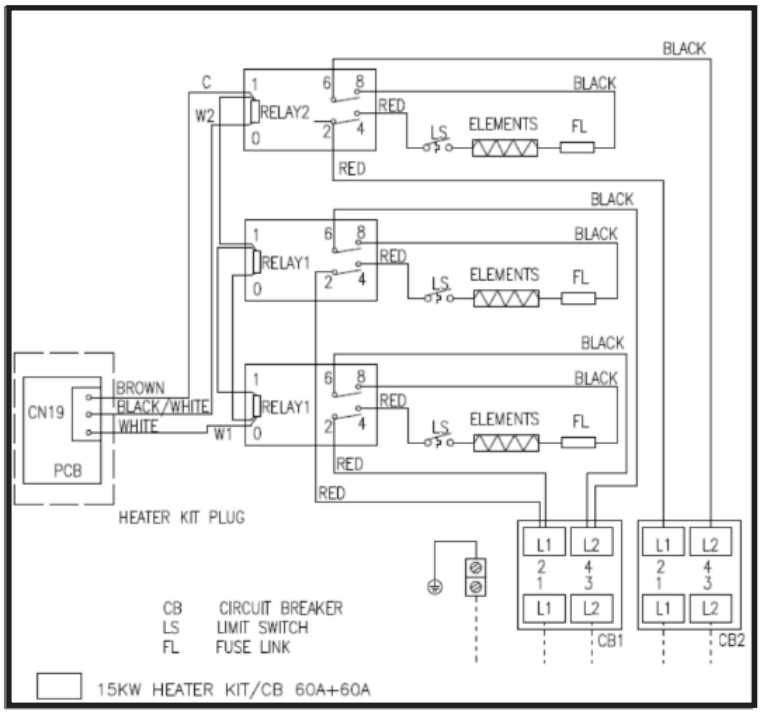
- When the indoor control board receives the W1/W2 signal, the electric heat kit will be energized and the indoor blower will be turned on.
- When the W1/W2 signal is off, the indoor blower will be turned off.
- The blower motor runs when "c" is energized, and off when "c" is de-energized.



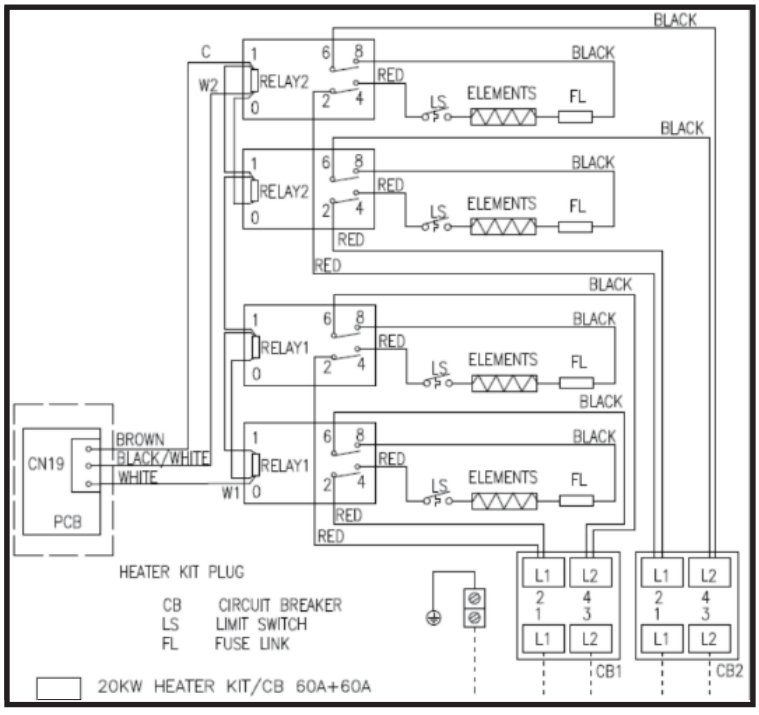
Wiring Diagram for 5KW Electric Heat



Wiring Diagram for 10KW Electric Heat



Wiring Diagram for 15KW Electric Heat



Wiring Diagram for 20KW Electric Heat

8 DISPOSAL

8.1 Disposal

1. For minimum installation height, minium room area (operating or storage), refer to the installation manual.
2. Risk Of Fire-Auxiliary devices that may be ignition sources should not be installed in the ductwork, other than auxiliary devices listed for use with the specific appliance. See instructions.
3. Mount with the lowest moving parts of at least 8.2ft (2.5m) above floor or grade level.
4. Disconnect all remote electric power supplies before servicing due to risk of electric shock which could cause serious injury or death.
5. Flammable refrigerant is used in conjunction with this unit. Its misuse can lead to an increased risk of fire. Ensure unit repair is only completed by trained service personnel. Do not puncture refrigerant tubing.
6. Dispose of this unit properly, in accordance with federal or local regulations. Flammable refrigerant is used. Incorrect disposal can lead to an increased risk of fire.
7. Flammable refrigerant is used in conjunction with this unit. Its misuse can lead to an increased risk of fire. Consult the Installation/Service Maunal before attempting to service this product, as safety precautions must be followed.
8. Flammable refrigerant is used in conjunction with this unit. Its misuse can lead to an increased risk of fire. Follow handling instructions carefully in compliance with national and local regulations.

8.2 Supplementary Statements

WARNING

- Do not use any means to accelerate the defrosting process or to clean other than those recommended by MRCOOL®.
- The appliance should be stored in a room without continuously operating ignition sources (for example: an open flame, operating gas appliance, operating electric heater, etc.).
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odour.

1. Please use a flammable gas detector to check before unloading and opening the container.
2. No fire source or smoking around the unit.
3. Pipework should be protected from physical damage and, in the case of flammable refrigerants, should not be installed in an unventilated space if that space is smaller than Amin in Annex GG, unless the A2L refrigerants where the installed pipes comply with 22.116. In the case of field charging, the effect on the refrigerant charge caused by the different pipe length, has to be quantified.
4. Compliance with national and local gas regulations should be observed.
5. Mechanical connections should be made in accordance with 22.118 and must be accessible for maintenance purposes;
6. Pipework including piping material, pipe routing, and installation, must include protection from physical damage during operation and servicing, and must be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints should be accessible for inspection prior to being covered or enclosed.
7. After completion of field piping for split systems, the field pipework should be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements.
8. The appliance should be stored to prevent mechanical damage from occurring.
9. Every working procedure that affects safety means should only be completed by competent persons according to Annex HH. Examples for such working procedures are:

- breaking into the refrigerating circuit
- opening of sealed components
- opening of ventilated enclosures

MRCOOL®

COMFORT MADE SIMPLE

Signature Series TruInverter™ Air Handler