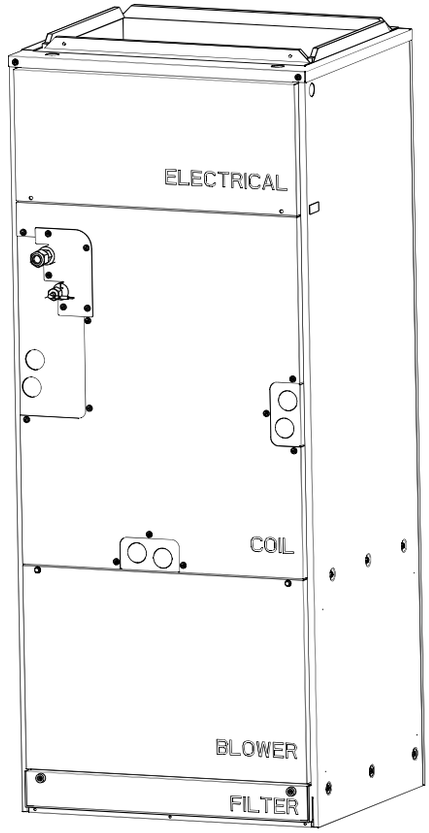
Installation Manual

Multi Position Air Handler 2 - 5 Ton



5TEM9C02AC21SA
5TEM9D04AC31SA
5TEM9D06AC31SA
5TEM9D07AC41SA

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

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

These instructions are intended as an assist to qualified and licensed personnel for proper installation, adjustment and operation of ECM air handler units. Read it thoroughly before attempting installation or service work.

Failure to follow these instructions may result in fire, electrical shock, property damage, personal injury or death

The instructions do not cover all variations in systems or provide for every possible contingency to be met in connection with the installation.

September 2025 **DLR-SVX001A-EN**

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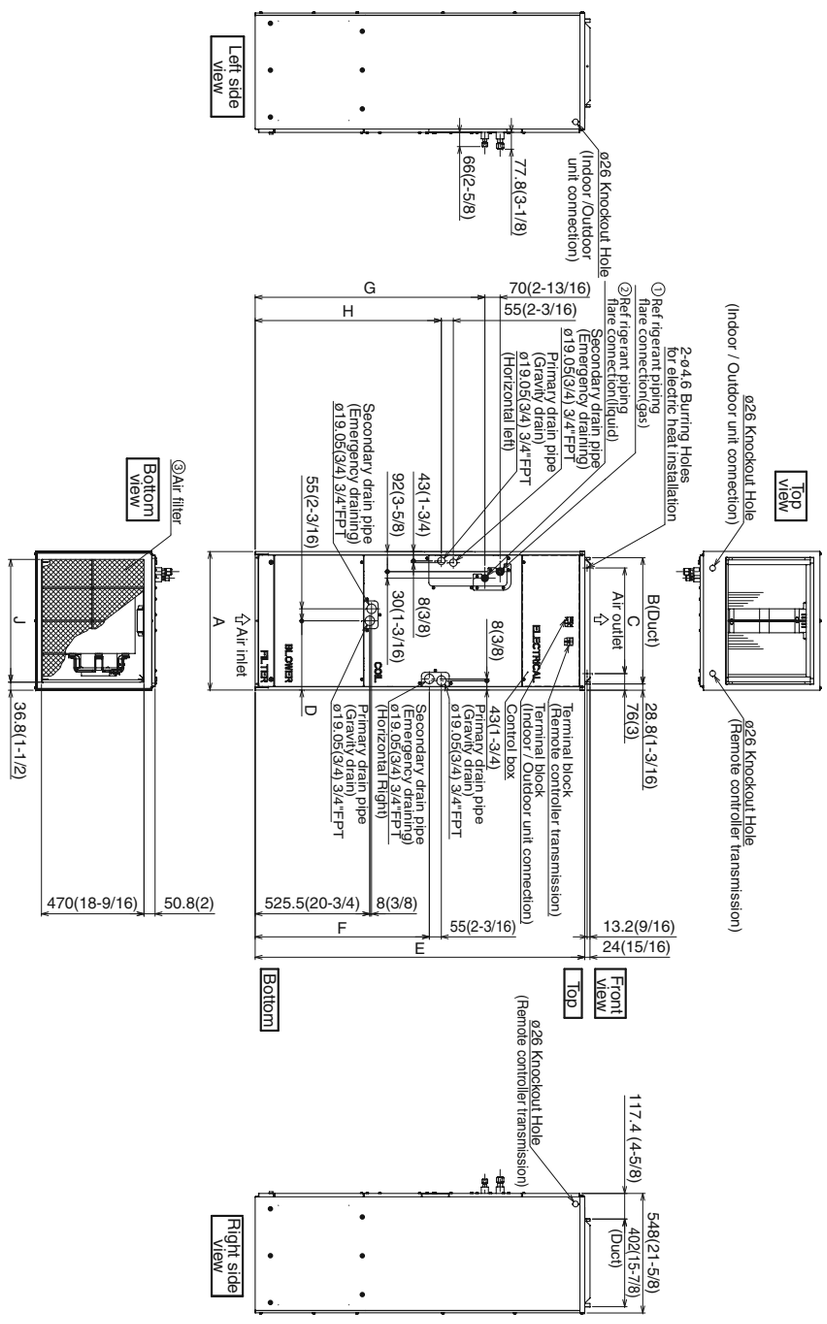
1. Dimensions

Provide enough clearance in front of unit for service and maintenance. Electrical entrance for the unit is located on both left and right side of the cabinet. See the right or left side view for knockout locations.



Units: mm (in.)

Units: mm (in.)

Model code	③ Nominal filter size	Duct connection	① Gas pipe	② Liquid pipe
5TEM9C02AC21SA	508 x 508 x 25.4 (20 x 20 x 1)	477 x 402 (18-13/16 x 15-7/8)	Ø 15.88 (5/8)	Ø 9.52 (3/8)
5TEM9D04AC31SA 5TEM9D06AC31SA	508 x 609.6 x 25.4 (20 x 24 x 1)	579 x 402 (22-13/16 x 15-7/8)		
5TEM9D07AC41SA			19.05 mm (3/4)	

Model code	A	B	C	D
5TEM9C02AC21SA	534 (21)	477 (18-13/16)	382.6 (15-1/8)	266.5 (10-1/2)
5TEM9D04AC31SA 5TEM9D06AC31SA 5TEM9D07AC41SA	635 (25)	579 (22-13/16)	484.6 (19-1/8)	317.5 12-1/2)

Model code	E	F	G	H	J
5TEM9C02AC21SA	1,378 (54-1/4)	737 (29-1/16)	935.5 (37-9/16)	792 (31-3/16)	461 (18-3/16)
5TEM9D04AC31SA 5TEM9D06AC31SA 5TEM9D07AC41SA	1511 (59-1/2)	798.5 (31-7/16)	1053 (41-1/2)	853.5 (33-5/8)	563 (22-3/16)

2. Inspect shipment

These air handlers are completely factory assembled, and all components are performance tested. Each unit consists of a blower assembly, refrigerant coil, and controls in an insulated, galvanized steel factory enclosure. Knockouts are provided for electrical wiring entrance. Check the unit rating plate to confirm specifications are as ordered. Upon receipt of equipment, carefully inspect it for possible damage. Take special care to examine the unit if the carton is damaged. If damage is found, it should be noted on the carrier's freight bill. Damage claims should be filed with the carrier immediately. Claims of shortages should be filed with the seller within 5 days.

3. Safety precautions

Before installing the unit, make sure you read all the “Safety precautions”. The “Safety precautions” provide very important points regarding safety. Make sure you follow them.

WARNING

This product can expose you to chemicals including lead, which are known to the state of California to cause cancer and birth defects or other reproductive harm. For more information go to: www.p65warnings.ca.gov

3.1. Symbols used in the text

WARNING

Describes precautions that should be observed to prevent danger of injury or death to the user.

CAUTION

Describes precautions that should be observed to prevent damage to the unit.

FLAMMABLE REFRIGERANT WARNING

This unit uses a flammable refrigerant. If refrigerant leaks and comes in contact with fire or heating part, it will create harmful gas and there is risk of fire.

: Indicates a part which must be grounded.

Meaning of symbols displayed on unit			
	Refrigerant Safety Group **A2L**	**Warning!** (Risk of fire)	**This unit uses a flammable refrigerant.** If refrigerant leaks and comes in contact with fire or heating part, it will create harmful gas and there is risk of fire.
	Read the OPERATING INSTRUCTIONS carefully before operation.		
	Service personnel are required to carefully read the OPERATING INSTRUCTIONS and INSTALLATION MANUAL before operation.		
	Further information is available in the OPERATING INSTRUCTIONS, INSTALLATION MANUAL, and the like.		

3.2. Before installation and electric work

WARNING

- Carefully read the labels affixed to the main unit.
- The unit must be installed by an authorized Dealer or properly trained technician.
  – Improper installation by the user may result in water leakage, electric shock, or fire.
- Install the air unit in a place that can withstand its weight.
  – Inadequate strength may cause the unit to fall down, resulting in injuries.
- Use the specified cables for wiring. Secure the connections so that the outside force of the cable is not applied to the terminals.
  – Inadequate connection and fastening may generate heat and cause a fire. Provide strain relief to wiring.
- Prepare for typhoons, hurricanes, earthquakes, etc., and install the unit at the specified place.
  – Improper installation may cause the unit to topple and result in injury.
- If the air conditioner must be repaired, consult the dealer.
  – If the unit is repaired improperly, water leakage, electric shock, or fire may result.
- Do not touch the heat exchanger fins.
  – Improper handling may result in injury.
- When handling the product, always wear protective equipment.
  – E.g.: Gloves, full arm protection, and safety glasses.
  – Improper handling may result in injury.
- Install the air conditioner according to this Installation Manual.
  – If the unit is installed improperly, water leakage, electric shock, or fire may result.
- Have all electric work done by a licensed electrician according the “National Electrical code and local Electrical codes” and “Interior Wire Regulations” and the instructions given in this manual and always use a special circuit.
  – If the power source capacity is inadequate or electric work is performed improperly, electric shock and fire may result.
- Keep the electric parts away from water.
  – It might result in electric shock, catching fire or smoke.
- When cleaning the Heat Exchanger and Drain Pan, ensure the Control Box, Motor and LEV remain dry, water proof covering.
- When installing and moving the air conditioner to another site, do not charge it with a refrigerant different from the refrigerant specified on the unit.
  – If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged.
- When moving and reinstalling the air conditioner, consult the dealer or an authorized technician.
  – If the air conditioner is installed improperly, water leakage, electric shock, or fire may result.
- Do not reconstruct or change the settings of the protection devices.
  – If the pressure switch, thermal switch, or other protection devices are shorted and operated forcibly, or parts other than those specified by the manufacturer are used, fire or explosion may result.
- Do not use a leak detection additive.
- Always use an air cleaner, humidifier, electric heater, and other accessories specified by the manufacturer.
  – Ask an authorized technician to install the accessories. Improper installation by the user may result in water leakage, electric shock, or fire.
- Securely install the outdoor unit terminal cover (panel).
  – If the terminal cover (panel) is not installed properly, dust or water may enter the outdoor unit and fire or electric shock may result.
- Supervise children near or around the appliance to ensure they do not play with or on the appliance.
  – Do not install this indoor unit in a location accessible to the general public.
- Pay special attention to the location the unit is installed in. Refrigerant is heavier than air so locations such as basements or crawlspaces

where refrigerant can accumulate can become dangerous.
- The appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons to avoid a hazard.

- Do not use refrigerant other than the type indicated on the unit nameplate.
  – Doing so may cause the unit or pipes to burst, or result in explosion of fire during use, during repair, or at the time of disposal of the unit.
  – It may also be in violation of applicable laws.
  – The manufacturer cannot be held responsible for malfunctions or accidents resulting from wrong type of refrigerant used.

3.3. Before getting started

FLAMMABLE REFRIGERANT WARNING

- Ensure all pipework, including piping material, when routing, during installation, operation, and service are protected from physical damage.
- The requirements contained within this manual are based on UL 60335-2-40 which is an appliance safety standard. During installation in the field, it is important to follow all applicable national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO, Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52.
  – Failure to comply with industry best practices and local regulations can result in a non-compliant installation.
- Ensure all field joints are accessible for inspection prior to being covered or enclosed.
- Verify all field pipework pressure tested with an inert gas after field pipe joining, and then vacuum tested prior to refrigerant charging.
- The installation location of the indoor unit must meet the minimum floor area as shown in ***Appendix A***, depending on the planned system total refrigerant charge.
  – Do not discharge refrigerant into the atmosphere.

CAUTION

- Do not install the unit where combustible gas may leak.
  – If the gas leaks and accumulates around the unit, an explosion may result.
- Do not use the air conditioner in special environments.
  – Oil, steam, sulfuric smoke, etc. can significantly reduce the performance of the air conditioner or damage its parts.
- When installing the unit in a hospital, communication station, or similar place, provide sufficient protection against noise.
  – The INVERTER equipment, private power generator, high-frequency medical equipment, or radio communication equipment may cause the air conditioner to operate erroneously, or fail to operate. On the other hand, the air conditioner may affect such equipment by creating noise that disturbs medical treatment of image broadcasting.
- Do not install the unit on a structure that may cause leakage.
  – When the room humidity exceeds 80% or when the drain pipe is clogged, condensation may drip from the indoor unit. Perform collective drainage work together with the outdoor unit, as required.
- When the ambient dew point temperature exceeds 75 °F (24 °C), dew condensation may occur on the unit surface. Perform appropriate treatment to avoid dew condensation.

3.4. Precautions for devices that use refrigerant

⚠ CAUTION

- Use refrigerant piping made of C1220 (Cu-DHP) phosphorus deoxidized copper as specified in the JIS H3300 “Copper and copper alloy seamless pipes and tubes”. In addition, be sure that the inner and outer surfaces of the pipes are clean and free of hazardous sulfur, oxides, dust/dirt, shaving particles, oils, moisture, or any other contaminants.
  - Contaminants on the inside of the refrigerant piping may cause the refrigerant residual oil to deteriorate.
  - Ensure brazing rods have a melting point above 800 °F (427 °C) in use with flammable refrigerants.
- Store the piping to be used during installation indoors and keep both ends of the piping sealed until just before brazing. (Store elbows and other joints in a plastic bag.)
  - If dust, dirt, or water enters the refrigerant cycle, deterioration of the oil and compressor trouble may result.
- Use liquid refrigerant to fill the system.
  - If gas refrigerant is used to seal the system, the composition of the refrigerant in the cylinder will change and performance may drop.
- Always charge refrigerant in a liquid state.
  - Charging refrigerant in the gaseous state will change the composition of the refrigerant and lead to a performance drop.
- Use a vacuum pump with a reverse flow check valve.
  - The vacuum pump oil may flow back into the refrigerant cycle and cause the system's oil to deteriorate.
- Do not use the following tools that are used with other refrigerants.
  - Gauge manifold, charge hose, gas leak detector, reverse flow check valve, refrigerant charge base, vacuum gauge, refrigerant recovery equipment.
  - If the other refrigerants and refrigeration oil are mixed in, the refrigerant may deteriorate.
  - If water is mixed in, the refrigeration oil may deteriorate.
  - Refrigerant does not contain any chlorine, gas leak detectors for conventional refrigerant will not react to it.
  - Do not use a charging cylinder. May cause the refrigerant to deteriorate.
- Be especially careful when managing the tools.
  - If dust, dirt, or water gets in the refrigeration system, the refrigerant may deteriorate.

3.5. Before getting installed (or moved)-electrical work

⚠ CAUTION

- Ground the unit.
  - Do not connect the ground wire to gas or water pipes, lightning rods, or telephone ground lines. Improper grounding may result in electric shock.
- Install the power cable so that tension is not applied to the cable.
  - Tension may cause the cable to break and generate heat and cause a fire.
- Install a leak circuit breaker as required.
  - If a leak circuit breaker is not installed, electric shock may result. Use power line cables of sufficient current carrying capacity and rating. Cables that are too small may leak, generate heat, and cause a fire.
- Use power line cables of sufficient current carrying capacity and rating.
  - Cables that are too small may leak, generate heat, and cause a fire.
- Use only a circuit breaker and fuse of the specified capacity.
  - A fuse or circuit breaker of a larger capacity or a steel or copper wire may result in a general unit failure or fire.
- Do not wash the air conditioner units.
  - Washing them may cause an electric shock.
- Be careful that the installation base is not damaged by long use.

  - If the damage is left uncorrected, the unit may fall and cause personal injury or property damage.
- Install the drain piping according to this Installation Manual to ensure proper drainage. Wrap thermal insulation around the pipes to prevent condensation.
  - Improper drain piping may cause water leakage and damage to furniture and other possessions.
- Be very careful about product transportation.
  - If the product weighs more than 20 kg [44 lb], then more than one person should carry the product.
  - Some products use PP bands for packaging. Do not use any PP bands for a means of transportation; it is dangerous.
  - Do not touch the heat exchanger fins. Doing so may cut your fingers.
- Safely dispose of the packing materials.
  - Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries.
  - Tear apart and throw away plastic packaging bags so that children will not play with them. If children play with a plastic bag which was not torn apart, they face the risk of suffocation.

3.6. Before starting the test run

CAUTION

- Turn on the power at least 12 hours before starting operation.
  - Starting operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.
- Do not touch the switches with wet fingers.
  - Touching a switch with wet fingers can cause electric shock.
- Do not touch the refrigerant pipes during and immediately after operation.
  - During and immediately after operation, the refrigerant pipes may be hot or may be cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor, and other refrigerant cycle parts. Your hands may suffer burns or frostbite if you touch the refrigerant pipes.
- Do not operate the air conditioner with the panels and guards removed.
  - Rotating, hot, or high-voltage parts can cause injuries.
- Do not turn off the power immediately after stopping operation.
  - Always wait at least five minutes before turning off the power. Otherwise, water leakage and trouble may occur.

4. Refrigerant R454B

FLAMMABLE REFRIGERANT WARNING

- Refrigerant is FLAMMABLE and may cause INJURY, DEATH, or significant DAMAGE to equipment if improperly handled.
  - Carefully read all labels affixed to the unit.
  - Carefully read and follow all safety precautions for the unit.

– Verify any person performing work near where flammable refrigerant is used is properly informed prior to work commencing of the risks and safety precautions associated with flammable refrigerant and the nature of the work being done.

4.1. Precautions for devices that use R454B

FLAMMABLE REFRIGERANT WARNING

- IGNITION SOURCES: Verify the following safety precautions are followed to prevent refrigerant ignition and ensure proper operation without equipment damage, injury, or death.
  – Verify equipment is installed in a room that does not contain continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater).
  – Verify equipment is installed in a room large enough to properly accommodate the release of the full system charge.
    ◦ Ensure actual system refrigerant charge is in accordance with the room sizes Amin and TAmin, found in ***Appendix A - Minimum area requirement table*** of this manual.
      • Improper room sizes can lead to dangerously high concentrations of refrigerant vapor.
    ◦ Ensure appropriate fire extinguishing equipment (dry powder or CO2 fire extinguisher) is available and adjacent to worksite whenever any hot work is required on the refrigerating equipment or any associated parts.
  – DO NOT use ignition methods, such as a halide torch, to detect refrigeration leaks. Electronic leak detectors may be used as long as they pose no risk as potential ignition source.
    ◦ Verify the electronic refrigerant leak sensor is calibrated to the refrigerant used and appropriate percent of gas is confirmed.
  – When installing field pipe joint connections, avoid locations with possible ignition sources such as UV lights, electric heaters, gas appliances, pilot flames, brushed motors and similar devices.
  – Ensure the worksite is free from faulty equipment and appliances that could be a potential ignition source.
    ◦ Failure to do so may result in ignition risk due to outdated and unsafe equipment.
  – Place “No Smoking" signs in the worksite.
  – Markings and labels on the equipment must remain legible. Correct all labels or service markings that are illegible. Labels and service markings contain information that is critical to the next service technician

FLAMMABLE REFRIGERANT WARNING

- VENTILATION: Be aware that refrigerants may not contain an odor. If the refrigerant gas comes into contact with a flame, poisonous gases will be released.
  – Limit or avoid work in confined spaces. Prior to installation, verify service connections and field joints are placed in ventilated and easily accessible areas.
  – Do not perform any hot work without proper ventilation in the work space.
  – Confirm that all ventilation outlets and machinery are not obstructed, and are operating adequately.
    ◦ Failure to provide constant ventilation allows for the concentration of refrigerant vapor in the work area.
  – If refrigerant gas leaks during installation work, ventilate the room.
    ◦ If the refrigerant gas comes into contact with a flame, poisonous gases will be released.

FLAMMABLE REFRIGERANT WARNING

- LEAK DETECTION: Check the work area for any potential toxic or flammable gases using an appropriate refrigerant detector prior to, during, and after work is complete.
  - If a leak is suspected, immediately remove/extinguish all naked flames.
  - Ensure all refrigerant is recovered and system is isolated prior to making repairs.
    - Instructions for the removal of refrigerant can be found in *Handling and service of R454B* chapter of this manual.
  - Hazardous vapors may exist in mechanical rooms. Use appropriate leak detection equipment (non-sparking) that is adequately sealed and intrinsically safe.
    - Ensure leak detection equipment set at a percentage of the LFL (lower flammability limit) of the refrigerant employed, and the appropriate percentage of gas (25% maximum) is confirmed.
  - Recover refrigerant via the outdoor unit service ports only. Do not vent refrigerant. Always follow the decommissioning procedure.
  - Do not pierce or burn.

CAUTION

- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
  - Some chemicals and cleaning products may be incompatible with the coil materials, and may corrode the coil.
- Verify leak detection fluids do not contain chlorine.
  - Leak detection fluids that contain chlorine may react with refrigerant and corrode pipework.
- Confirm that refrigerant piping and other components are installed in a position/location that is unlikely to be exposed to corrosive materials.
  - Corrosion can reduce the longevity of the product, and possibly lead to a hazardous refrigerant leak.
- When it is necessary to replace electrical components, the new components must be fit for the purpose and to the correct specification. Always follow guidelines in the installation and service manuals, and if in doubt, consult with the manufacturer's technical department for assistance.
  - Improperly sourced parts may lead to reduced functionality and product life.

4.2. Installation of R454B system

FLAMMABLE REFRIGERANT WARNING

- Ensure proper protection from physical damage during installation, operation, and service when performing pipework or handling piping material.
- Verify pipe work performed in compliance with national and local regulations and standards.
- Ensure all field joints in pipe work are inspected prior to covering and enclosing.
  - Verify all field pipe joints are properly pressure tested with inert gas.
  - Verify all field pipe joints are vacuum tested prior to refrigerant charging.

◦ Verify all indoor field-made joints are tightness tested with 0.25 times the MAXIMUM ALLOWABLE PRESSURE, with NO LEAK DETECTED.

FLAMMABLE REFRIGERANT WARNING

Auxiliary devices which may be a POTENTIAL IGNITION SOURCE shall not be installed in the duct work. Examples of such POTENTIAL IGNITION SOURCES are hot surfaces with a temperature exceeding 1292° F (700° C) and electric switching devices.

IMPORTANT

For approved electric heater kits that are allowed for use with the listed air handlers, see the Indoor unit accessories section

FLAMMABLE REFRIGERANT WARNING

LEAK DETECTION SYSTEM INSTALLED. This air handler is equipped with a refrigerant leak detection system.

See service manual for service and replacement instructions.

- Unit must remain ON, except for service, installation, or inspection.
- Loss of power to the refrigerant leak sensor mounted in the indoor unit will result in an inability to detect a refrigerant leak. This may cause a fire. Refrigerant leak sensor lifetime is 15 years.
- Only replace refrigerant leak sensor devices with sensors approved for use by the manufacturer.
- Do not install equipment in a configuration where false ceilings or drop ceilings are used as a return air plenum.

4.2.1. Safety checks for systems using R454B

1. **Complete prior to installation**
   - Verify the REFRIGERANT CHARGE is in accordance with the room size, found in the charts below in *Minimum floor and minimum conditioned space area*, where refrigerant containing parts are installed.
   - Verify ventilation openings are not obstructed and the required ventilation is present.

     ### IMPORTANT

     Alarm-triggered mechanical ventilation is not supported at this time.

   - Verify markings and signs for the equipment are visible and legible. Correct all illegible markings and signs.
   - Verify refrigeration pipe and components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.
   - Verify common household chemicals and appliances are properly stored away from the return vents and air handler

– Vapors and gases from chemicals such as propane, butane, methane, insecticides, aerosol or cleaning sprays, and paint or small smoke producing appliances may falsely trigger the leak detection system and impede the proper function of the unit.

2. **Checks to electrical devices**
   Repair and maintenance of electrical components include initial safety checks and component inspection procedures.
   - Verify capacitors are discharged in a safe manner to avoid possibility of sparking.
   - Verify there are no live electrical components.
   - Ensure wiring is not exposed while charging, recovering, or purging the system.
   - Verify continuity of earth bonding.
   - If a fault exists that could compromise safety, do not connect electrical supply to the circuit until fault is repaired.
   - If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. Report any malfunction or faulty equipment/operation to the owner of the equipment so all parties are aware.
3. **During repairs to sealed components**
   - Verify all electrical power supplies are disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during service, then permanently operating leak detection must be installed at the most critical point to warn of a potentially hazardous situation.
   - Verify the casing is not altered in any manner that affects protection.
     – Verify no visible physical damage to cables exists.
     – Verify connections are not excessive.
     – Verify terminals are installed according to specification.
     – Verify there is no damage to seals.
     – Verify gland fitting are installed properly and according to specifications.
   - Ensure equipment properly secured.
   - Ensure seals or sealing materials are not degraded and operating properly.
   - Verify all replacement parts in accordance with the manufacturer specifications.
4. **Intrinsically safe components can only be replaced but never repaired**
   - Do not apply any permanent inductive or capacitance loads to the circuit without ensuring it will not exceed the permissible voltage and current permitted for the equipment in use. Intrinsically safe components are the only type of components that may be worked on while live in the presence of a flammable atmosphere.
   - Ensure test apparatus meets correct rating specification.
   - Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

NOTE

The use of silicon sealant can inhibit the effectiveness of some types of leak detection equipment.

Intrinsically safe components do not have to be isolated prior to working on them.

5. **Cabling**
   - Verify cabling is installed in a location that avoids wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects.
   - Check the cables for effects of aging or continual vibration from sources such as compressors or fans.

4.2.2. Minimum floor and conditioned space area requirements

For safe and acceptable installation, there are a number of requirements that must be met to ensure that in the event of a refrigerant leak, refrigerant vapors do not have the opportunity to collect and create hazardous concentration levels of refrigerant vapors.

These requirements are in relation to the following categories:

- Area of the conditioned space (**TAmin**)
- Area of the indoor unit installation space (**Amin**)
- Installation height of the indoor unit, measured from the floor to the bottom of the air handler (h_0)
- Opening conditions for connected rooms and natural ventilation (**Anv**).
- Ducting and damper configurations

For all installations, the following guidelines must be followed:

- Residential installations and ductwork should be designed to comply with ACCA's Manual D (ANSI / ACCA 1 Manual D 2016, Residential Duct Systems).
  - Failure to comply with industry best practices can result in poor performance, including unbalanced heating / cooling / airflow.
- When zone dampers are used, they must be configured such that they will open fully during a refrigerant leak error.
  - Pre-existing zone dampers that do not meet this requirement must be permanently opened fully and disabled.
- Manual dampers must not be completely closed during or after installation. Balancing is acceptable.
  - Closing dampers can reduce the conditioned space area beyond intended acceptable limits.
- Vent registers, grilles, and covers must not completely obstruct air flow from any vent.
  - A blocked vent can reduce the conditioned space area beyond intended acceptable limits.
- At least one room (not including the indoor unit installation room) must have a dedicated return duct.
  - Spaces without return ducts have a risk of refrigerant accumulation during a leak event.
- The height of the ceiling in the indoor unit installation room must be at least 2.2 m (7 ft - 2.7 in).
  - Area calculations have been calculated using this assumption.
- The area of the indoor unit installation room must be at least 20% of the total area of **Amin**.
- Rooms adjacent to the indoor unit installation room can be considered part of the **Amin** area for the purpose of contributing to **Amin** area when the following conditions are met:
  - The rooms are on the same floor.
  - The rooms are connected by a permanent opening that cannot be closed, with an area greater than **Anv** that is below 300 mm (11.8 in) from the floor, at least 50% of which is below 200 mm (7.8 in) from the floor.
  - The rooms are connected by a second permanent opening that cannot be closed, with an area greater than 50% of **Anv** that is above 1.5 m (4 ft - 11.1 in).
- Natural ventilation requirements can be satisfied by use of ventilation ducting, passive through-wall ducts, drop ceilings, louvered doors, door undercuts, space between wall and floor, etc.
  - For openings which extend to the floor, the minimum height is 20 mm (0.8 in) above the top of the floor covering (i.e. tiles and carpet pile).
- Enhanced tightness refrigeration systems (ETRS) are approved for fixed **Anv** requirements.
  - This indoor unit is considered an enhanced tightness refrigeration system (ETRS).
  - For ETRS-compliant systems, the value for:

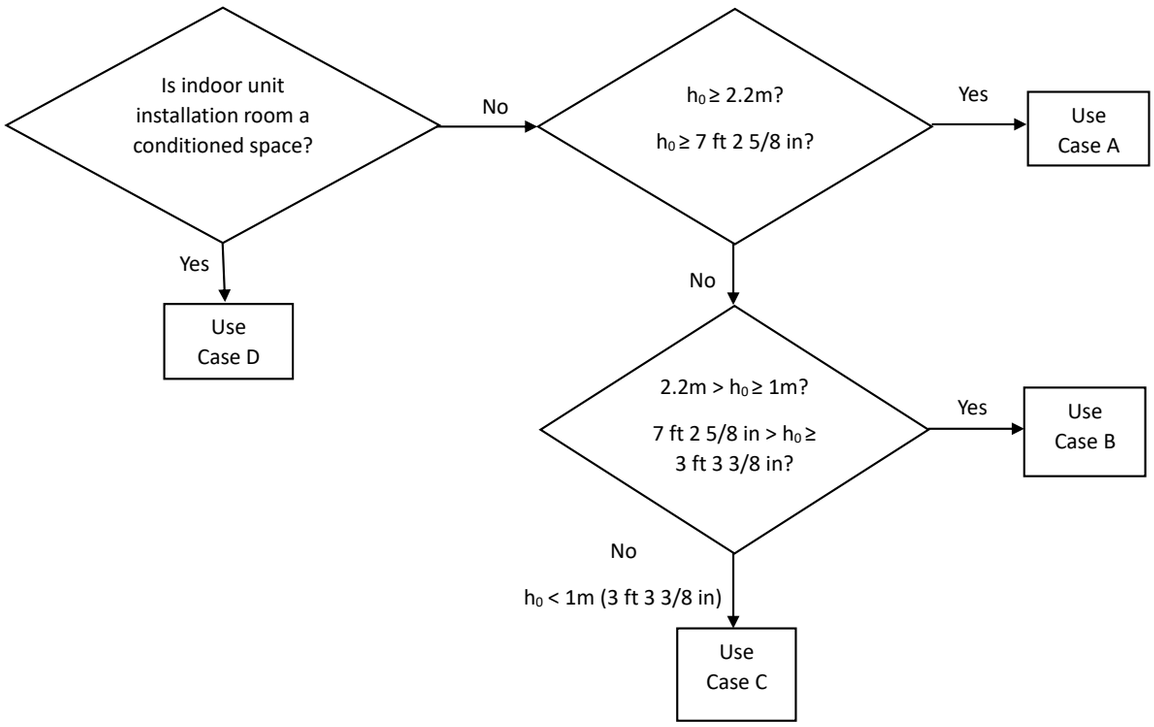
$$A_{nvETRS} \geqslant 114cm^2 \ or \ 22in^2$$

.

  - For Non-ETRS-compliant systems, the minimum opening size can be determined from the following equation:

$$A_{nv} = 0.0317 \times \left(m_c - 0.337 \times \left(\sqrt{A}\right)\right) \times \sqrt{0.563 \times \sqrt{A}}$$

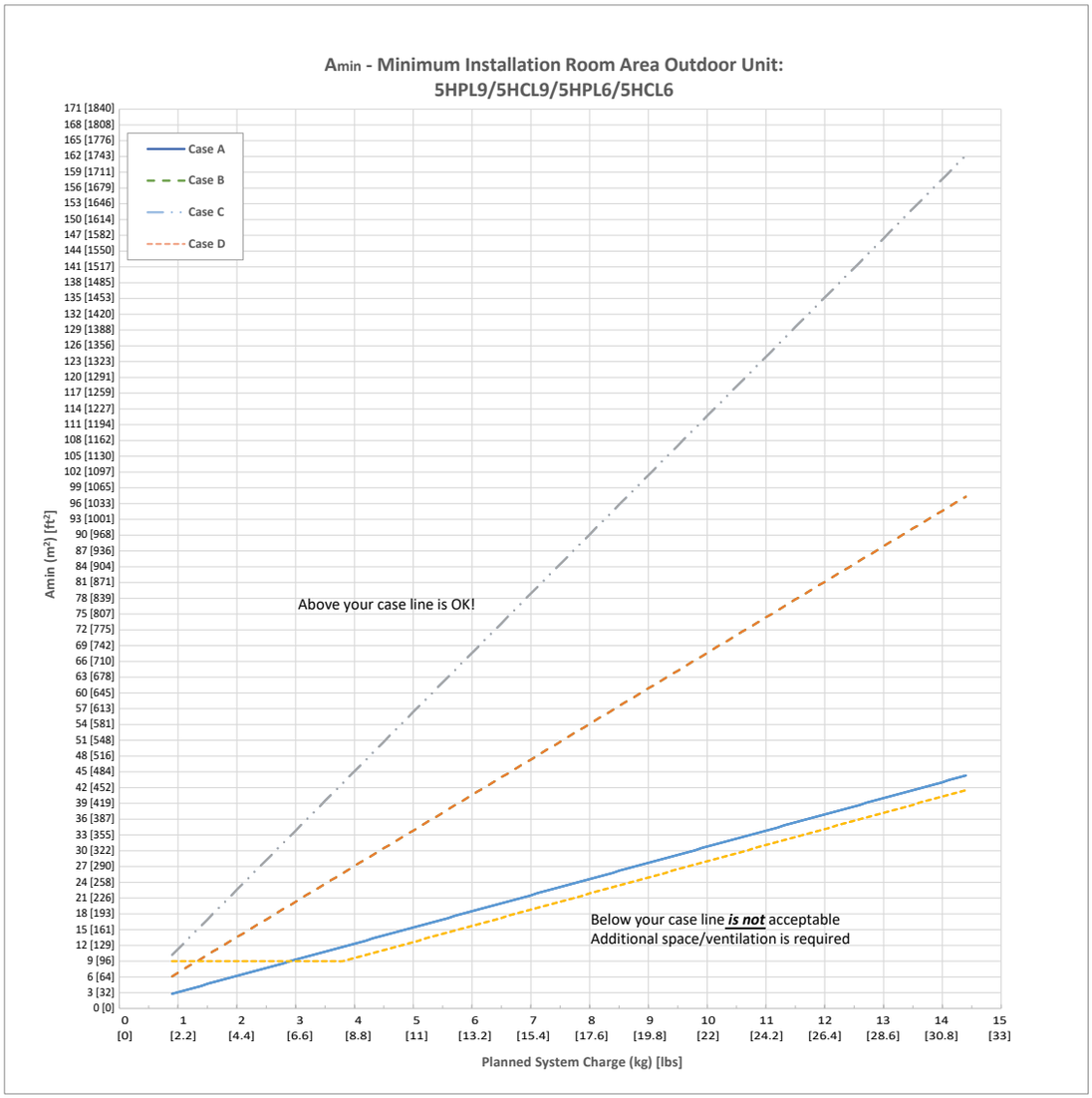
  - Where **A** is the area of the installation room in square meters, and m_c is the planned total system charge in kilograms.
- Use the tables on the following pages to determine **Amin** and **TAmin** requirements.
  1. Match the chart title to the outdoor unit being paired with the air handler.
  2. Use the following flow chart to determine which case line is correct for your application.
  3. Confirm the planned system charge, m_c, and trace up to the correct case line.
  4. Trace left from the intersection with the correct case line to determine **Amin** and **TAmin**.
  5. This information is available in ***Appendix A - Minimum area requirement table*** at the end of this installation manual.

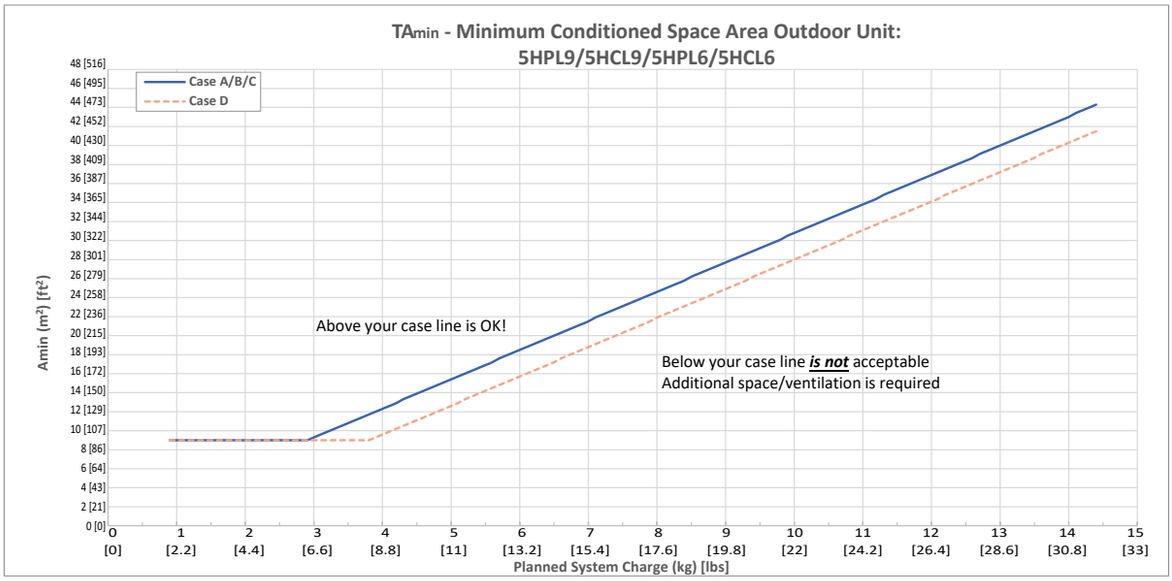


NOTE

For systems certified as ETRS the following ventilation requirement can be substituted:

$$A_{nvETRS} \geqslant 114cm^2 \ or \ 22in^2$$


Amin - Minimum Installation Room Area Outdoor Unit:
5HPL9/5HCL9/5HPL6/5HCL6
Case A
Case B
Case C
Case D
Above your case line is OK!
Below your case line is not acceptable
Additional space/ventilation is required
Amin (m²) [ft²]
Planned System Charge (kg) [lbs]



4.3. Handling and service of R454B system

FLAMMABLE REFRIGERANT WARNING

- Follow all national and local regulations and policies regarding refrigerant removal, evacuation, and recovery processes.
- Follow all safety precautions and procedures found in the installation and service manuals.
- Flammable refrigerant systems may only be purged with oxygen-free nitrogen.
  – Never use compressed air or oxygen for purging flammable refrigerant systems.
- Do not place vacuum pump air outlet near potential ignition sources.
- Verify proper ventilation available.

4.3.1. Removal and evacuation of refrigerant R454B

FLAMMABLE REFRIGERANT WARNING

- Verify vacuum pump outlet is secured away from potential ignition sources.
- Verify proper ventilation is available.

1. Safely remove refrigerant following local and national regulations.
2. Evacuate
3. Purge the circuit with inert gas.

4. Evacuate
5. Continuously flush or purge with inert gas when using a flame to solder or de-solder.
6. Open the circuit
7. Recover the refrigerant charge into the correct recovery cylinders if venting is not allowed by local and national codes.

4.3.2. Purging the system with R454B

NOTE

This process might need to be repeated several times.

1. Break the system vacuum with oxygen-free nitrogen.
2. Continue to fill until the working pressure is achieved.
3. Vent to atmosphere.
4. Evacuate the system.
5. Repeat steps until no refrigerant remains in the system, then fill a final time with oxygen-free nitrogen.
6. When purge is complete, vent the system down to atmospheric pressure to enable work to take place.

4.3.3. Charging R454B system

In addition to conventional charging procedures and safety precautions described in the installation and service manuals, read and follow the following precautions:

FLAMMABLE REFRIGERANT WARNING

- Do not allow contamination of different refrigerants to occur when using charging equipment.
- Keep hoses or lines as short as possible to minimize the amount of refrigerant contained in them.
- Keep all cylinders in an appropriate position according to the instructions.
- Ensure that the refrigerating system is properly grounded prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- DO NOT OVERFILL the refrigerant system.
- Pressure test the system prior to re-charging with appropriate purging gas.
  1. Using dry nitrogen, pressurize the field piping and indoor coil to the lower of the maximum operating pressures listed on the name plates of the indoor and outdoor units.
  2. After removing the pressure source, maintain the test pressure for at least one (1) hour with no decrease of pressure indicated by the test gauge. The test gauge resolution must be less than 30 psi.
  3. Check for leaks by using a soapy solution at each field-made joint.
- Leak test the system at completion of charge, prior to commissioning, and before leaving the worksite.

4.3.4. Recovery of R454B

FLAMMABLE REFRIGERANT WARNING

- Do not mix refrigerants in recovery units and especially not in cylinders.
- Never heat the compressor body with an open flame or any other ignition sources to accelerate the process.

Verify the following prior to recovering refrigerant from the system:

- Verify that only the proper cylinders required for flammable refrigerant recovery are used and that they are properly labeled.
  - If in doubt, contact manufacturer for consultation.
- Verify the correct number of cylinders needed for total system charge are available.
- Verify cylinders are in good working order with necessary pressure relief and shut-off valves.
- Verify recovery cylinders are empty, properly evacuated, and cooled before recovery.
- Verify calibrated weighing scales are available and in good working order.
- Verify hoses are complete with leak-free disconnect coupling and in good condition.
- Ensure all recovered refrigerant is processed in accordance with local legislation, in proper recovery cylinder, and with appropriate transfer note arranged.
- If compressors or compressor oils are to be removed, verify they are evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant.
- Verify oil drained from the system is carried out safely.

4.4. Description and testing of leak mitigation functions

NOTE

The refrigerant leak detection system can be tested to verify that leak mitigation actions are functional. These actions serve to slow the leak rate and to disperse any concentrated refrigerant in the ducting.

Leak mitigation actions include automatic cutoff of the outdoor unit compressor and activating the fan motor of the indoor unit for circulation airflow.

4.4.1. Testing procedure

1. Confirm that the system is powered on and in normal operation.
2. Unplug the refrigerant leak sensor cable from the indoor unit control board at the plug connector labeled CNSA.
3. The mitigation actions will be triggered and will continue until the unit is powered off.
4. Power off the system.
5. Reconnect the refrigerant leak sensor cable.
6. Restore power and return the system to normal operation.

FLAMMABLE REFRIGERANT WARNING

The fan will automatically start when refrigerant leak is detected by refrigerant leak sensor. Keep a safe distance from the fan to avoid injury.

4.5. Decommissioning of R454B system

NOTE

LABELING: All equipment that is decommissioned and emptied of refrigerant must have a label stating FLAMMABLE REFRIGERANT with the date and signature affixed to the equipment.

Prior to decommissioning, verify the following safety checks:

- Follow all safety precautions and procedures.
- Take oil and refrigerant samples in case analysis is required prior to re-use of recovered refrigerant.
- Verify proper power is available necessary to fully execute procedure.
- Ensure the recovery process is supervised at all times by a trained professional.
- Verify mechanical handling equipment is available, if required, for handling refrigerant cylinders.
- Ensure all personal protective equipment is available and being used correctly.
- Verify recovery equipment and cylinders conform to the appropriate standards.

Follow the steps listed in this procedure to properly decommission the system:

1. Isolate system electrically.
2. Pump down refrigerant system, if possible.
3. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
4. Verify cylinder is situated on the scales before recovery takes place.
5. Start the recovery machine and operate in accordance with instructions.
   - Do not overfill cylinders (no more than 80 % volume liquid charge).
   - Do not exceed the maximum working pressure of the cylinder, even temporarily.
6. Once cylinders are properly filled and the process complete:
   - Promptly remove the cylinders and the equipment from site.
   - Verify all isolation valves on the equipment are closed.

NOTE

Do not re-use recovered refrigerant in another refrigerant system unless it has been cleaned in accordance with procedure and regulation.

4.6. Disposal of R454B

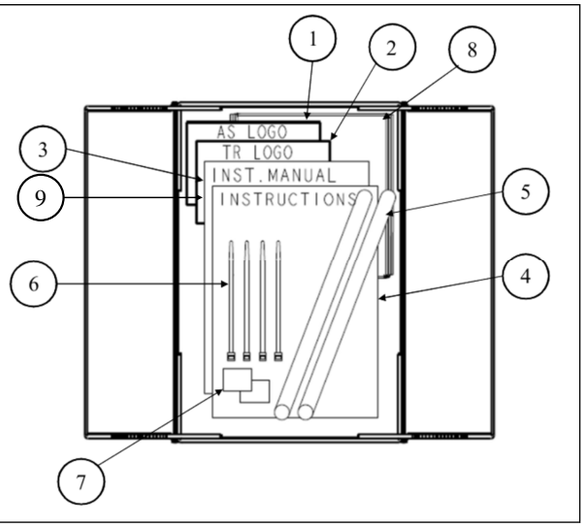
Recover the refrigerant and recycle it.

If recycling is not possible then it should be incinerated by a licensed facility.

5. Indoor unit accessories

5.1. Accessory box contents

Part No.	Part Description	Qty
1	American Standard logo label	1
2	Trane logo label	1
3	Installation manual	1
4	Operation manual	1
5	Plastic tube	2
6	Plastic tie	4
7	Drain pan seal	2
8	Thermostat Interface	1
9	Warranty information sheet	1



5.2. Approved electric heater kits

Table 1. Approved for use with 5TEM9 and R454B refrigerant.

Model code	EH03/05/08/10-MPA-M(B)	EH10-MPA-L(B)	EH15-MPAS-L(B)	EH17-MPAS-L(B)	EH19-MPAS-L(B)
5TEM9C02AC21SA	x				
5TEM9D04AC31SA		x	x		
5TEM9D06AC31SA		x	x	x	
5TEM9D07AC41SA			x	x	x

6. Selecting an installation site

6.1. Site considerations

- Avoid locations exposed to outside air.
- Select a location free of obstructions to the airflow in and out of the unit.
- Avoid locations exposed to steam or vapor.
- Avoid locations where combustible gas may leak, settle, or be generated.
- Avoid installation near machines emitting high-frequency waves (high frequency welders, etc.).
- Avoid locations where the airflow is directed at a fire alarm sensor. (Hot air could trigger the alarm during operation.)
- Avoid places where acidic solutions are frequently used.
- Avoid places where sulfur-based or other sprays are commonly used.
- When the air handler is installed in the horizontal position please install a drain pan under entire cabinet.
- Install sufficient thermal insulation to prevent condensation from forming on the outlet and inlet ducts.

IMPORTANT

If propane, butane, methane, or other gas appliances, insecticides or other sprays, smoke-producing appliances, paints, or chemicals are used near the unit, the refrigerant leak sensor inside the indoor unit may detect and display a refrigerant leak error, making operation impossible.

6.2. Suspended horizontal mounting

This product does not contain mounting brackets for installation by means of suspension. There are numerous difficulties that an installer would need to address before installing the product by suspension including, but not limited to, confirming a sufficiently strong base attached to a building structure of adequate strength to support this product considering:

- Weight of the product
- Weight and load of ducts and piping
- Weight of the auxiliary drain pan
- Earthquakes and other possible external forces in and around the installation environment.

Support brackets must run the length of the unit and be of sufficient strength to support the weight of the unit and connected ductwork. Vibration isolation is recommended for horizontal installations.

Please note the manufacturer and its affiliates are not responsible for any damage to household/building goods/property, bodily injury, or death resulting from this suspended product falling due to reasons including, but not limited to insufficient strength, improper installation, or deterioration over time of the suspension devices.

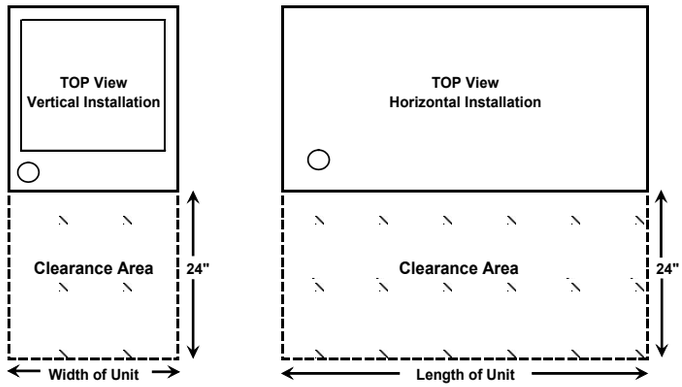
7. Combining indoor units with outdoor units

For combining indoor units with outdoor units, refer to the outdoor unit’s Installation Manual.

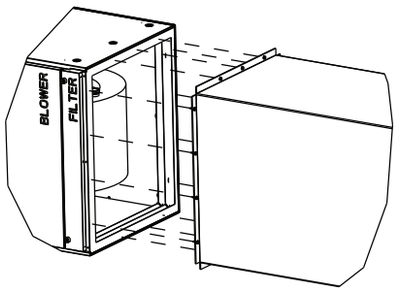
8. Installing the unit

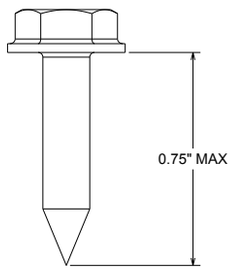
The air handler can be installed in a vertical or horizontal (right and left) configuration as shown in steps included in the chapter *Mount positions* sub-sections: *Vertical installations*, *Horizontal right installations*, and *Horizontal left installations*. The units are designed for “0” zero clearance to combustibles. 24 in. (610 mm) is required for service access to the front of the unit (see Installation clearance). Regardless of mounting configuration, the air handler must be mounted level to facilitate proper condensate drainage.

Installation clearance



9. Duct connection



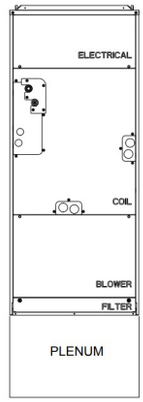


- See the outline drawing for the size of the duct connection.
- Use flanged ducts for connections to return.
- Do not use sheet metal screws longer than 0.75” to secure any ductwork to the air handler.

10. Mount positions

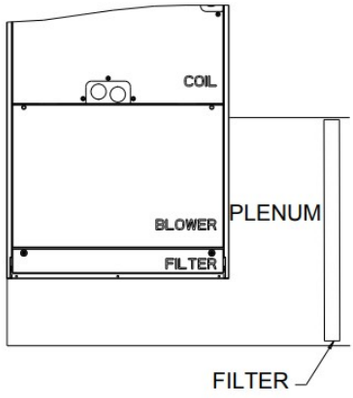
10.1. Vertical installations

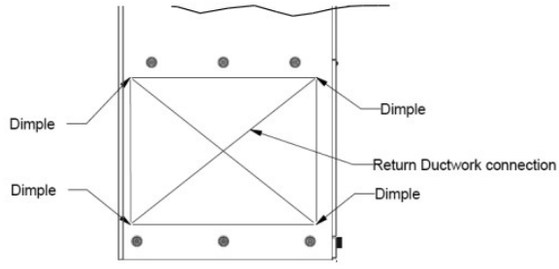
The air handler must be supported on the bottom only and set on a solid floor with a return plenum below or field supplied supporting frame or plenum. Securely attach the air handler to the floor or a supporting frame or plenum.



10.1.1. Side return

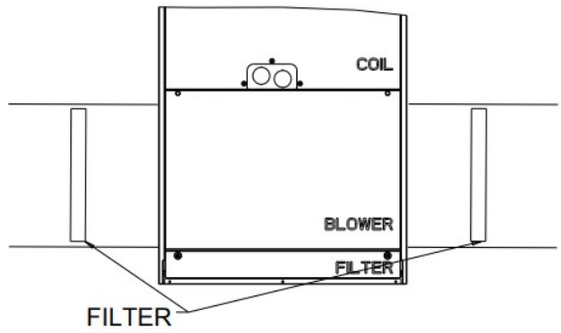
Dual side returns or additional plenum below the unit must be used on all models to ensure proper air flow. If the side return is used, **it is the responsibility of the installer to ensure the ducts are properly sized and sealed to the cabinet.** When cutting a hole into the side of the cabinet, follow the instructions provided below to avoid damaging any internal structure or wiring.





SIDE RETURN

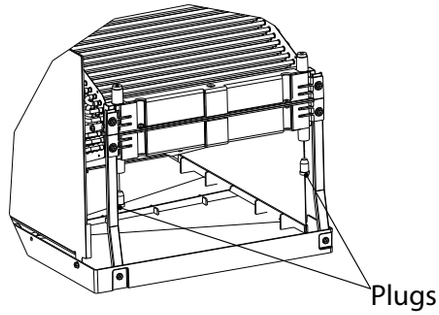
Dual side return seal bottom of air handler add 2 filters →

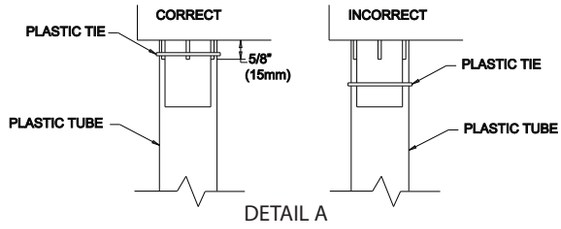


10.2. Horizontal right installations

Refer to chapter: *Mount positions* sub-section: *Horizontal left installations* Step. 1 through 3 & 8, for removing the entire coil assembly from the air handler cabinet. This will require removing the Filter, Blower, and Coil Panels along with the bracket(s) that secures the coil assembly. Be sure to disconnect the waterproof thermistor and refrigerant leak sensor connections in order to remove the coil from the cabinet.

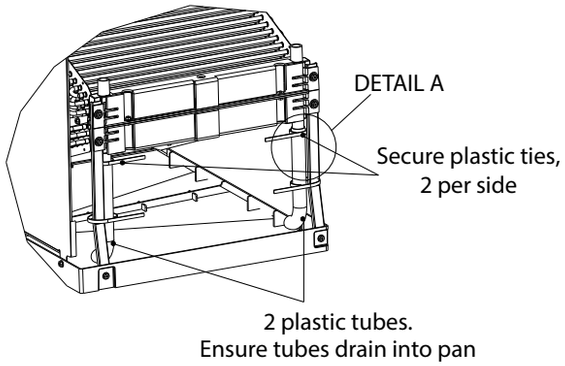
Once the coil is removed, the two clear plastic tubes included in the accessory box will need to be attached to the top drain pan. First, remove the lower rubber plugs in the top drain pan. Next, install the clear plastic tubes which are included in the accessory box. Ensure the plastic tubes drain into the pan. Also, be sure the clear plastic tubes do not have any restriction. Cutting of the plastic tube is required, please refer to the table below for length. Finally, secure the clear plastic tubes to the top drain pan per Detail A and to the metal brackets supporting the coil to the top drain pan with the provided plastic ties as shown.





Model code	Tube Length
5TEM9C02AC21SA	6.9 in. (175 mm)
5TEM9D04AC31SA, 5TEM9D06AC31SA 5TEM9D07AC41SA	8.9 in. (225 mm)[1]

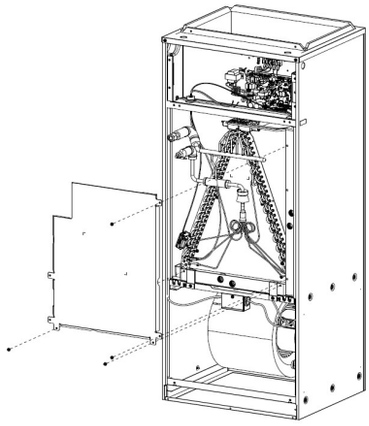
[1]Tube length provided



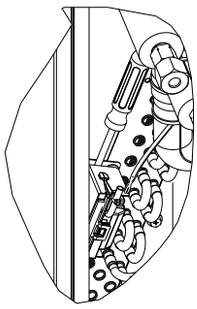
Reinstall the coil assembly along with bracket(s) that secure(s) it. Failure to reinstall the brackets will result in capacity loss and condensation formation inside the cabinet.

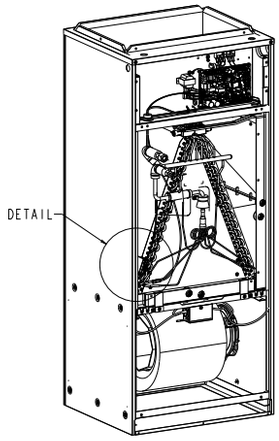
Refrigerant Detection Sensor Placement

Step. 1 Remove the screws (4) and remove the front plate from the coil assembly.



Step. 2 Remove the refrigerant leak sensor from the sensor bracket, then remove the (2) screws shown in the image to remove the bracket from the end plate of the coil assembly. Careful not to discard the sensor bracket and screws, this will be used in a later step.

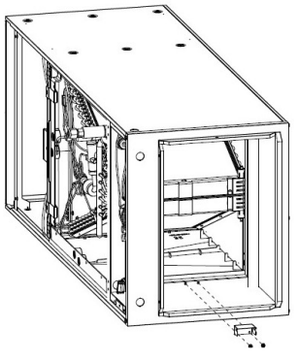


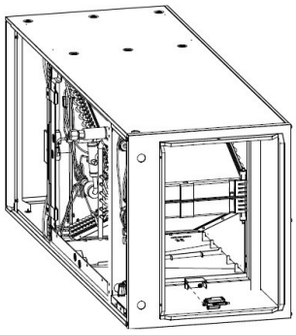


TIP

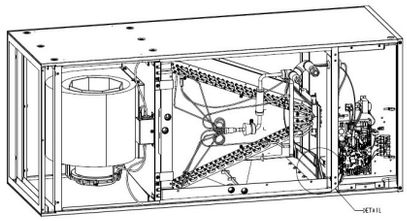
- If there is difficulty removing the refrigerant leak sensor / housing assembly from the vertical flow bracket, insert a screwdriver between the sensor housing assembly and the bracket as shown in the detailed area above.
- Gently apply pressure against the back of the sensor housing assembly to release it from the bracket.
- Once it has released, remove the bracket by hand.

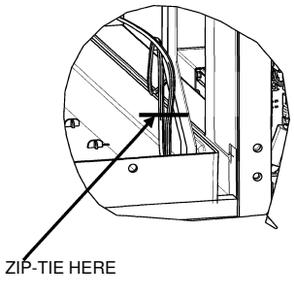
Step. 3 Using the removed screws from **Step. 2**, install the refrigerant leak sensor bracket using the pre-drilled holes on the cabinet shelf as shown. Ensure the orientation matches the image. Insert the sensor into the bracket.



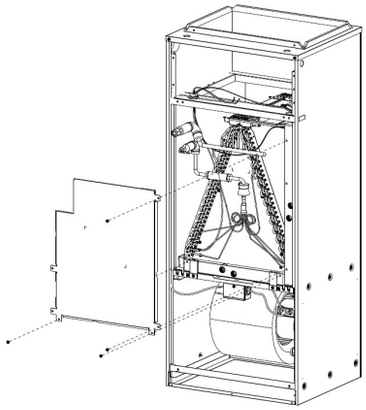


Step. 4 In order to prevent water from running down the refrigerant leak sensor cable outside of the drain pan, a Drip Loop **MUST** be installed to direct water into the drain pan. Do this by using a zip-tie to secure the sensor cable to the support bracket, creating a loop in the cable to allow water to properly flow into the drain pan.





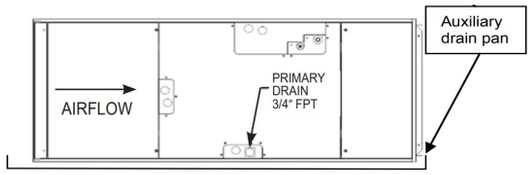
Step. 5 Reattach the front plate with the (4) screws.



Step. 6 Refer to chapter *Mount positions*, subsection *Horizontal left installations* instructions, Step. 1- 4b & 6 to secure the coil and reassemble the panels.

NOTE

For Horizontal installation an auxiliary drain pan must be installed.



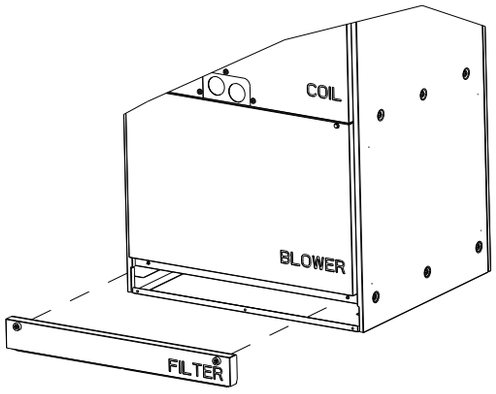
IMPORTANT

Horizontal Right Installation
Fan assembly rotation not required

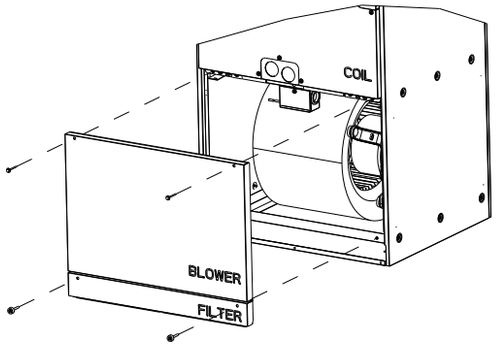
10.3. Horizontal left installations

For horizontal left installation the drain pan will need to be moved to the opposite side of the coil. This can be done by moving the two brackets and drain pan to the left of the coil. This way, the condensate that formed on the coil will fall in the drain pan. Also, the appropriate knockouts for the drains will need to be removed once the drain pan is in its correct position. In addition to relocating the side drain pan, the fan assembly will also need to be removed rotated 180° and reinstalled. The motor has to be closest to the ground. The two clear plastic tubes included in the accessory box will also need to be attached to the top drain pan. See instructions below.

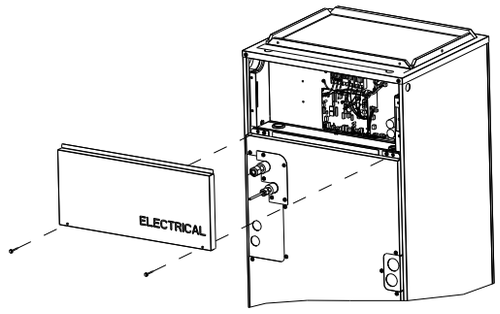
Directions for rotating fan for horizontal left installation:



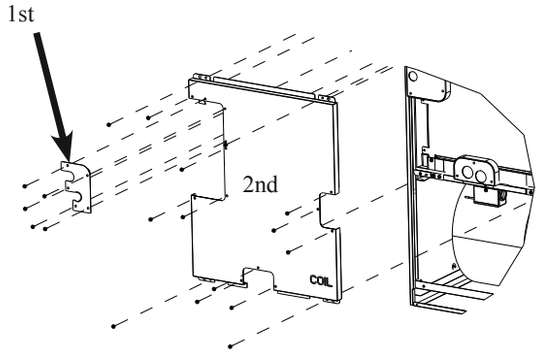
Step. 1 Remove the panel marked “FILTER”.



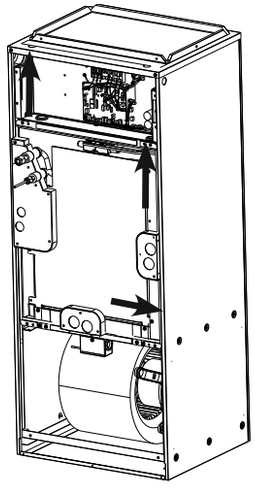
Step. 2 Remove the panel marked “BLOWER”.



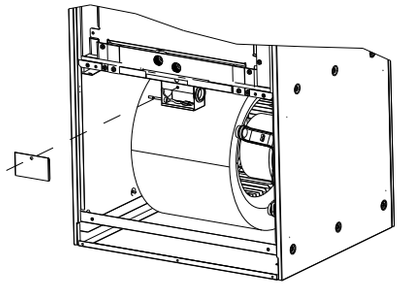
Step. 3 Remove the panel marked "ELECTRICAL".



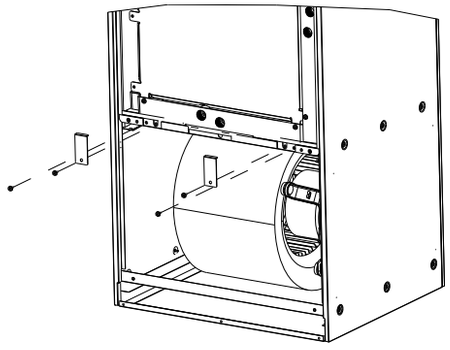
Step. 4a Remove the screws securing the (3) panels to the COIL panel shown in the image above. Remove the “1st” panel and “2nd” panel marked “COIL”.



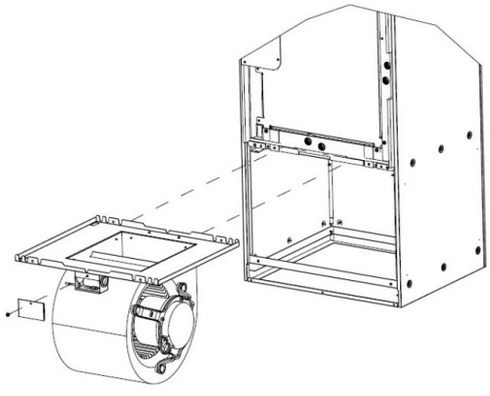
Step. 4b Next, remove the smaller panels covering the drain holes and refrigerant lines by first sliding in the direction marked above.



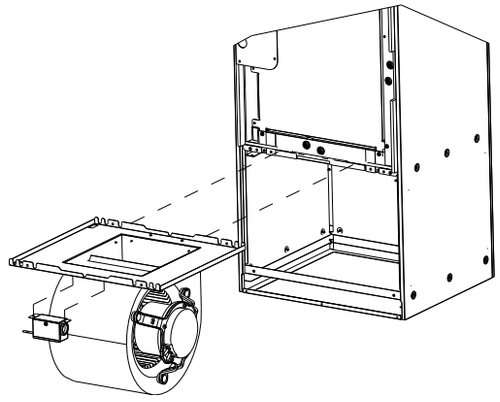
Step. 5 Remove the electrical enclosure cover mounted on the fan assembly. Disconnect the motor connector along with the connector for the return air thermistor. Remove all of the harnesses from the electrical enclosure leaving only the return air thermistor attached to the electrical enclosure.



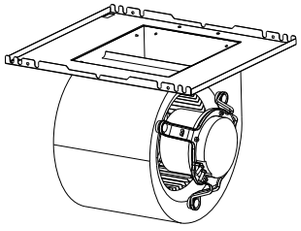
Step. 6 Remove the (4) screws indicated in the image along with the brackets that secure the coil.

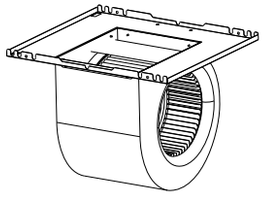


Step. 7 Slide the entire fan assembly out from the cabinet.

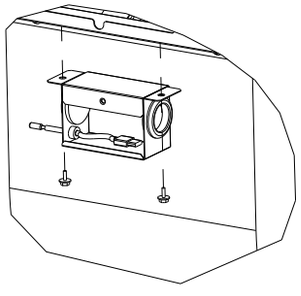


Step. 8 Remove the electrical enclosure from the fan assembly.

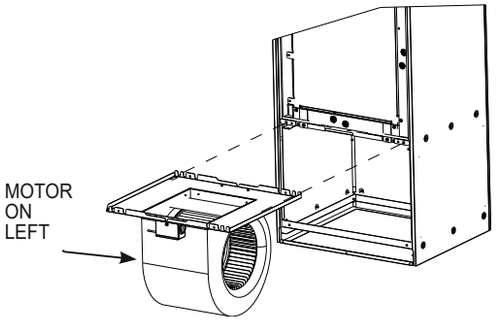




Step. 9 Rotate the blower assembly 180°. The motor should now be on the opposite side.



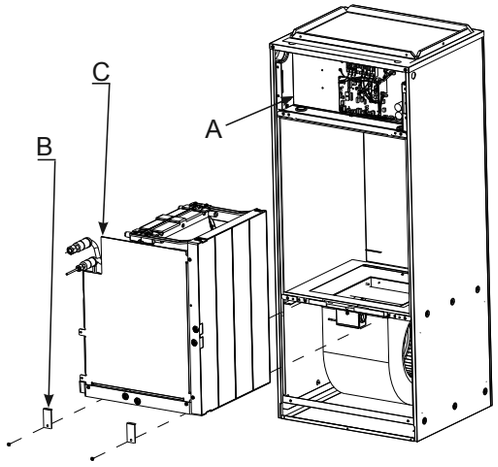
Step. 10 Reinstall the enclosure for the return air temperature sensor on the blower assembly on the opposite side from its original location.



Step. 11 Reinsert the blower assembly with the motor now on the left into the air handler cabinet and reuse the (2) screws that secured the fan assembly in position. Reroute the (2) connectors for the motor back into the enclosure and reconnect.

NOTE

The wiring harness might have to be removed from the plastic retainers mounted to the motor bracket in order to have sufficient length to reach the electrical enclosure mounted to the fan assembly. Ensure wiring harness is secure so it cannot be pulled into the fan. Reroute the return air thermistor connector back into the electrical enclosure and reconnect.



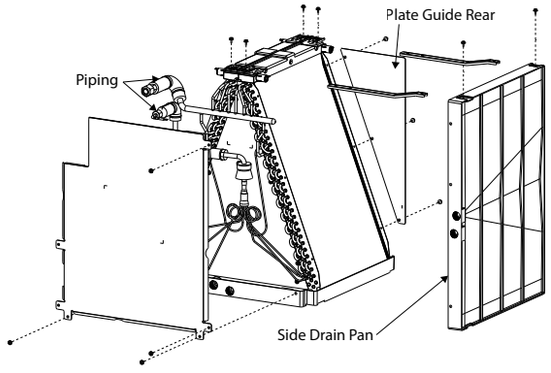
Step. 12

A. Unplug the thermistor (CN44) from the control board and route the harness from control box out through the rubber grommet.

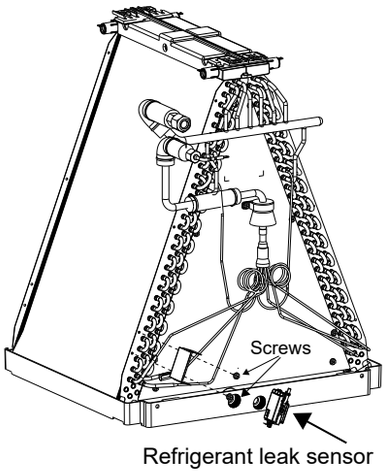
- Unplug the refrigerant leak sensor (CNSA) from the control board and route the harness from control box out through the rubber grommet.

B. Remove the brackets which secure the coil assembly.

C. Slide the coil assembly out of the air handler cabinet.



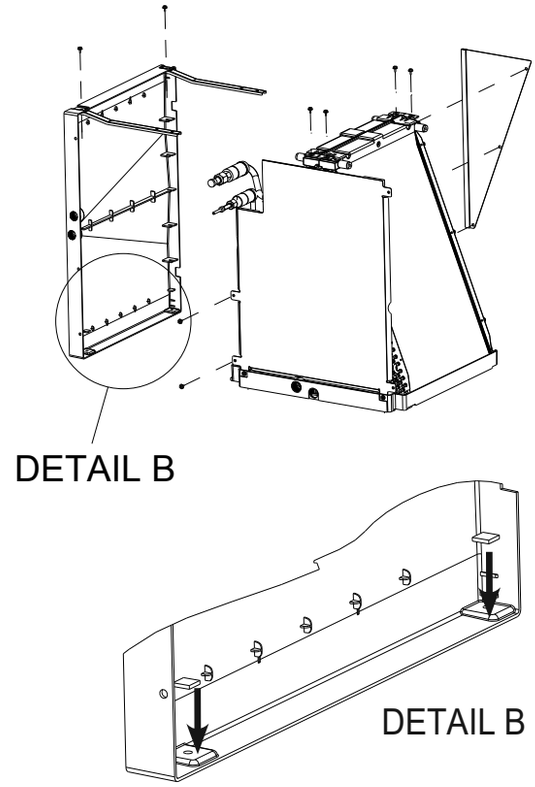
Step. 13 Remove the Plate Guide Rear (3 screws), Front Plate (4 screws), and Side Drain Pan (2 screws) along with the supporting brackets (4 screws) from the coil assembly.



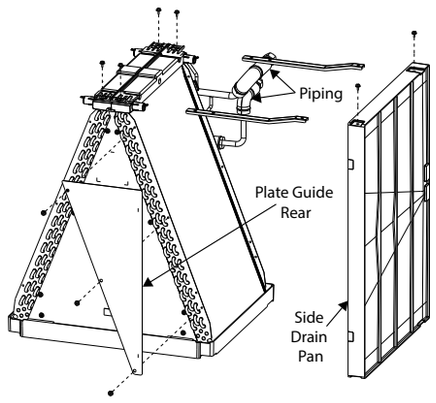
TIP

- If there is difficulty removing the refrigerant leak sensor / housing assembly from the vertical flow bracket, insert a screwdriver between the sensor housing assembly and the bracket as shown in the detailed area above.
- Gently apply pressure against the back of the sensor housing assembly to release it from the bracket.
- Once it has released, remove the bracket by hand.

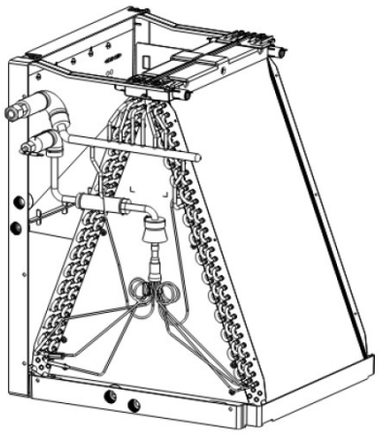
Step. 14 Remove the refrigerant leak sensor from the sensor bracket, then remove the (2) screws shown in the image to remove the bracket from the end plate of the coil assembly. Careful not to discard the sensor bracket and screws, this will be used in a later step.

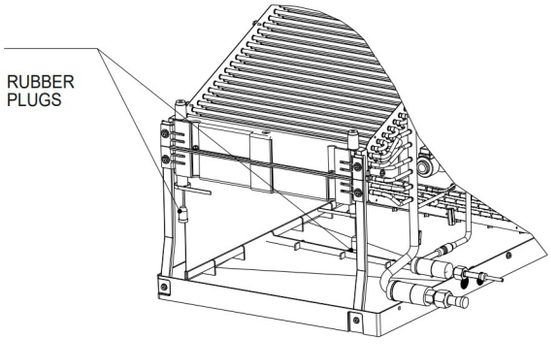


Step. 15a Install the drain pan seals (2) included in the accessory box as shown above. These seals will cover the unused holes in the side drain pan to prevent leaks.

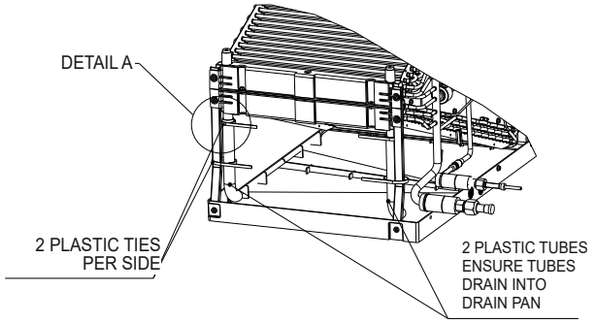


Step. 15b Reinstall the brackets to the opposite side of the Side Drain Pan. The Side Drain Pan will be reinstalled on the opposite side of the Coil Assembly. Reattach the Plate Guide Rear on the opposite side of the coil assembly.

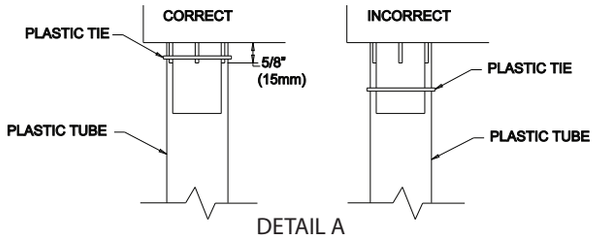




Step. 15c Remove the rubber plugs indicated in the image above.

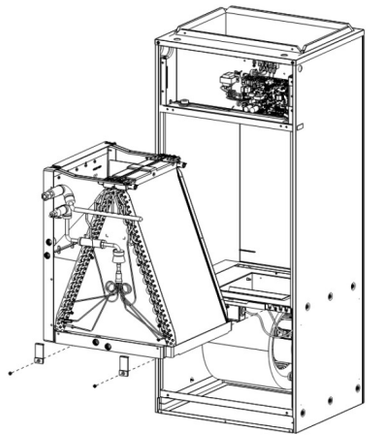


Step. 15d Next, install the clear plastic tubes which are included in the accessory box. Ensure the plastic tubes drain into the pan. Also, be sure the clear plastic tubes do not have any restriction. Cutting of the plastic tube is required, please refer to the table for length. Finally, secure the clear plastic tubes to the top drain pan per Detail A. Then to the metal brackets supporting the coil to the top drain pan with the provided plastic ties as shown.

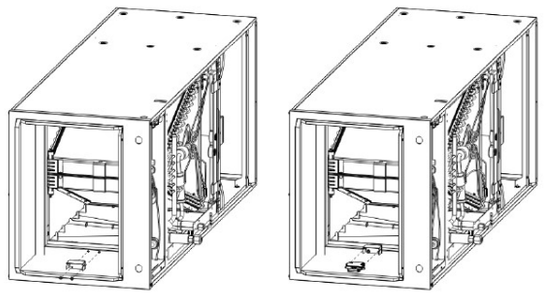


Model code	Tube Length
5TEM9C02AC21SA	6.9 in. (175 mm)
5TEM9D04AC31SA, 5TEM9D06AC31SA 5TEM9D07AC41SA	8.9 in. (225 mm)[1]

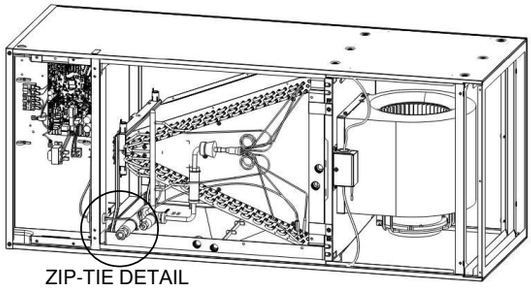
[1]Tube length provided

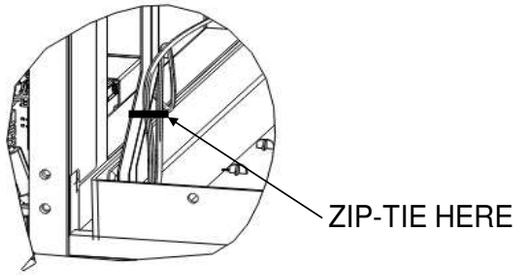


Step. 16 Reinstall the coil assembly along with the bracket(s) that secure(s) it. Failure to reinstall the brackets will result in capacity loss and condensation formation inside the cabinet.



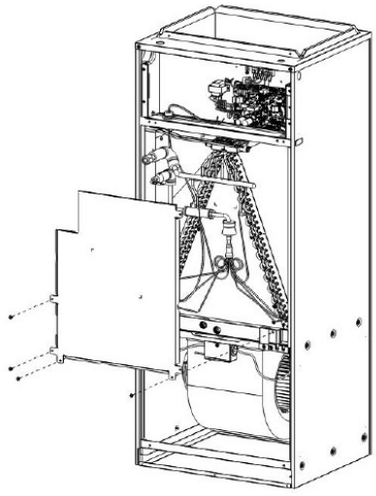
Step. 17 Reinstall the refrigerant leak sensor bracket using the (2) screws from previous step in the position noted in the image. Once sensor bracket is installed, the refrigerant leak sensor can be reinserted into the sensor bracket.



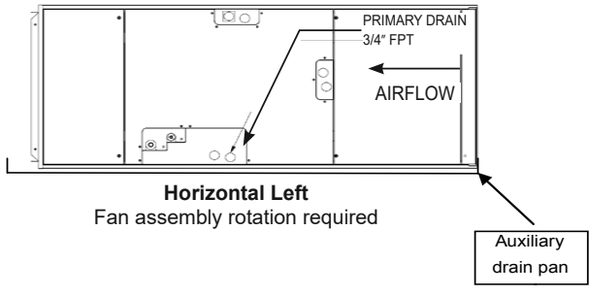


Step. 18 In order to prevent water from running down the refrigerant leak sensor cable outside of the drain pan, a Drip Loop **MUST** be installed to direct water into the drain pan. Do this by using a zip-tie to secure the sensor cable to the support bracket, creating a loop in the cable to allow water to properly flow into the drain pan.

- The wiring harness for the refrigerant leak sensor will reroute into the electrical section and plug into CNSA.



Step. 19 Reattach the front plate with the (4) screws.



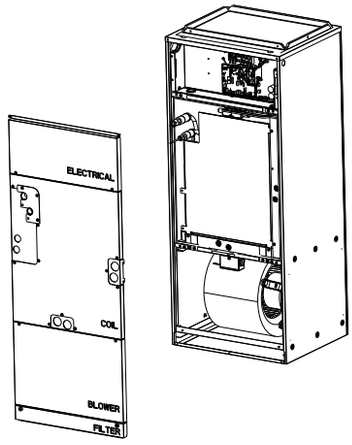
Step. 20 Refer to the chapter *Mount positions*, sub-section *Horizontal left installations*, step 1 to 4 to reassemble the panels. Ensure the proper knock-outs are removed for drainage and electrical connections.

⚠ CAUTION

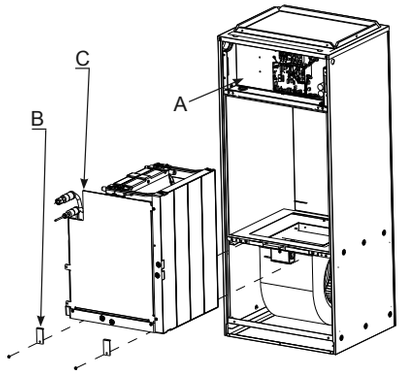
For Horizontal installation, an auxiliary drain pan must be installed.

10.4. Downflow installations

As a result of innovative multi-position design, the air handler may be converted from its original configuration to a downflow position without the need for a stability kit or other external fitting. Operation in the downflow position may result in excess condensate buildup. A Condensate Management Kit (CMA-1) should be used to mitigate such water runoff.

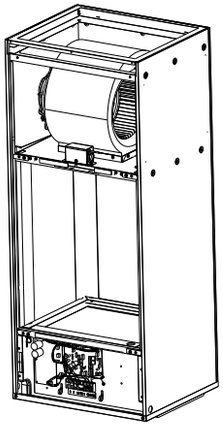


Step. 1 Please refer to chapter: *Mount positions* sub-section: *Horizontal left installations* steps 1 to 4 for removing the panels which cover the Electrical, Coil Assembly, Blower and Filter.

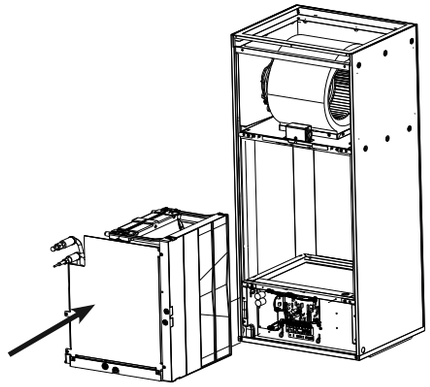


Step. 2

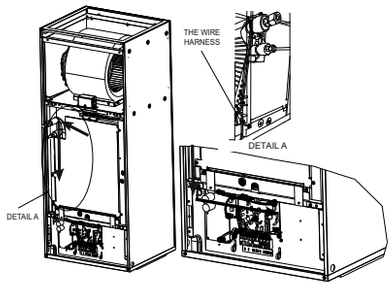
A. Unplug the Thermistor (CN44) from the control board and route the harness from control box area out through the rubber grommet.
- Unplug the refrigerant leak sensor (CNSA) from the control board and route the harness from control box out through the rubber grommet.
B. Remove the brackets which secure the coil assembly.
C. Slide the coil assembly out of the air handler cabinet.



Step. 3 Rotate the cabinet so the Fan assembly is on top.

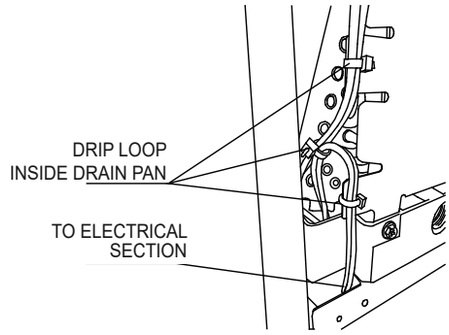


Step. 4a Reinsert the coil assembly back into the cabinet. The bracket(s) are not required to be reattached.

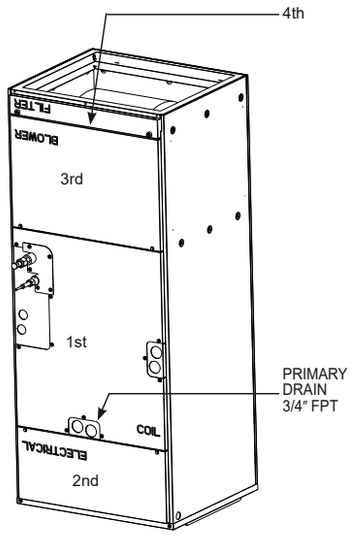


Step. 4b Cut the plastic ties that are securing the extra wiring for the Thermistor (CN44). Route the thermistor wires into the Electrical section of the air handler on the left side of the coil. The wiring harness for the refrigerant leak sensor will reroute into the electrical section and plug into CNSA.

- Use the metal tab in Detail A to secure the wires with a zip-tie.
- The notch in the drain pan allows the wires to pass the drain pan, go through the sheet metal shelf which now supports the Coil Assembly and enter the Electrical section of the Air Handler. Reconnect the Thermistor (CN44) to the control board.



Step. 4c In order to prevent water from running down the thermistor and refrigerant leak sensor wires into the electrical area, a Drip Loop MUST be installed to direct water into the drain pan.



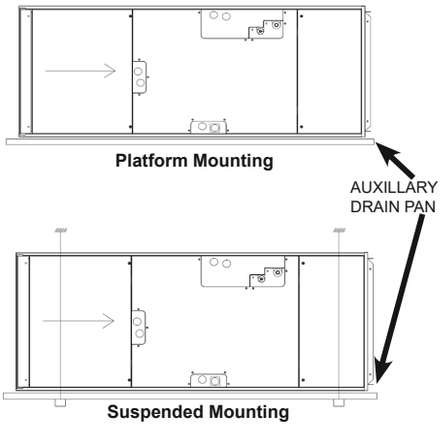
Step. 5 Reinstall the panels over the drains and refrigerant lines. Next, install the panels which cover the Electrical (2nd), Blower (3rd) and Filter (4th).

NOTE

The panel which covers the Coil Assembly will be installed upright as the original vertical orientation from the factory, while the other panels' text will read upside down.

Horizontal Mounting

The unit can be installed on a platform or suspended from rails as shown below. The rails must run the length of the unit and be of sufficient strength to support the weight of the ductwork. Vibration isolation is recommended for horizontal installations. Some jurisdictions may require an auxiliary drain pan be mounted under the unit. Always follow local or national code requirements.



10.5. Service note: servicing and replacing the refrigerant leak sensor

NOTE

The steps and figures on the preceding pages can be used to locate, service and replace the refrigerant leak sensor. For a complete refrigerant leak sensor replacement procedure, please refer to the indoor unit service manual.

To remove the panels and front plate, go to the *Horizontal left installations* chapter and complete Step. 1 through 4 and *Horizontal right installations* Step. 1.

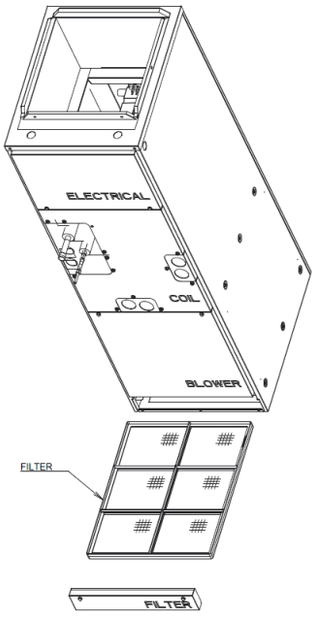
To access the sensor for vertical and downflow installations, go to the chapter *Horizontal right installations* and refer to Step. 2 to locate and replace the sensor.

To locate the sensor for horizontal installations, refer to the chapter *Horizontal left installations* and refer to Step. 17 to access and replace the sensor.

Once the sensor housing assembly is removed from the bracket, open the housing and unplug the cable from the sensor PCB. The sensor PCB is replaced, and the cable is reused. The same steps can be followed in reverse to reassemble the indoor unit after service is completed.

11. Air filter

A washable (reusable) air filter is provided with the air handler unit. The filter can be installed once the unit has been removed from its packaging. It is recommended the air filter be cleaned once per month. The pressure drop is to be determined by the installing contractor based on the overall static pressure performance of the system including supply and return ductwork sizing. The factory static pressure performance is 0.50” esp. A field selectable 0.30 and 0.80 esp. is available. See instructions for changing to 0.30 or 0.80 esp in the chapter *Electrical wiring,* sub-section *Changing blower external static pressure*.



12. Refrigerant piping work

For constraints on piping length and allowable difference of elevation, refer to the design section of the engineering manual.

The method of pipe connection on the air handler is flare connection.

Provide proper bracing for refrigerant piping so no load is imparted upon the connections at the air handler. No more than 30” away from the connections on the air handler is recommended.

WARNING

When installing and moving the unit, do not charge it with refrigerant other than the refrigerant specified on the unit. Mixing of a different refrigerant, air, etc. may cause the refrigerant cycle to malfunction and result in severe damage.

CAUTION

Use refrigerant piping made of C1220 (Cu-DHP) phosphorous deoxidized copper as specified in ASTM B280 Standard for copper and copper alloy seamless pipes and tubes. In addition, be sure that the inner and outer surfaces of the pipes are clean and free of hazardous sulfur, oxides, dust/dirt, shaving particles, oils, moisture, or any other contaminant. Never use existing refrigerant piping.

CAUTION

COIL UNDER PRESSURE

Always wear safety glasses when working around pressurized devices. The air handlers are shipped with a nitrogen holding charge in the coil. Carefully follow these instructions when releasing the charge.

Carefully remove the flare nut off the end of the pipe to release any gas.

Both refrigerant lines need to be insulated all the way up to the cabinet. Make sure the openings in the cabinet around the refrigerant lines are sealed. 3/8 in thick insulation is the minimum recommended thickness. Based on ambient conditions, local codes and line length, thicker insulation may be desired.

Do not put any oil on the threaded portion of the flare nuts. This may cause the flare nut to loosen and leak refrigerant.

FLAMMABLE REFRIGERANT WARNING

Do not use reusable mechanical connectors (press fittings, quick-connect fittings) when connecting the refrigerant piping by brazing instead of using flare connections. Complete all brazing work prior to connecting indoor unit to outdoor unit.

To reduce the risk of failure for compressor and valves, avoid contact with abrasive components, sand paper, or tools with sharp edges.

- To deburr pipes, use a reamer or other tools. Do not use sand paper or any tools that use abrasive materials.
- Use pipe cutters to cut pipes. Do not use a grinder or other tools with sharp edges or abrasive materials.
- When performing either of the above functions, ensure debris does not enter the pipe.
  - If foreign material does enter the pipe, wipe the inside to remove all foreign material.

Pipe diameter inch (mm)	Nut (mm)	A inch (mm)	Tightening torque	
		Clutch type tool for R454B	N•m	lb•ft (kgf•cm)
1/4 (6.35)	(17)	0 to 0.02 (0 to 0.5)	13.7 to 17.7	10 to 13 (140 to 180)
3/8 (9.52)	(22)		34.3 to 41.2	25 to 30 (350 to 420)
1/2 (12.7)	(26)		49.0 to 56.4	36 to 42 (500 to 575)
5/8 (15.88)	(29)		73.5 to 78.4	54 to 58 (750 to 800)

Refrigerant pipe processing

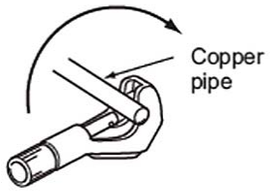


Fig. 1

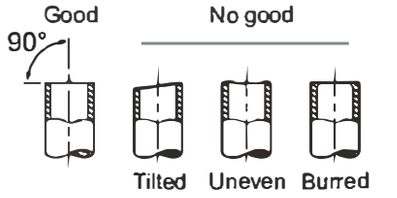


Fig. 2

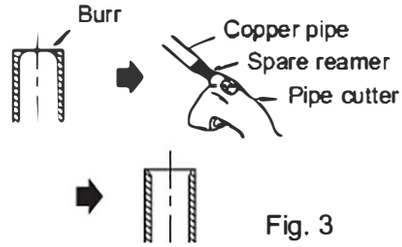


Fig. 3

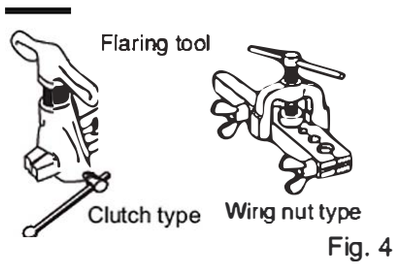


Fig. 4

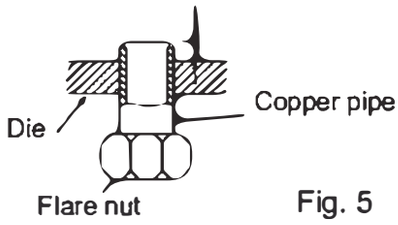


Fig. 5

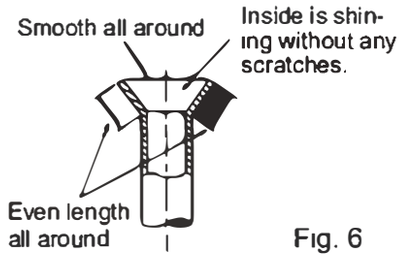
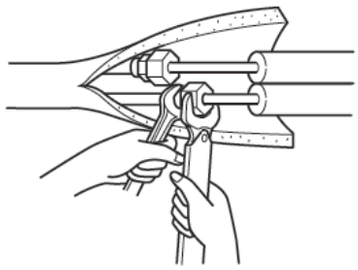


Fig. 6

Apply proper torque to flare nuts.



- Never use existing refrigerant piping.
- The large amount of chlorine in conventional refrigerant and refrigerant oil in the existing piping will cause the new refrigerator to deteriorate.
- Store the piping to be used during the installation indoors and keep both ends of the piping sealed until just before brazing.
- If dust, dirt or water gets into the refrigerant cycle, the oil will deteriorate and the compressor may fail.
- The refrigerant used in the unit is highly hydroscopic and mixes with water which will degrade the refrigerant oil.

12.1. Insulation

To avoid dew drops, provide sufficient anti-sweating insulation to the refrigerant and drain pipes. When using commercially available refrigerant pipes, be sure to cover with available insulating material with heat-resistant temperature of more than 100 °C [212 °F] and thickness given in the following table, on both

liquid and gas pipes. Insulate all indoor pipes with polyethylene insulation with a minimum density of 0.03 and a thickness as specified in the table below.

Pipe size	Insulation thickness
6.4 mm to 25.4 mm [1/4 to 1 in.]	>10 mm [7/16 in.]
28.6 mm to 38.1 mm [1-1/8 to 1-1/2 in.]	>15 mm [5/8 in.]
• If the unit is used on the highest story of a building and under high temperature and high humidity, it is necessary to use thicker insulation than specified in the table above. • If there are customer's specifications, please follow them.	

12.2. Piping size

Model code		5TEM9C02AC21SA, 5TEM9D04AC31SA, 5TEM9D06AC31SA	5TEM9D07AC41SA
Refrigerant pipe	Liquid pipe [in]	9.52 mm [3/8]	
	Gas pipe [in]	15.88 mm [5/8]	19.05 mm (3/4)
Drain Pipe [in]		O.D. 32 mm [1-1/4]	

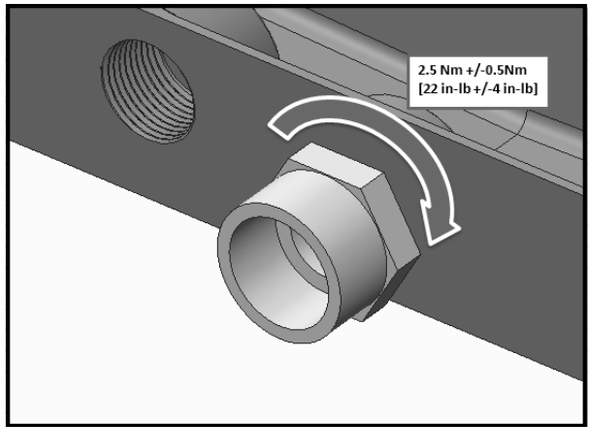
13. Drain connections

IMPORTANT

Over-tightening the drain connections could result in drain pan breakage and failure.

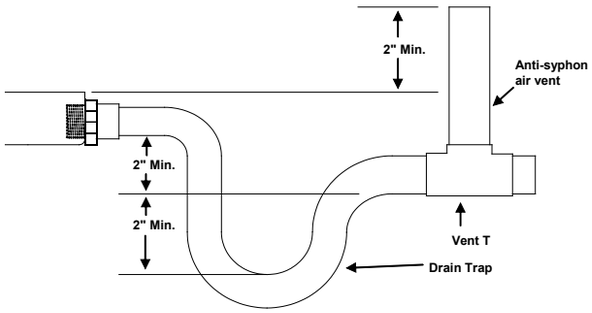
Please follow the following technique for attaching the drain pan adapter:

1. Apply thread sealant approved for plastics.
2. Torque the drain pan adapter to 2.5 Nm ±0.5 [22 in-lb ±4].



The air handler contains ¾" FPT drain connections. When the unit is used in the vertical position, there is one set. When the unit is mounted horizontally there is one set. Each set contains a primary drain and a secondary or auxiliary drain. The primary drain is the one that is lowest (even with the bottom of the pan). The secondary drain is at the higher level. They are labeled on the dimensional drawings above.

- These units operate with a positive pressure at the drain connections and **although a P-trap is not required, it is recommended to prevent capacity loss. Always follow local codes and standards.**
- The trap needs to be installed as close to the unit as possible. Make sure the top of the trap is below the connection to the drain pan to allow complete drainage of the pan.
- Slope the drain line a minimum of ¼" per foot.
  - Do not reduce the pipe size from ¾", this could cause premature blockage in the lines.
  - Do not braze near the plastic drain piping.



NOTE

Horizontal runs must also have an anti-siphon air vent (standpipe) install ahead of the horizontal run to eliminate air trapping. Horizontal drain lines must be pitched a minimum ¼" per foot.

Route the drain lines outside or to an appropriate drain. Drain lines must be installed so they do not block service access to the front of the unit. 24" clearance in the front is for routine maintenance or service.

NOTE

Check local codes before connecting the drain line to an existing drainage system.

Insulate the drain lines where sweating could cause water damage. Upon completion of installation, it is the responsibility of the installer to ensure the drain pan(s) captures all condensate, and all condensate is draining properly and not getting into the ductwork/system.

CAUTION

If secondary drain is not installed, the secondary access must be plugged.

Vertical mounting

When mounted vertically, the air handler's primary drain connection is located in the center of the unit. The slightly higher drain to the left is the secondary drain.

Attach the drain connector and tighten **TO THE PROPER TORQUE SHOWN PREVIOUSLY** with sealant and install the drain line.

IMPORTANT

Over-tightening the drain connection could result in drain pan breakage and failure.

The secondary connection should be connected to a separate drainage system. Run the secondary drain so the occupants will be able to notice water flowing through the secondary drain indicating a blockage in the primary drain. Optional use for the secondary is a primary drain line overflow switch (provided by others). This device will shut the cooling operation unit down in the event of a primary drain line blockage. See wiring section for connecting this device.

Horizontal (Left or Right):

If the unit is installed horizontally, remove the knockout in the front panel to gain access to the side drain pan connections. Attach the connector as described above and route drain line. Any vertical drain pan openings must be covered to eliminate air loss which will decrease the capacity of the unit.

IMPORTANT

Over-tightening the drain connection could result in drain pan breakage and failure.

The secondary connection should be connected to a separate drainage system. Run the secondary drain so the occupants will be able to notice water flowing through the secondary drain indicating a blockage in the primary drain. Optional use for the secondary is a primary drain line overflow switch (provided by others). This device will shut the cooling operation unit down in the event of a primary drain line blockage. See wiring section for connecting this device.

⚠ CAUTION

If secondary drain is not installed, the secondary access must be plugged.

14. Electrical wiring

⚠ WARNING

Electrical work should be done by a qualified electrical contractor in accordance with “Engineering Standards for Electrical Installation” and supplied installation manuals. If the power circuit lacks capacity or has an installation failure, it may cause a risk of electrical shock or fire.

- Be sure to follow local and national code requirements when wiring these units.
- Install the unit in a manner to prevent that any of the control circuit cables (remote controller, transmission cables) are brought in direct contact with the power cable outside the unit.
- Ensure that there is no tension on any wire connections.
- Some cables (power, remote controller or transmission) above the ceiling may become damaged by accident or by animals. Use conduit as much as possible to prevent damage.
- Never connect the power cable to leads for the transmission cables. The cables will break.
- Be sure to connect control cables to the indoor unit, remote controller and the outdoor unit.
- Perform wiring in compliance with the safety regulations detailed in UL 1995.
- Be sure to install an earth leakage breaker to the power if required by local codes.
- Ensure that there is no slack on all wire connections.

⚠ CAUTION

Be sure to ground the unit. Do not connect the grounding cable to any gas pipe, water pipe, lightening rod, or telephone earth cable. Incomplete grounding may cause a risk of electrical shock.

If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

External I/O specifications

⚠ CAUTION

Wiring should be covered by insulation tube with supplementary insulation.

Use relays or switches with IEC or equivalent standard.

The electric strength between accessible parts and control circuit should have 2750 V or more.

Wiring

Electrical wiring to the air handler will come from the outdoor unit. Please refer to the installation instructions for the outdoor unit.

⚠ CAUTION

DO NOT POWER THE ELECTRIC HEAT FROM THE OUTDOOR UNIT. FOLLOW THE APPROPRIATE WIRING SCHEMATIC FOUND IN THE ELECTRIC HEATER INSTRUCTIONS.

14.1. Connecting line voltage

Make sure power supply is off.

The unit should be installed by a licensed contractor/electrician. If required by applicable national, state, and local codes, a disconnect switch will need to be installed when the indoor unit is powered from the outdoor unit.

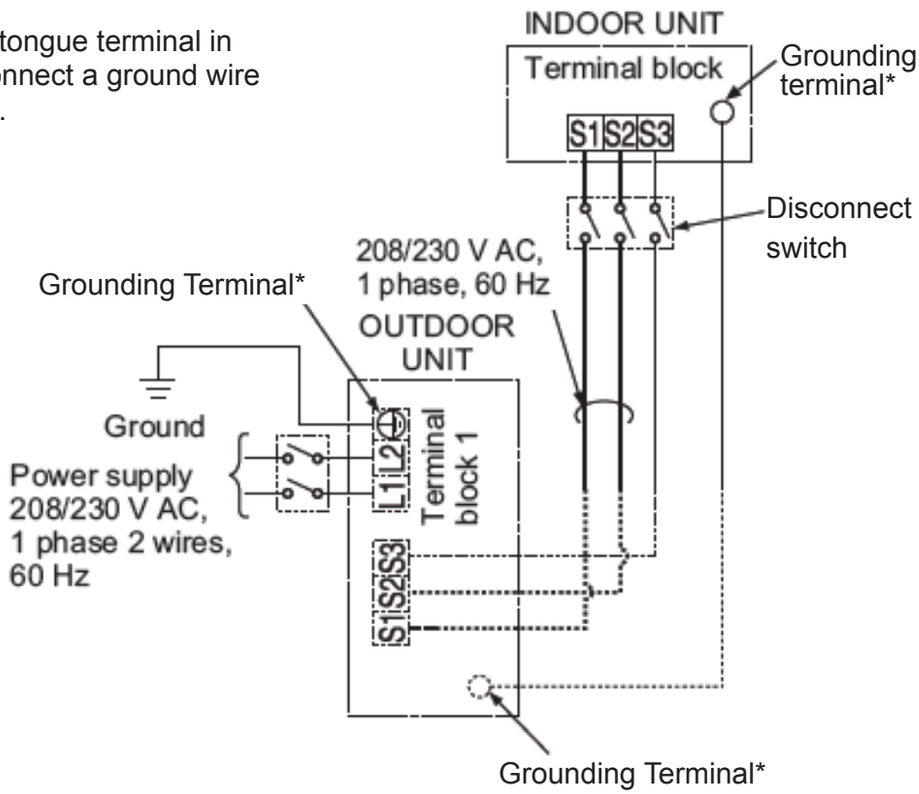
NOTE

If the air handler will be installed with electric heat package do not power the electric heat from the outdoor unit.

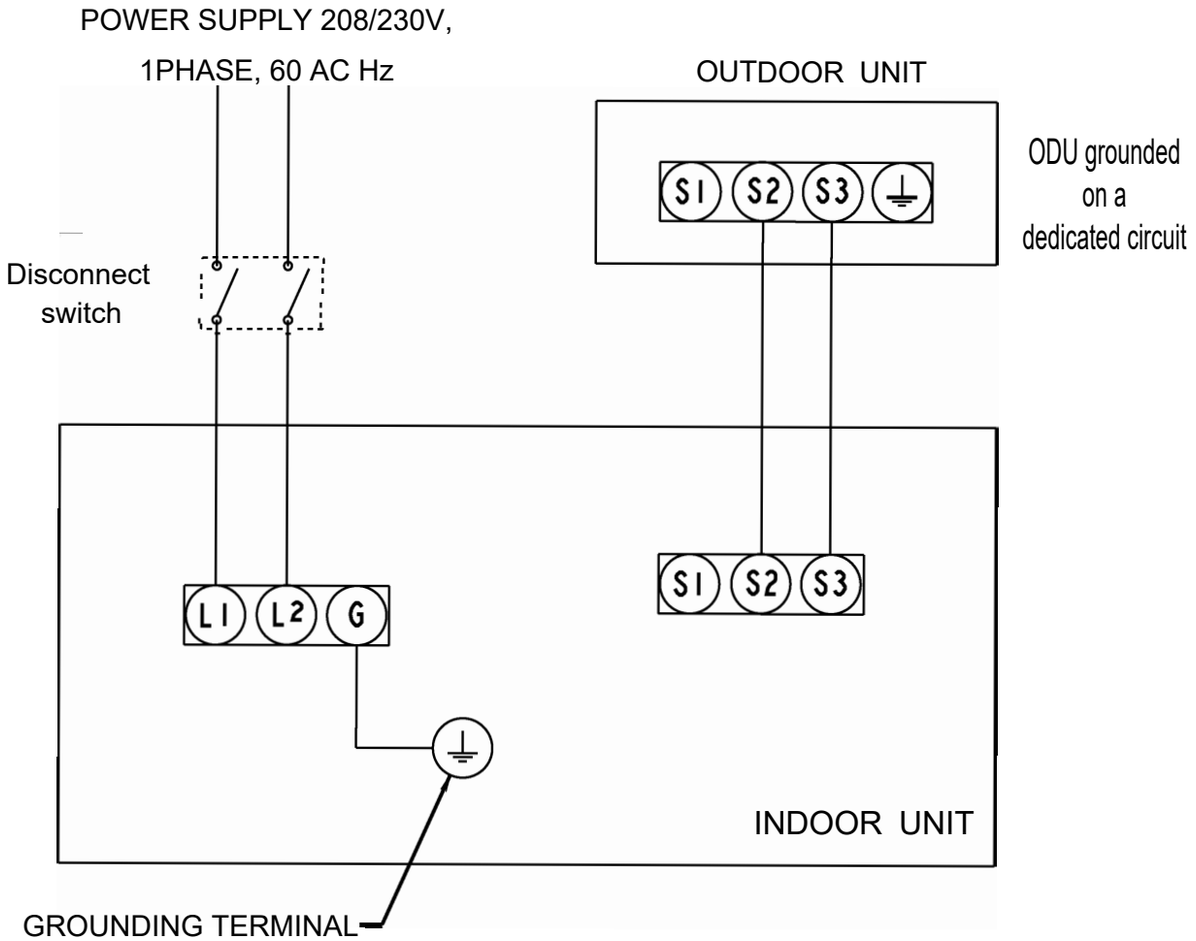
All wiring must conform to national and local codes.

5TEM9C02AC21SA, 5TEM9D04AC31SA

Remark:
* Use a ring tongue terminal in order to connect a ground wire to terminal.



5TEM9D06AC31SA, 5TEM9D07AC41SA



1. Remove the desired knockout on the air handler.
2. Attach a conduit pipe connector to the air handler and route the wiring as shown in the above diagram. Ensure conduit connection hole is air tight and add a sealant if necessary.
3. Firmly tighten all of the terminal screws. After tightening, verify that the wires are tightly fastened.

14.1.1. Electrical characteristics, function table

Model code	Indoor Unit				IFM	
	Hz	Volts	Voltage Range	MCA (A)	Output (kW)	FLA (A)
5TEM9C02AC21SA	60	208 / 230	188 to 253	4.13/4.13	0.244	3.3
5TEM9D04AC31SA				5.5/5.5	0.430	4.4
5TEM9D06AC31SA				5.63/5.63		4.5
5TEM9D07AC41SA				9.3	.75	7.4

MCA: Max. Circuit Amps (= 1.25 × FLA) Output: Fan motor rated output IFM: Indoor Fan Motor FLA: Full Load Amps

Function table

Mode	Settings	Mode (function) No.	Setting no.	Default setting
Power failure auto restart	Not available	01	1	1
	Available		2	
Indoor temperature detect	Indoor unit operating average	02	1	1
	Indoor unit's internal sensor		2	
	Remote controller's internal sensor		3	
LOSSNAY connectivity	Not supported	03	1	1
	Supported (indoor unit **is not** equipped with outdoor air intake)		2	
	Supported (indoor unit **is** equipped with outdoor air intake)		3	
Power voltage	240V (230V)	04	1	1
	220V (208V)		2	
Filter sign	100 Hr	07	1	3
	2500 Hr		2	
	No filter sign indicator		3	
External static pressure	See section 14.4 of the installation manual	08	1	2
			2	
			3	
		10	1	1
			2	
Heater control	Heater not present	11	1	1
	Heater present[a.]		2	
Humidifier	Humidifier not present	13	1	1
	Humidifier present		2	
Humidifier control	Heat mode & Thermo ON	16	1	1
	Heat mode		2	
Defrost on/off cycle settings [b.]	Standard	17	1	1
	High for humid winter climates		2	
Heater control **defrost and error**	Disable heater during defrost and error	23	1	1
	Enable heater and fan during defrost and error [c.]		2	
Fan speed thermo off (**heating**)	Extra low	25	1	1
	Stop		2	
	RC Setting		3	
Fan speed thermo off (**cooling**)	RC setting	27	1	1
	Stop		2	

[a.] While the heater is on, the fan will operate at high speed regardless of the fan setting on the remote controller.

[b.] Only operational with 5HPL9/5HCL9

[c.] The heater will not operate if the following errors are active. In these cases, the error must be corrected, and the system restarted in order to recover heater function:

- Remote controller communication error (E4, E5)
- M-NET communication error (A0-A8)
- Air intake sensor error (P1)

Installers are strongly advised never to physically uninstall a wired controller while the system is running. In addition to the safety concerns, this practice can also trigger a remote controller communication error.

IMPORTANT

If the system detects an error that could potentially create a safety hazard, the heater will not operate.

CAUTION

If a heater is installed in a duct, do not use Panel Heater Connector. By doing so, the fan will turn off when the heater is on, which may result in fire.

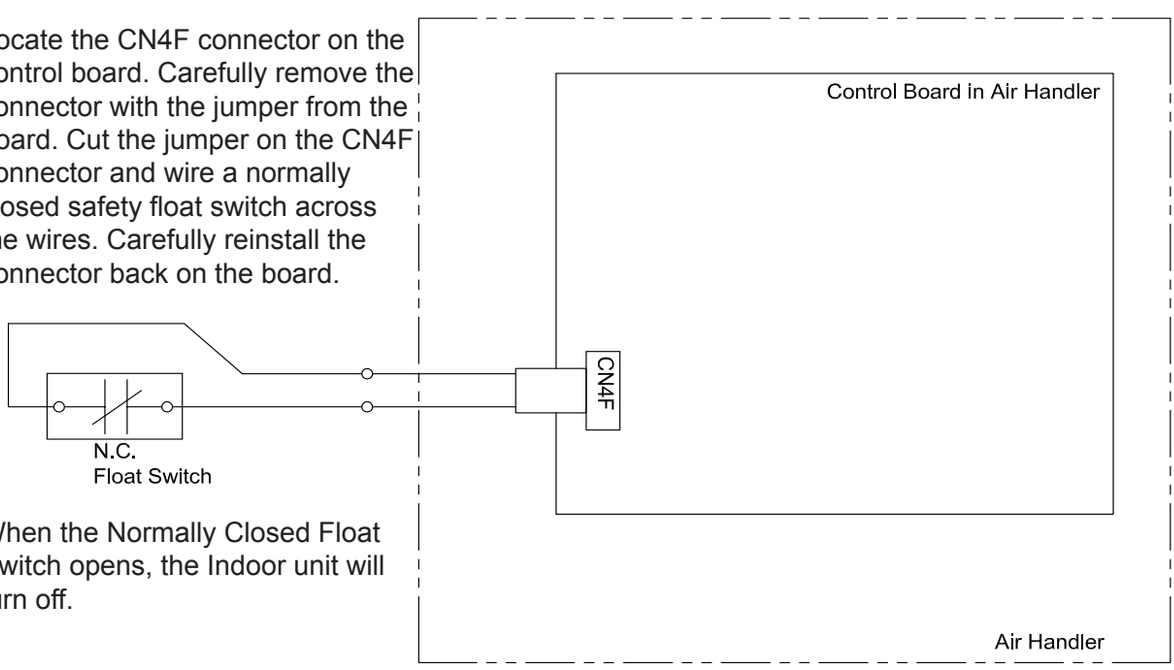
NOTE

When using the SPTB1 accessory, take special care when restarting power to the system to ensure that both the indoor unit and outdoor unit are powered up at the same time to avoid triggering a communication error.

14.2. Condensate overflow safety switch connection (CN4F)

The circuit board is equipped with a connection to attach a condensate safety float switch. The switch should be a normally closed low voltage rated switch. The switch should be installed in a location that it can sense a drain blockage causing a rise in water level. This resulting rise in level will cause it to open. The switch location is to be determined by the installing contractor. When the switch opens, it will cause the LEV to close, stopping the cooling operation. The fan will continue to run and a fault code will be shown at the controller. Correcting the problem and closing the switch will be required before normal operation can resume. See installation below:

Locate the CN4F connector on the control board. Carefully remove the connector with the jumper from the board. Cut the jumper on the CN4F connector and wire a normally closed safety float switch across the wires. Carefully reinstall the connector back on the board.



When the Normally Closed Float Switch opens, the Indoor unit will turn off.

14.3. Changing blower external static pressure

The air handler is equipped with an adjustable static pressure setting. The available settings are shown in the table below.

Model code	Available ESP [in. WG]		
5TEM9	0.30	0.50[a.]	0.80

[a.] The air handler will be set to 0.50 ESP from the factory.

The air handler's static pressure can be changed through the mode/function settings in the controller. Please refer to the installation manual for the controller on how to change this option. Depending on the controller used, the mode/function will be either 08 for mode in PAR & Simple MA type controllers or 108 for function in MHK type controllers. Please notice there are different settings when installing the air handler in the downflow position.

Table 2. Vertical, Horizontal Left, Horizontal Right External Static Pressure Setting

External Static Pressure	Setting No. Mode/Function 08	Setting No. Mode/Function 10[a.]
0.3 in. WG [75Pa]	1	1
0.5 in. WG [125Pa][a.]	2	1
0.8 in. WG [200Pa]	3	1

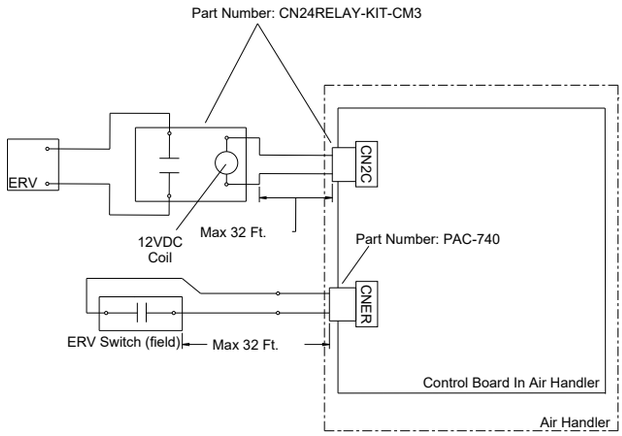
Table 3. Downflow External Static Pressure Setting

External Static Pressure	Setting No. Mode/Function 08	Setting No. Mode/Function 10
0.3 in. WG [75Pa]	1	2
0.5 in. WG [125Pa][a.]	2	2
0.8 in. WG [200Pa][b.]	3	2

[a.] Factory setting

[b.] 5TEM9D06AC31SA downflow external static pressure: 0.70

14.4. ERV (Energy Recovery Ventilation)



ERV Control

Sequence of operation:

1. The ERV demand switch closes CNER
2. 12 VDC is provided to CN2C to turn on ERV
3. If the unit goes into defrost, CN2C stops 12 VDC output

ERV Switch:

- Non-Voltage a-contact input
- Contact rating voltage >= 15 VDC
- Contact rating current >= 0.1 A
- Minimum applicable load <= 1mA at DC

ERV output CNER input	Function Mode 26	Condition	Fan speed	CN2C output (=Fan output)
OFF	-	Cool/Heat/Fan operation	RC[a.] setting	ON
		Defrost	STOP	OFF
		STOP	STOP	OFF
ON	1[b.]	Cool/Heat/Fan operation	RC setting	ON
		Defrost	STOP	OFF
		STOP	STOP	OFF
	2	Cool/Heat/Fan operation	RC setting	ON
		Defrost	STOP	OFF
		STOP	RC setting [c.,d.]	ON

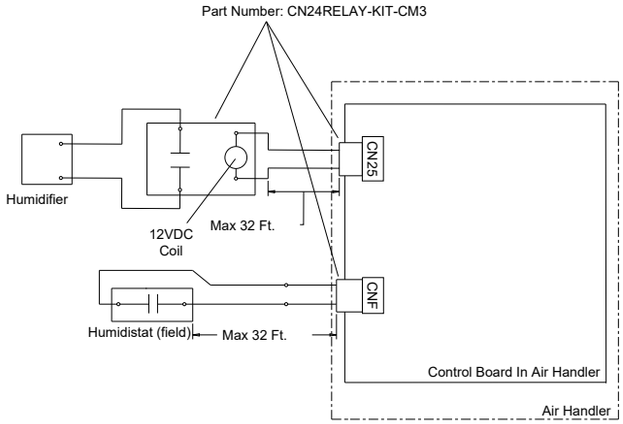
[a.] Remote controller

[b.] Factory setting

[c.] If ERV control is effective when STOP, IDU doesn't report fan status or PB error (Fan motor error).

[d.] When fan speed setting by RC is "Auto", Fan speed is fixed to "HIGH".

14.5. Humidifier



Humidifier Control (CN25 Output is ON)
Sequence of operation:

1. The humidistat closes CNF
2. The fan starts on high
3. CN25 provides 12VDC to turn on the Humidifier (do not exceed 1 Watt draw per relay)
4. When the Humidistat opens, the fan continues to run for 30 seconds to clear the ductwork of moist air
5. If defrost starts during humidifier operation, CN25 de-energizes

Humidistat:

- Non-Voltage a-contact input
- Contact rating voltage > = 15 VDC
- Contact Rating Current > = 0.1 A
- Minimum Applicable Load < = 1mA at DC

Mode (function) No.		Humidistat Output	Condition	CN25 Output	Fan Speed
13	**16**	**CNF Input**	**(No Defrost/No Error)**		
2	1[a.]	OFF	Heat operation & Thermo OFF	OFF	RC[b.] Setting
			Heat operation & Thermo ON		
		ON	Heat operation & Thermo OFF	OFF	RC Setting
			Heat operation & Thermo ON	ON	High
	2	OFF	Heat operation & Thermo OFF	OFF	RC Setting
			Heat operation & Thermo ON		
		ON	Heat operation & Thermo OFF	ON	High
			Heat operation & Thermo ON		
1[a.]	-	-	No humidifier operation	OFF	RC Setting
The fan continues to run for 30 seconds after the humidifier stops.					

CAUTION

If a heater is installed in a duct, do no use Panel Heater Connector. By doing so, the fan will turn off when the heater is on, which may result in fire.

NOTE

When using the SPTB1 accessory, take special care when restarting power to the system to ensure that both the indoor unit and outdoor unit are powered up at the same time to avoid triggering a communication error.

[a.] Factory setting

[b.] Remote controller

15. Test run

15.1. Before test run

After completing installation and the wiring and piping of the indoor and outdoor units, check for refrigerant leakage, looseness in the power supply or control wiring, wrong polarity, and no disconnection of one phase in the supply. Use a 500-volt megohmmeter to check that the resistance between the power supply terminals and ground is at least 1.0 MΩ.

Do not carry out this test on the control wiring (low voltage circuit) terminals.

WARNING

Do not use the air conditioner if the insulation resistance is less than 1.0 MΩ.

After installation or after the power source to the unit has been cut for an extended period, the insulation resistance will drop below 1 MΩ due to refrigerant accumulating in the compressor. This is not a malfunction. Perform the following procedures.

1. Remove the wires from the compressor and measure the insulation resistance of the compressor.
2. If the insulation resistance is below 1 MΩ, the compressor is faulty or the resistance dropped due to the accumulation of refrigerant in the compressor.
3. After connecting the wires to the compressor, the compressor will start to warm up after power is supplied. After supplying power for the times indicated below, measure the insulation resistance again.
   - The insulation resistance drops due to accumulation of refrigerant in the compressor. The resistance will rise above 1 MΩ after the compressor is warmed up for two to three hours.
     (The time necessary to warm up the compressor varies according to atmospheric conditions and refrigerant accumulation.)
   - To operate the compressor with refrigerant accumulated in the compressor, the compressor must be warmed up at least 12 hours to prevent breakdown.
4. If the insulation resistance rises above 1 MΩ, the compressor is not faulty.

CAUTION

- The compressor will not operate unless the power supply phase connection is correct.
- Turn on the power at least 12 hours before starting operation.
  – Starting operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.

15.2. Test run

Refer to the installation manual that comes with each remote controller for details.

15.3. Self-check

Refer to the installation manual that comes with each remote controller for details.

Remote controller	[Output pattern A] Errors detected by indoor unit
Check code on the LCD	**Symptom**
P1	Intake sensor error
P2 / P9	Pipe (liquid or 2-phase pipe) sensor error
E6 / E7	Indoor / outdoor unit communication error
P4	Float switch connector open error
P5	Drain pump error
P6	Freezing / overheating safeguard operation
EE	Communication error between indoor and outdoor units
P8	Pipe temperature error
E4, E5	Remote controller signal communication error
PB	Fan motor error
Fb	Indoor unit control system error (memory error, etc.)
FL	Refrigerant leak detected
FH	Refrigerant leak sensor error[a.]
PL	Refrigerant circuit abnormal
E0, E3	(NO sound) Remote controller transmission error
E1, E2	(NO sound) Remote controller control board error

[a.]The refrigerant leak sensor is not properly connected OR replacement of refrigerant leak sensor is required due to end of life or failure. See the sub-section *Service note: servicing and replacing the refrigerant leak sensor* found in chapter *Mount positions* for basic information about the refrigerant leak sensor location and replacement. A complete procedure can be found in the Indoor Unit service manual.

Remote controller	[Output pattern B] Errors detected by unit other than indoor unit (outdoor unit, etc.)
Check code on the LCD	**Symptom**
E9	Indoor/outdoor unit communication error (transmitting error) (outdoor unit)
UP	Compressor overcurrent interruption
U3 / U4	Open/short of outdoor unit thermistors
UF	Compressor overcurrent interruption (when compressor locked)
U2	Abnormal high discharging temperature / 49C worked / insufficient refrigerant
U1 / Ud	Abnormal high pressure (63H worked) / overheating safeguard operation
U5	Abnormal temperature of heat sink
U8	Outdoor unit fan protection stop
U6	Compressor overcurrent interruption / abnormal of power module
U7	Abnormality of super heat due to low discharge temperature
U9 / UH	Abnormality such as overvoltage, voltage shortage, abnormal and synchronous signal to main circuit / current sensor error
FL	Refrigerant leakage or Refrigerant leak sensor error caused by other rooms
Others	Other errors (refer to the technical manual for the outdoor unit)

If the unit cannot be operated properly after the above test run has been performed, use this table to remove the cause:			
Symptom			**Cause**
Remote controller		**LED 1, 2 (PCB in outdoor unit)**	
PLEASE WAIT	For about 2 minutes following power-on	After LED 1, 2 are lit → LED 2 is turned off Only LED 1 is lit (correct operation)	• For about 2 minutes after power-on, operation of the remote controller is not possible due to system start-up. (correct operation)
PLEASE WAIT → Error code	After about 2 minutes has expired following power-on	Only LED 1 is lit → LED 1, 2 blink.	• Connector for the outdoor unit's protection device is not connected. • Reverse or open phase wiring for the outdoor unit's power terminal block (L1, L2, L3)
Display messages do not appear even when operation switch is turned ON (operation lamp does not light up).		Only LED 1 is lit → LED 1, 2 blinks twice LED 2 blinks once	• Incorrect wiring between indoor and outdoor units (incorrect polarity of S1, S2, S3) • Remote controller wire short
Operation is not possible for about 30 seconds after cancellation of function selection. (correct operation)			

Description of LED 1, 2, and 3 on the indoor controller	
LED 1: power for microcomputer	Indicates whether control power is supplied. Make sure that this LED is always lit.
LED 2: power for remote controller	Indicates whether power is supplied to the remote controller. This LED lights only in the case of the indoor unit which is connected to the outdoor unit refrigerant address "0".
LED 3: communication between indoor and outdoor units	Indicates state of communication between the indoor and outdoor units. Make sure that this LED is always blinking.

15.4. Auto restart function

Indoor unit control board

This model is equipped with the AUTO RESTART FUNCTION.

When the indoor unit is controlled with the remote controller, the operation mode, set temperature, and the fan speed are memorized by the indoor unit control board.

The AUTO RESTART FUNCTION will restart the unit within a time delay of 5 to 10 minutes after power is restored.

Set the AUTO RESTART FUNCTION using the remote controller. (Mode no. 01)

16. Appendix A - Minimum area requirement table

IMPORTANT

This quick reference worksheet must be used in conjunction with Installation manual instructions regarding minimum room area calculation. All safety precautions and instructions must be followed as stated in the Installation manual.

1. What is the factory refrigerant pre-charge of the outdoor unit (ODU)?

   TIP

   The factory refrigerant pre-charge of the ODU can be found on it's nameplate.

   - **Factory pre-charge = _____lb or kg** (circle one)
2. Will there be an additional refrigerant line set beyond the limit of the factory refrigerant pre-charge?
   - **Additional charge = _____lb or kg** (circle one)
3. Take the values from **Step. 1** and **Step. 2**and use the following equation to find the Total planned system charge.
   - **Total planned system charge (m_c) = Factory (Step. 1) + Additional (Step. 2) = _____lb or kg** (circle one)
4. Is the installation space a conditioned space as defined in the installation manual? **YES** or **NO** (circle one)

   - If **Yes** – **Use Case D**. This is the easiest and least restrictive case.
   - Then, **Skip to step 6**. In this case only: **$TA_{min} = A_{min}$**

   - If **No** – Continue to the next step.
5. What is the planned installation height of the indoor unit (IDU), measure from floor to lowest downward facing surface of the IDU?
   - **Installation height (h_0) = _____ ft or m** (circle one)

h_0 - (ft, in.)	h_0 - (m)	Use Case:	Mark correct Case with an 'X'
Lower than 3 ft. 3 3/8 in.	Lower than 1 m	C	
3 ft. 3 3/8 in. to 7 ft 2 5/8 in.	1 m to 2.2 m	B	
Higher than 7ft. 2 5/8 in.	Higher than 2.2 m	A	

6. Use the **Minimum area requirement table,** on the following pages, to determine the correct values for A_{min} and TA_{min}.
   a. In the left most column, find the correct or nearest value for m_c (calculated Step. 2), mark this row with an *.
   b. In the top row, find the column that describes the correct Case (chosen in Step. 4) and the ODU installed, mark this column with an *.
   c. Find the intersection of the marked row and column. Circle the correct values for A_{min} and TA_{min}.
   d. Write the required minimum room area below:

- Minimum room area for installation room
  A_{min} = _____ft^2 or m^2 (circle one)
- Minimum conditioned space area
  TA_{min} = _____ft^2 or m^2 (circle one)

7. Now, find the total areas of each Zone (as defined in the installation manual) and add the room areas together to find the total **TA_{min}** for each zone.

Zone 1		Zone 2		Zone 3		Zone 4	
Room	Area	Room	Area	Room	Area	Room	Area
Zone 1 TA_{min} total		**Zone 2 TA_{min} total**		**Zone 3 TA_{min} total**		**Zone 4 TA_{min} total**	

8. Answer questions **a. - d.** below to verify that room requirements are met.
   a. Does the combined area of each Zone meet or exceed **TA_{min}** as defined in Step. 6d?
      - **Yes** or **No** (circle one)
   b. Does the combined area of the installation room and adjacent connected rooms meet or exceed **A_{min}**?
      - **Yes** or **No** (circle one)
   c. If **A and B** are **YES**, then proceed with installation.
   d. If **A and/or B** are **NO**, then additional area, ventilation, or installation height required.

Table 4. Minimum room area table

Planned System Charge	Case A		Case B	
mc kg [lbs]	Amin 5HPL9/5HCL9/5HPL6/5HCL6 m^2 [ft^2]	TAmin 5HPL9/5HCL9/5HPL6/5HCL6 m^2 [ft^2]	Amin 5HPL9/5HCL9/5HPL6/5HCL6 m^2 [ft^2]	TAmin 5HPL9/5HCL9/5HPL6/5HCL6 m^2 [ft^2]
0.9 [1.9]	2.8 [30.2]	9 [96.9]	6.1 [65.7]	9 [96.9]
1 [2.2]	3.1 [33.4]	9 [96.9]	6.8 [73.2]	9 [96.9]
1.5 [3.3]	4.7 [50.6]	9 [96.9]	10.2 [109.8]	9 [96.9]
2 [4.4]	6.2 [66.8]	9 [96.9]	13.6 [146.4]	9 [96.9]
2.5 [5.5]	7.7 [82.9]	9 [96.9]	16.9 [182]	9 [96.9]
3 [6.6]	9.3 [100.2]	9.3 [100.2]	20.3 [218.6]	9.3 [100.2]
3.5 [7.7]	10.8 [116.3]	10.8 [116.3]	23.7 [255.2]	10.8 [116.3]
4 [8.8]	12.3 [132.4]	12.3 [132.4]	27.1 [291.8]	12.3 [132.4]
4.5 [9.9]	13.9 [149.7]	13.9 [149.7]	30.5 [328.3]	13.9 [149.7]
5 [11]	15.4 [165.8]	15.4 [165.8]	33.8 [363.9]	15.4 [165.8]
5.5 [12.1]	16.9 [182]	16.9 [182]	37.2 [400.5]	16.9 [182]
6 [13.4]	18.5 [199.2]	18.5 [199.2]	40.6 [437.1]	18.5 [199.2]
6.5 [14.5]	20 [215.3]	20 [215.3]	44 [473.7]	20 [215.3]
7 [15.6]	21.5 [231.5]	21.5 [231.5]	47.3 [509.2]	21.5 [231.5]
7.5 [16.7]	23.1 [248.7]	23.1 [248.7]	50.7 [545.8]	23.1 [248.7]
8 [17.8]	24.6 [264.8]	24.6 [264.8]	54.1 [582.4]	24.6 [264.8]
8.5 [18.9]	26.2 [282.1]	26.2 [282.1]	57.5 [619]	26.2 [282.1]
9 [20]	27.7 [298.2]	27.7 [298.2]	60.9 [655.6]	27.7 [298.2]
9.5 [21.1]	29.2 [314.4]	29.2 [314.4]	64.2 [691.1]	29.2 [314.4]
10 [22.1]	30.8 [331.6]	30.8 [331.6]	67.6 [727.7]	30.8 [331.6]
10.5 [23.1]	32.3 [347.7]	32.3 [347.7]	71 [764.3]	32.3 [347.7]
11 [24.2]	33.8 [363.9]	33.8 [363.9]	74.4 [800.9]	33.8 [363.9]
11.5 [25.3]	35.4 [381.1]	35.4 [381.1]	77.8 [837.5]	35.4 [381.1]
12 [26.4]	36.9 [397.2]	36.9 [397.2]	81.1 [873]	36.9 [397.2]
12.5 [27.5]	38.4 [413.4]	38.4 [413.4]	84.5 [909.6]	38.4 [413.4]
13 [28.6]	40 [430.6]	40 [430.6]	87.9 [946.2]	40 [430.6]
13.5 [29.7]	41.5 [446.8]	41.5 [446.8]	91.3 [982.8]	41.5 [446.8]
14 [30.8]	43 [462.9]	43 [462.9]	94.6 [1018.3]	43 [462.9]
14.4 [31.7]	44.3 [476.9]	44.3 [476.9]	97.3 [1047.4]	44.3 [476.9]

Planned System Charge	Case C		Case D Amin = TAmin	
mc kg [lbs]	Amin 5HPL9/5HCL9/5HPL6/5HCL6 m2 [ft2]	TAmin 5HPL9/5HCL9/5HPL6/5HCL6 m2 [ft2]	Amin 5HPL9/5HCL9/5HPL6/5HCL6 m2 [ft2]	TAmin 5HPL9/5HCL9/5HPL6/5HCL6 m2 [ft2]
0.9 [1.9]	10.2 [109.8]	9 [96.9]	9 [96.9]	9 [96.9]
1 [2.2]	11.3 [121.7]	9 [96.9]	9 [96.9]	9 [96.9]
1.5 [3.3]	16.9 [182]	9 [96.9]	9 [96.9]	9 [96.9]
2 [4.4]	22.6 [243.3]	9 [96.9]	9 [96.9]	9 [96.9]
2.5 [5.5]	28.2 [303.6]	9 [96.9]	9 [96.9]	9 [96.9]
3 [6.6]	33.8 [363.9]	9.3 [100.2]	9.3 [100.2]	9.3 [100.2]
3.5 [7.7]	39.5 [425.2]	10.8 [116.3]	10.8 [116.3]	10.8 [116.3]
4 [8.8]	45.1 [485.5]	12.3 [132.4]	12.3 [132.4]	12.3 [132.4]
4.5 [9.9]	50.7 [545.8]	13.9 [149.7]	13.9 [149.7]	13.9 [149.7]
5 [11]	56.4 [607.1]	15.4 [165.8]	15.4 [165.8]	15.4 [165.8]
5.5 [12.1]	62 [667.4]	16.9 [182]	16.9 [182]	16.9 [182]
6 [13.4]	67.6 [727.7]	18.5 [199.2]	18.5 [199.2]	18.5 [199.2]
6.5 [14.5]	73.2 [788]	20 [215.3]	20 [215.3]	20 [215.3]
7 [15.6]	78.9 [849.3]	21.5 [231.5]	21.5 [231.5]	21.5 [231.5]
7.5 [16.7]	84.5 [909.6]	23.1 [248.7]	23.1 [248.7]	23.1 [248.7]
8 [17.8]	90.1 [969.9]	24.6 [264.8]	24.6 [264.8]	24.6 [264.8]
8.5 [18.9]	95.8 [1031.2]	26.2 [282.1]	26.2 [282.1]	26.2 [282.1]
9 [20]	101.4 [1091.5]	27.7 [298.2]	27.7 [298.2]	27.7 [298.2]
9.5 [21.1]	107 [1151.8]	29.2 [314.4]	29.2 [314.4]	29.2 [314.4]
10 [22.1]	112.7 [1213.1]	30.8 [331.6]	30.8 [331.6]	30.8 [331.6]
10.5 [23.1]	118.3 [1273.4]	32.3 [347.7]	32.3 [347.7]	32.3 [347.7]
11 [24.2]	123.9 [1333.7]	33.8 [363.9]	33.8 [363.9]	33.8 [363.9]
11.5 [25.3]	129.6 [1395.1]	35.4 [381.1]	35.4 [381.1]	35.4 [381.1]
12 [26.4]	135.2 [1455.3]	36.9 [397.2]	36.9 [397.2]	36.9 [397.2]
12.5 [27.5]	140.8 [1515.6]	38.4 [413.4]	38.4 [413.4]	38.4 [413.4]
13 [28.6]	146.4 [1575.9]	40 [430.6]	40 [430.6]	40 [430.6]
13.5 [29.7]	152.1 [1637.2]	41.5 [446.8]	41.5 [446.8]	41.5 [446.8]
14 [30.8]	157.7 [1697.5]	43 [462.9]	43 [462.9]	43 [462.9]
14.4 [31.7]	162.2 [1746]	44.3 [476.9]	44.3 [476.9]	44.3 [476.9]

17. Appendix B - High altitude applications - capacity reduction factors

Capacity reduction

When air conditioners and heat pumps are installed in areas above sea level, operating capacity is reduced due to decreased air density. Because of this, equipment size may need to be increased to meet the load requirements. The following correction factors apply to 5TEM9/7 Series air conditioners and heat pumps for both heating and cooling operation. The indoor and outdoor units need to be sized based on the capacity reduction due to the increased air density.

Altitude ft (m)	Indoor unit correction factor	Outdoor unit correction factor
0	1.00	1.00
1,000	0.96	0.99
2,000	0.93	0.98
3,000	0.90	0.98
4,000	0.86	0.97
5,000	0.83	0.96
6,000	0.80	0.95
7,000	0.77	0.94
8,000	0.74	0.94
9,000	0.71	0.93
10,000	0.69	0.92

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