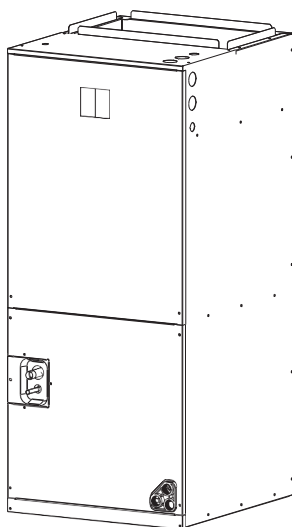




Installer's Guide

Indoor Unit



Split System Cooling Only & Heat Pump
Up to 20 SEER2
Air Handler 2 - 5 Tons
R454B

NOTE: Appearance of unit may vary.

GAV24B2A
GAV36B2A
GAV48B2A
GAV60B2A



ALL phases of this installation must comply with NATIONAL, STATE AND LOCAL CODES

IMPORTANT — This Document is customer property and is to remain with this unit. Please return to service information pack upon completion of work.

These instructions do not cover all variations in systems or provide for every possible contingency to be met in connection with the installation. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to your installing dealer or local distributor.

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

NOMENCLATURE

	G	A	V	36	B	2	A	
	1	2	3	4	5	6	7	
Series	GT4							
Unit Type	Air Handler							Version
Feature	Variable Speed							Electrical
V						208/230V, 1PH, 2 60Hz		
Nominal Capacity								Refrigerant
24	24K BTU					B		R454B
36	36K BTU					X		R32
48	48K BTU							
60	60K BTU							

FOR UP TO DATE INFORMATION SUCH AS SPECIFICATIONS, CATALOGS, AND BULLETINS, PLEASE SCAN BELOW OR VISIT INNOVAIR.COM



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1. Symbol and Key to Safety Instructions

1.1 Symbol Keywords



WARNING

The warnings in this document are identified by warning triangles printed on a black background. The keyword at the beginning of the warning indicates the type and severity of the risk if no measures are taken to prevent it.

The following keywords are defined and used in this document:



Dangerous

Means a hazardous situation, which, if not avoided, will lead to death or serious injury.



Warnin

Indicates a hazardous situation, which may lead to death or serious injury if not avoided.



Caution

Indicates a hazardous situation, which may cause mild to moderate injury if not avoided.



Note

Used to deal with behaviors unrelated to personal injury.

Important Information



This symbol represents important information that is not harmful to people or property.

1.2 Safety

Please Read Before Continuing.

Warning:



- The unit must be installed by qualified personnel with a capability certificated for handling R454B refrigerant. Refer to regulation and laws in use on installation location.
- This 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.
- The appliance shall be installed in accordance with national wiring regulations.
- Children should be supervised to ensure that they do not play with the appliance.
- The minimum clearance to combustible surfaces (curtains,blinds,etc.) from the appliance should be 300 mm.
- Leak detection system installed. Unit must be powered except for service
- Before accessing the connection terminals, all power circuits must be disconnected.
- Please read these instructions carefully before attempting to install or operate. Failure to follow these instructions may result in incorrect installation, adjustment, repair or maintenance, which may result in fire, electric shock, property damage, personal injury or death.
- Installation, service, maintenance and repair of this unit must be performed by a certified technician.
- Servicing shall be performed only as recommended by the manufacturer.
- Product uninstallation and recycling must be performed by a certified technician.
- keep any required ventilation openings clear of obstruction;
- The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation
- The appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) and ignition sources (for example an operating electric heater)

QUALIFICATION OF WORKERS

The installation and servicing of this equipment must be performed by qualified, experienced technicians only. Professional installation personnel should have the following experience:

- Installing the electric heater
- Opening of sealed components
- Opening of ventilated enclosures
- Commissioning and troubleshooting
- Checking the electric control part and wiring
- Breaking into the refrigerant circuit and charging

This document is property of customer and should be kept together with this equipment.



These instructions do not cover all the different variations of the system, nor do they provide all the unexpected situations that may be encountered during the installation process.



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

Warning: Fire, electric shock, property damage, personal injury or death



- The whole installation process must comply with NATIONAL, STATE AND LOCAL CODES. If you need more information, please contact your local dealer.
 - Dispose of properly in accordance with federal or local regulations. Flammable refrigerant used.
 - Risk of fire due to flammable refrigerant used. Follow handling instructions carefully in compliance with national regulations
-

Warning: Risk of electric shock



- Can cause injury or death. disconnect all remote electric power supplies before servicing. More than one disconnect switch may be required to cut off the power of the equipment. Dangerous voltage can cause serious personal injury or death.
-

Warning: Electric shock



- If the fan assembly needs to be dismantled, all disconnect switches supplying power to the equipment must be powered off and locked (if the device cannot be seen), so that the field power cord can be safely dismantled from the fan assembly. Otherwise, it may cause electric shock, personal injury or death.
-

Warning: Fire, electric shock, property damage, personal injury or death







- Flammable refrigerant used. Consult repair manual/owner's guide before attempting to service this product. All safety precautions must be followed.
 - Due to possible equipment damage or personal injury, installation, repair and maintenance should be carried out by trained qualified maintenance personnel. Consumers are advised to only clean/replace the filter screen. Do not operate the equipment with the access panel removed.
-

Warning:



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

 A2L	WARNING	This symbol is that this appliance uses a flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	CAUTION	This symbol means that the operation manual should be read carefully.
	CAUTION	This symbol means that a service personnel should be handling this equipment with reference to the installation manual.
	CAUTION	This symbol is available such as the operating manual or installation manual.

Warning:



- This product may expose you to chemicals including lead and lead components, which are known to cause cancer, birth defects or other reproductive harm in California. For more information, please visit www.P65Warnings.ca.gov.

Warning: Electric shock



- The device must be permanently grounded. Otherwise, it will cause electric shock, personal injury or death.

Note: Fire risk

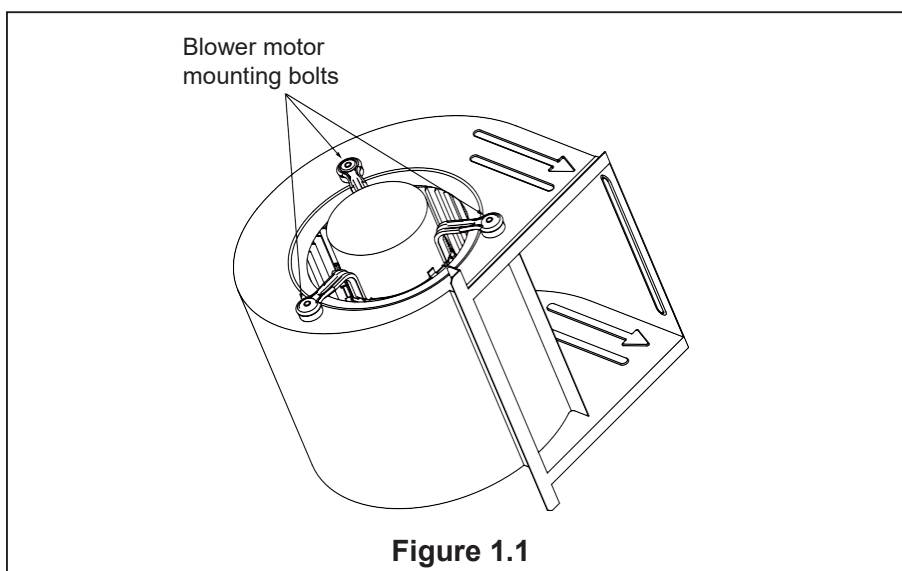


- The product is only used for one or two residences.
- The materials of pressure ventilation system and piping system must meet the latest NFPA 90B standard.

Note:



- Make sure the fan bracket is fastened (3 motor mounting bolts-Figure1). Then, before operating the device, checking whether the wheels are firmly fixed on the motor shaft.



1.3 Safety precautions for R454B refrigerant

1. Information on service

1.1 Checks of the area

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the REFRIGERATING SYSTEM.

1.2 Work procedure

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

1.3 General work area

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

1.4 Checking for presence of refrigerant

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

1.5 Presence of fire extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

1.6 No ignition sources

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

1.7 Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

1.8 Checks to the refrigerating equipment

Where electrical components are being replaced, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS: the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed.

- the ventilation machinery and outlets are operating adequately and are not obstructed.
- If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
- marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.

- refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any 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.

1.9 Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This should be reported to the owner of the equipment, so all parties are advised. Initial safety checks shall include:

- that capacitors are discharged: this shall be done in a safe manner to avoid the possibility of sparking.
- that no live electrical components and wiring are exposed while charging, recovering or purging the system.
- that there is continuity of earth bonding.

2. Repairs of sealed components

2.1 During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

2.2 Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, and the excessive number of con

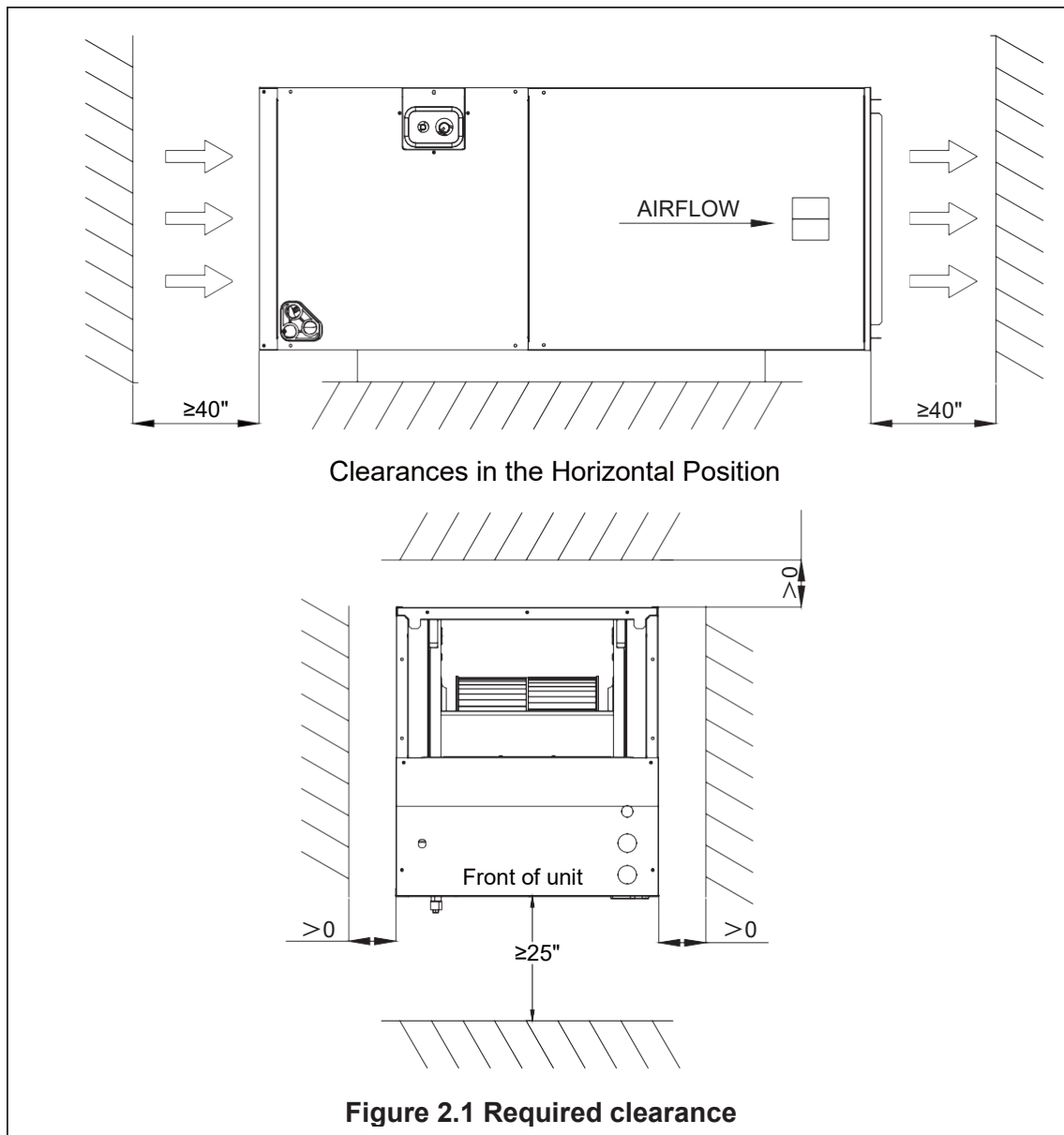
2. General

The device can return air at the bottom at the upward airflow position, return air from left to right at the horizontal position and return air at the top at the downward airflow position.

This air handler provides flexibility to be installed in any upward, downward or horizontal airflow application. According to the airflow performance table in Section 5, adjust the fan speed through the DIP switch (located on the control panel of the air handler) to select the correct air volume. Please refer to the wiring diagram of Dip switch settings.

Please refer to section 4 for high and low voltage wiring.

To ensure proper installation, please choose a firm and flat site. Make sure enough clearance is reserved for installation and maintenance.





Note:

- As shown in Figure 2.1, the installed device must have the required clearance. Failure to follow these instructions may result in equipment damage and/or premature equipment failure.



Warning: Fire risk

- Keep flammable materials and vapors (such as gasoline) away from air handlers. Failure to follow these instructions may result in death, explosion or fire.

2.1 Installation in High Humidity Environment

When the unit is installed in a hot and humid place, if the temperature in the installation space exceeds 86 °F and the RH (relative humidity) exceeds 80%, it is recommended to insulate the outside of the cabinet. Use glass wool or polyethylene foam as insulation material; The thickness should be greater than 2 inches, and it must be suitable for the installation space opening.

Condensates may also be produced on the insulation surface. Ensure that insulation materials designed for HVAC systems are used. In the process of refrigeration, condensates may be produced on the surface. It is also recommended to use an auxiliary drain pan and fix the equipment firmly to prevent it from falling. See Figure 2.2, 2.3, 2.4 and 2.5.



For the use of auxiliary drainage tray, please refer to local regulations.

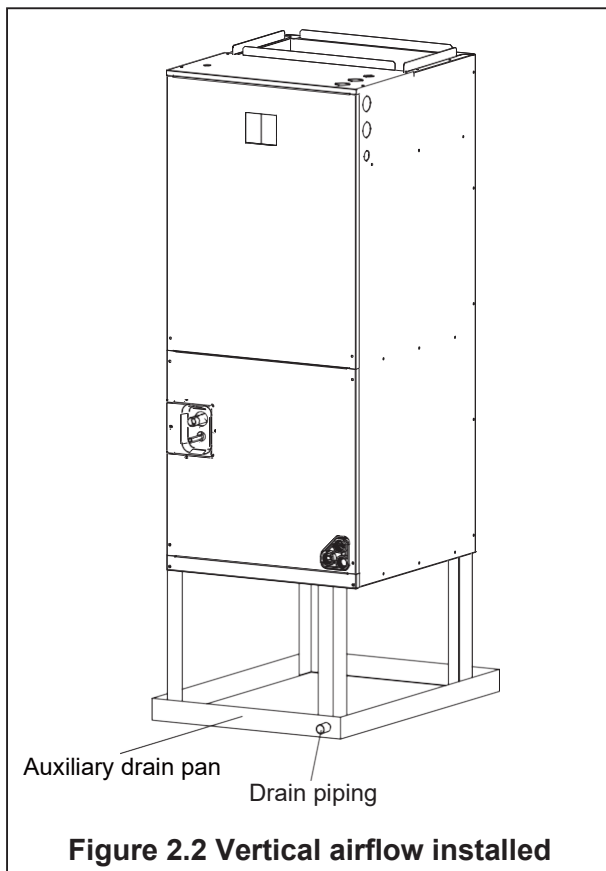


Figure 2.2 Vertical airflow installed

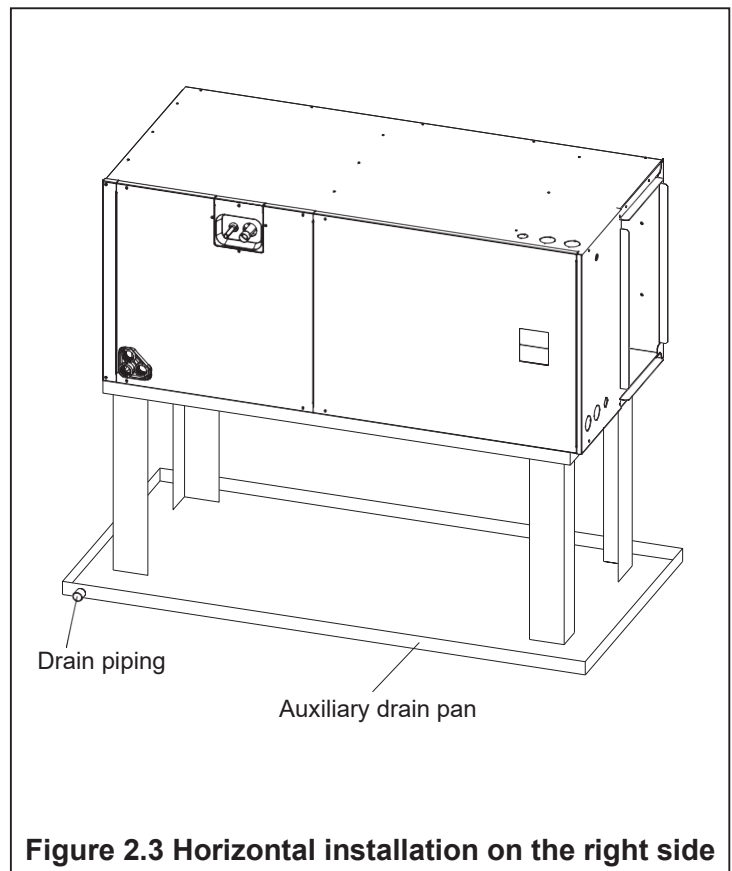
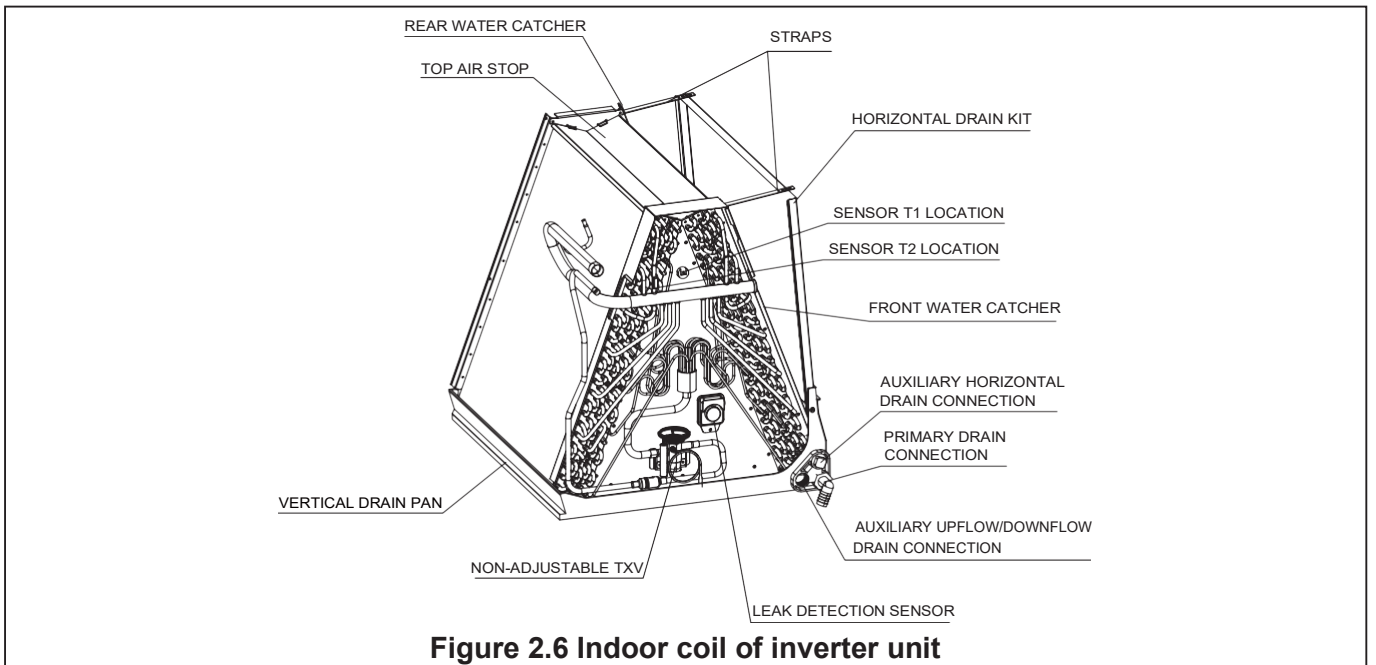
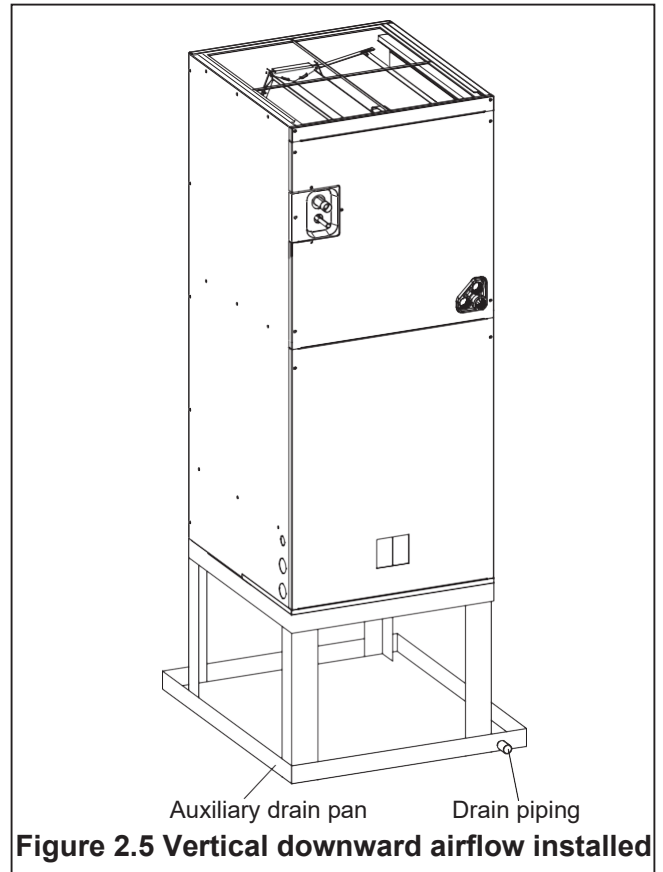
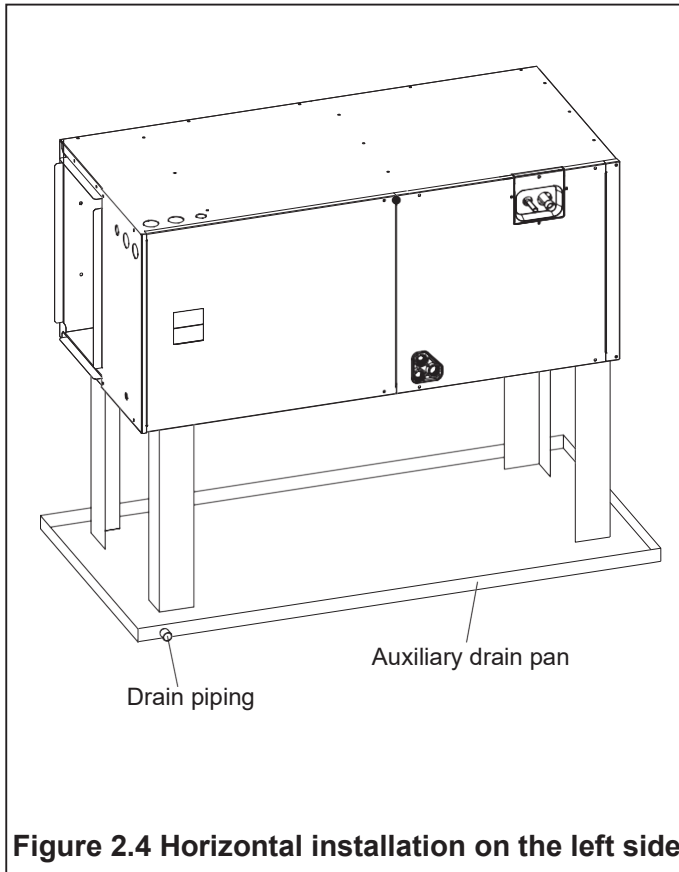


Figure 2.3 Horizontal installation on the right side



2.2 Unit Dimension



The front of the unit requires a clearance of 25 inches for the maintenance of filters and coils.

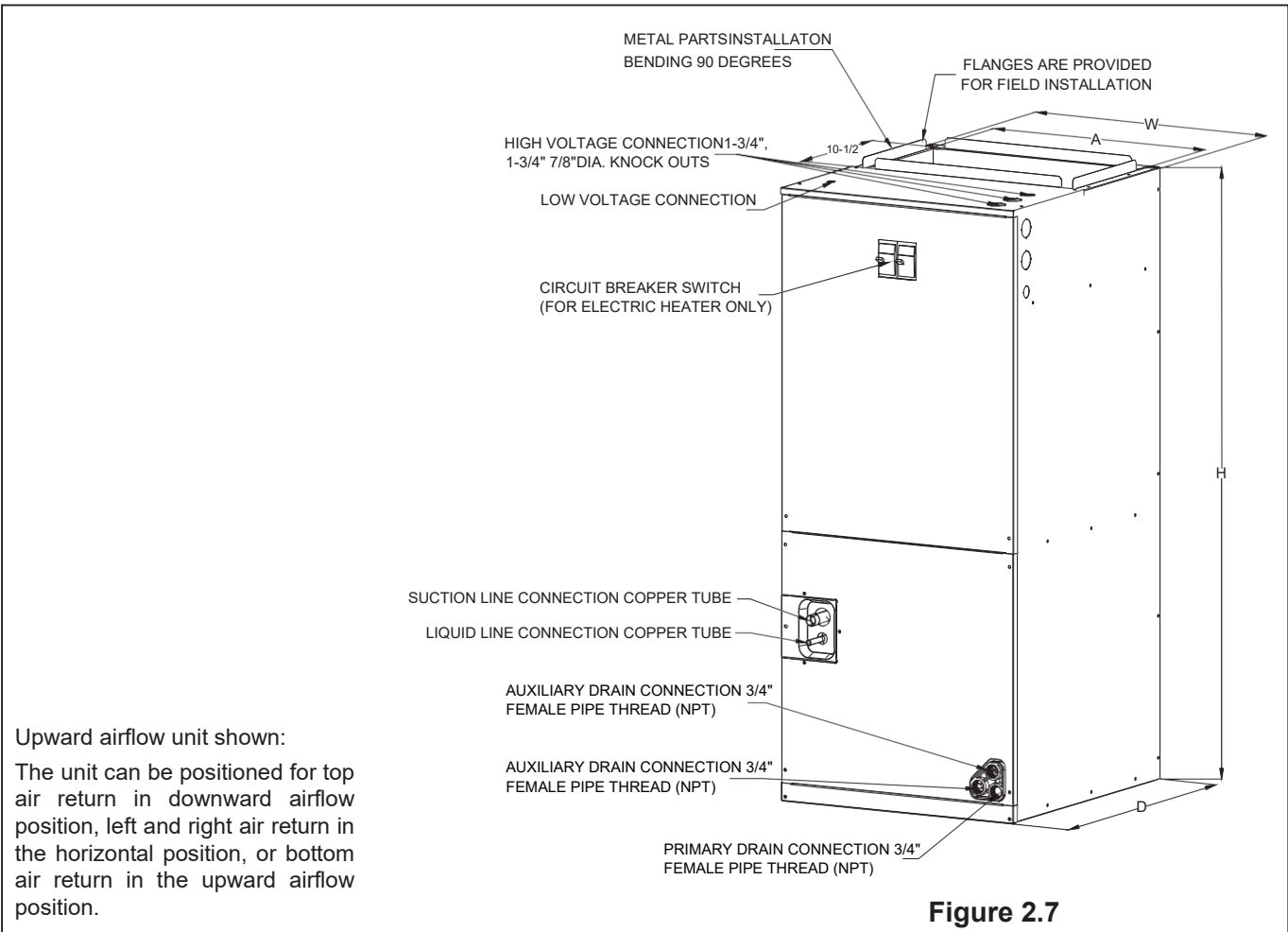


Table 2.1 Unit Dimension

Model	Dimension Inches [mm]				
	Height "H"	Width "W"	Dimension "D"	Air outlet "A"	Liquid Line / Suction Line
24K	45-3/4 [1162]	19-5/8 [500]	22 [560]	17-7/8 [454]	3/8 / 3/4 [9.5]/[19]
36K	45-3/4 [1162]	19-5/8 [500]	22 [560]	17-7/8 [454]	3/8 / 3/4 [9.5]/[19]
48K	53-1/8 [1350]	22 [560]	24 -1/2[623]	19-1/2 [496]	3/8 / 3/4 [9.5]/[19]
60K	53-1/8 [1350]	22 [560]	24 -1/2[623]	19-1/2 [496]	3/8 / 3/4 [9.5]/[19]

3. Application

3.1 Vertical Upward Airflow

- The vertical upward airflow configuration is the factory default configuration of all models (see Figure 2.7).
- If the return air is to be ducted, the duct should be installed flush with the ground. Use 1/8 to 1/4 inch thick fireproof elastic gasket between ducts, unit and floor.



Torque applied to the drainage connection should not exceed 15 foot-pounds. For vertical upward air flow and horizontal right installation, dimensions of pipe and drain pipe can be found in Figure 3.1.

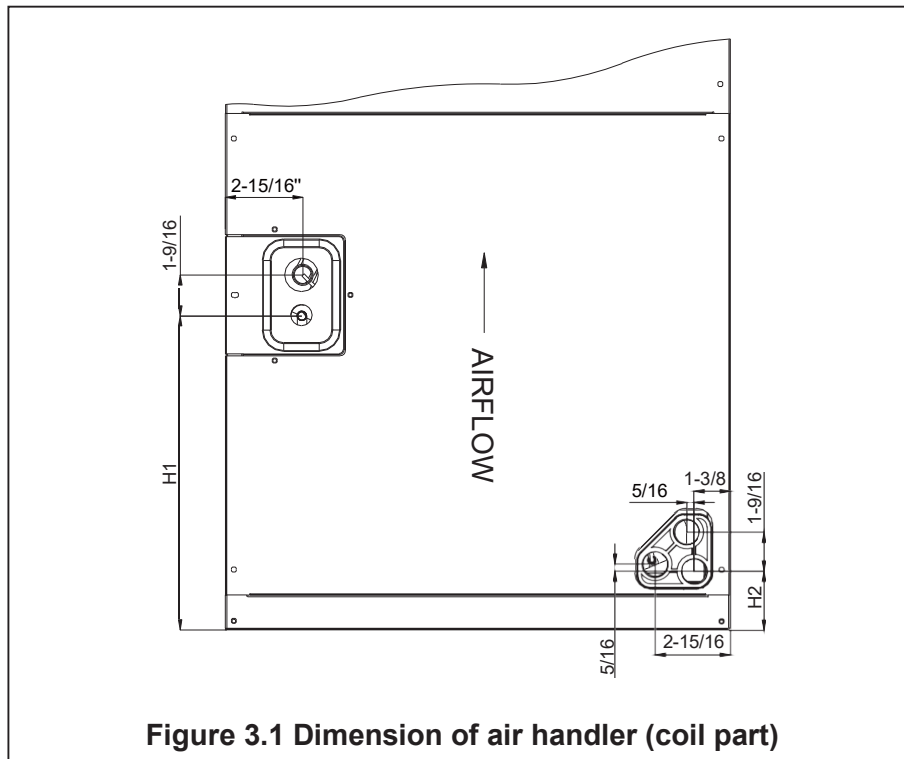


Table 3.1

Model	"H1" inch [mm]	"H2" inch [mm]
24K/36K	12-1/4 [311]	2-1/4[57]
48K/60K	19[483]	1-25/32[45]

3.2 Vertical Downward Airflow

Convert to Vertical Downward airflow Position:

The vertical upward airflow position can be converted into the vertical downward airflow position. Remove the coil (evaporator) access panel and coil and reinstall it by rotating 180 ° from the original position. See Figure 3.2 and 3.4.

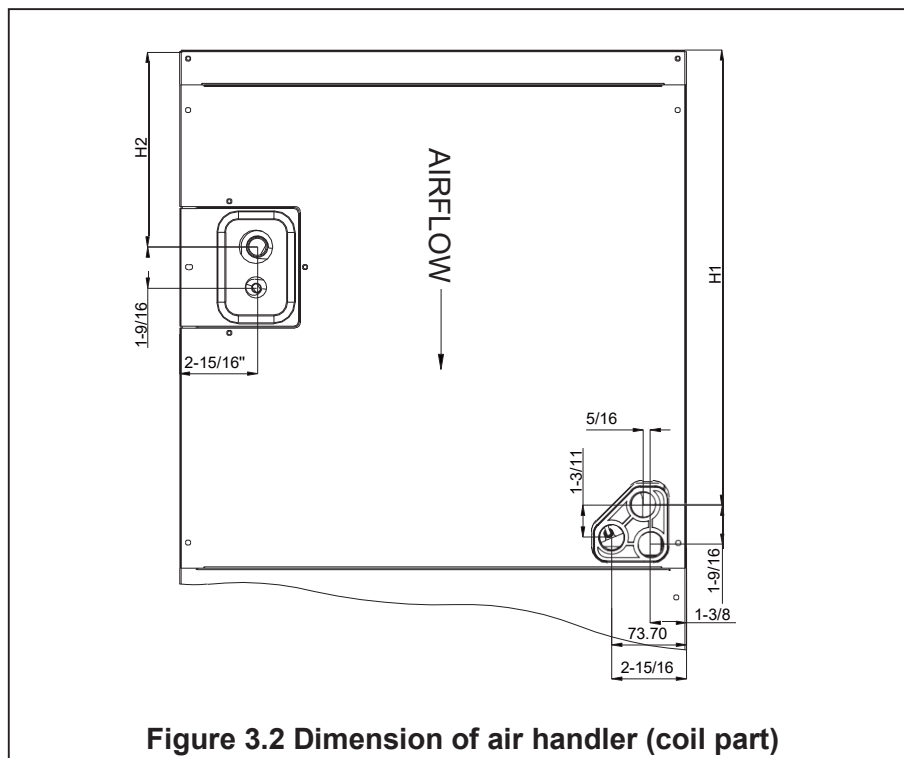


Figure 3.2 Dimension of air handler (coil part)

Table 3.2

Model	"H1" inch [mm]	"H2" inch [mm]
24K/36K	17-11/16 [449]	7-9/16 [192]
48K/60K	21-11/16 [551]	4-13/32 [112]

3.3 Horizontal

Horizontal right installation is the default factory configuration for all models.

Switch to Horizontal Left Installation:

- By removing the indoor coil assembly and reinstalling the coil, the vertical up flow position can be converted into a horizontal left position, See Figure 3.3 and 3.4.
- Rotate the device by 90° to the horizontal left position, with the coil segment on the right and the blower segment on the left.
- Re-install the indoor coil by rotating 180° from the original position. Ensure that the fixing groove is fully engaged with the coil guide rail. See figs. 3.4.
- When configured to be placed horizontally above the ceiling and/or living space, it is recommended to use an additional field supplied drain pan.

Steps to Change Cabinet Direction to Vertical Downward or Horizontal Left Direction

1. Remove the screws and the front panel, and disconnect the plug of T1 sensor , T2 sensor and leak detection sensor wire from the circuit board (Figure 3.3, Step 1).
2. Pull out the coil with sensor wire (do not disconnect T1 sensor , T2 sensor and leak detection sensor from the coil). (Figure 3.3, Step 2)
3. Install the coil in the correct direction and fix it in place. Reinsert those sensor wires in PCBA through the gap on the cabinet cover (Figure 3.3, Step 3).

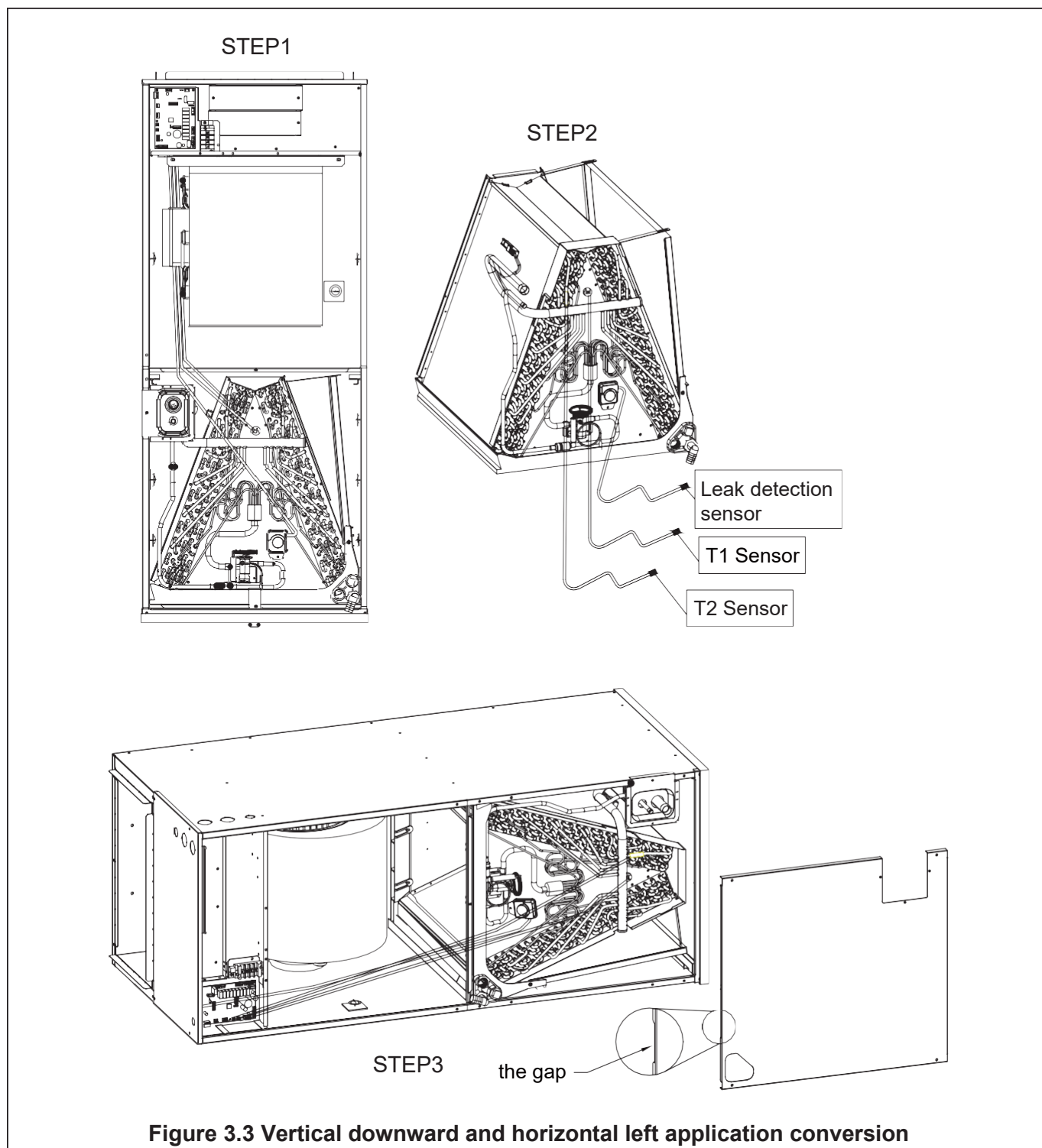


Figure 3.3 Vertical downward and horizontal left application conversion

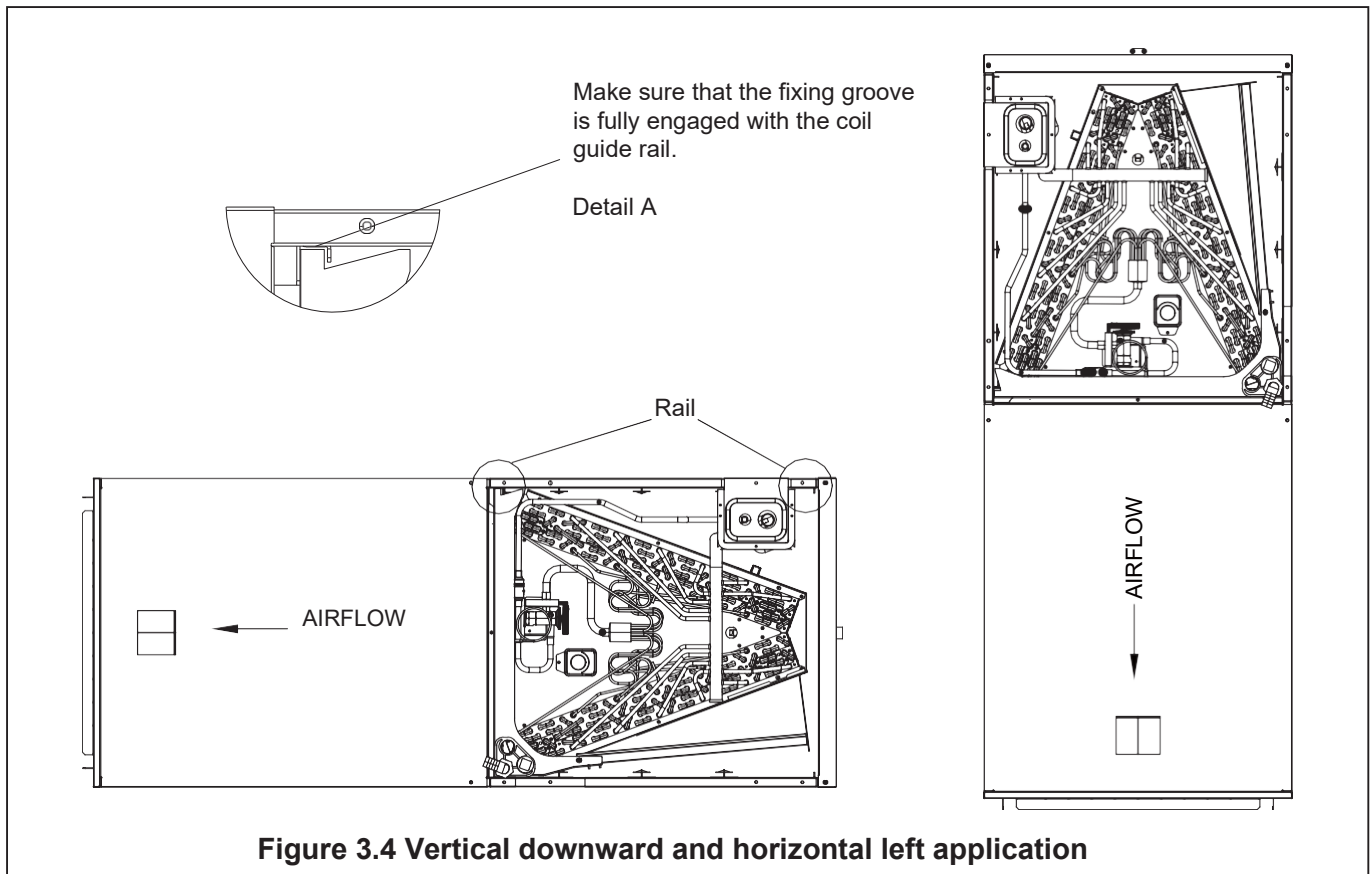


Figure 3.4 Vertical downward and horizontal left application

Note:



- Horizontal units must be configured for right hand air supply or left-hand air supply. Horizontal drain pan must be located under indoor coil.
- Failure to use the drain pan will result in property damage.

Horizontal Conversion:

Remove the indoor coil and reinstall it by 180 ° from the original position. The horizontal right air outlet can be changed to the horizontal left air outlet.

3.4 Installation in unconditioned space.

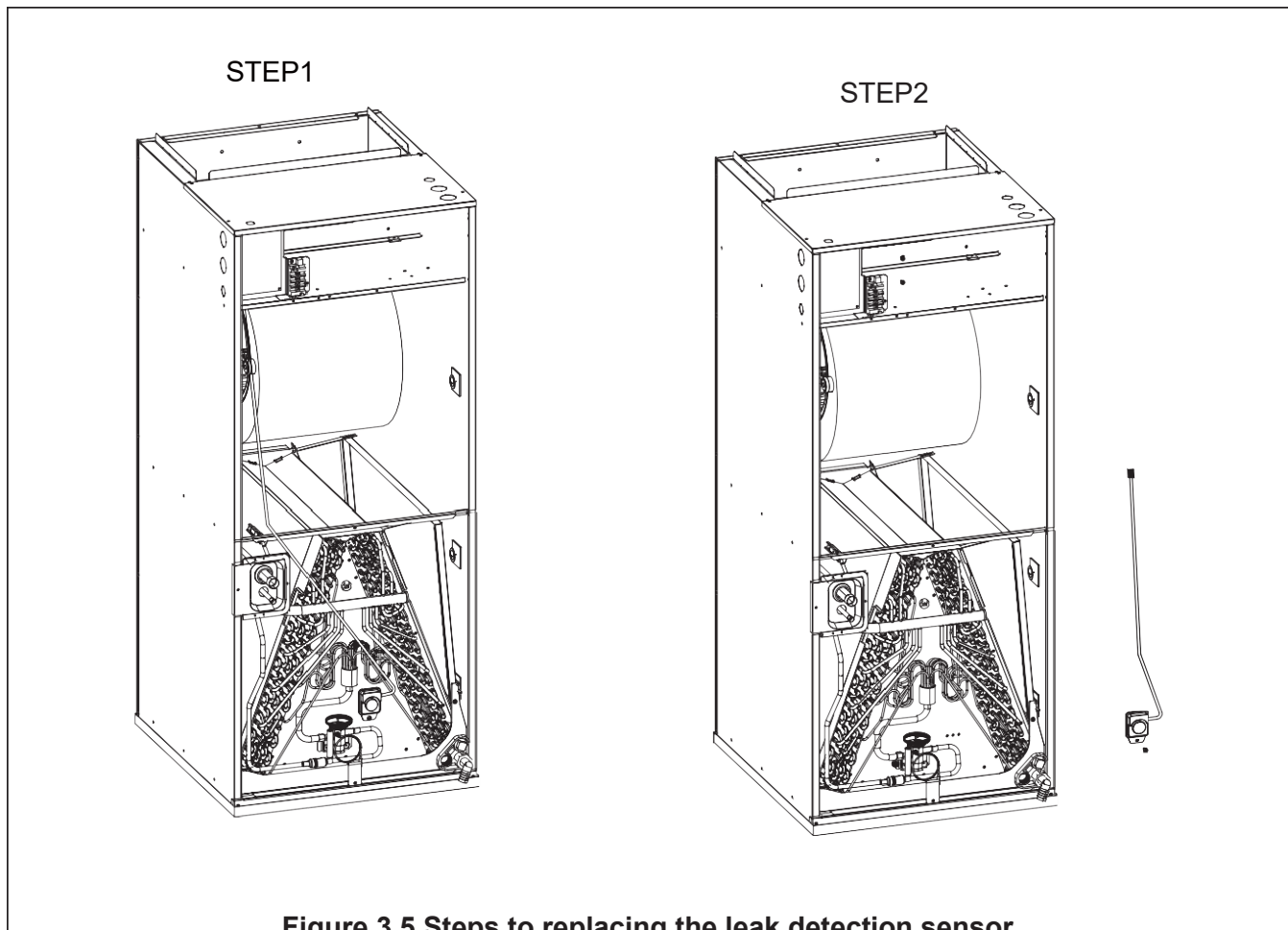
Note:



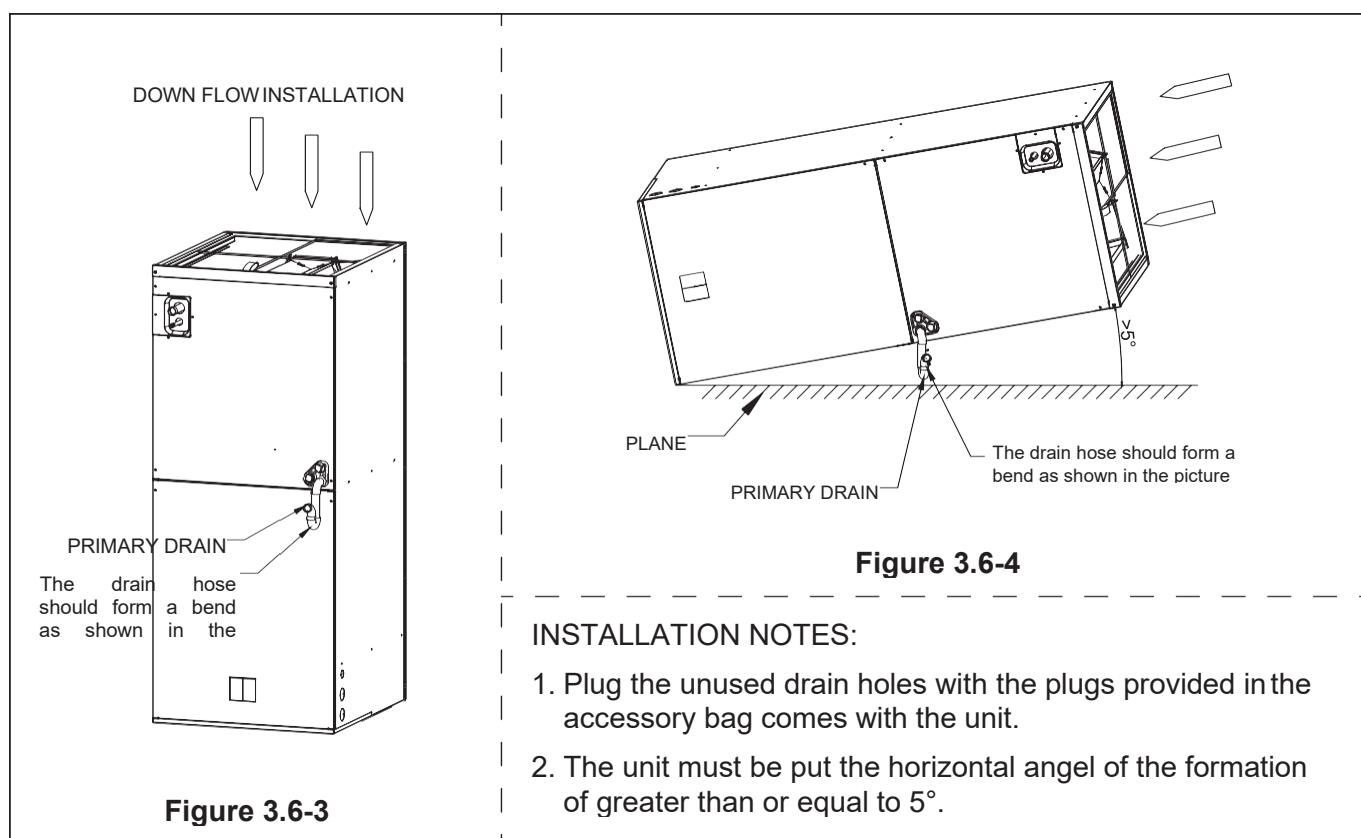
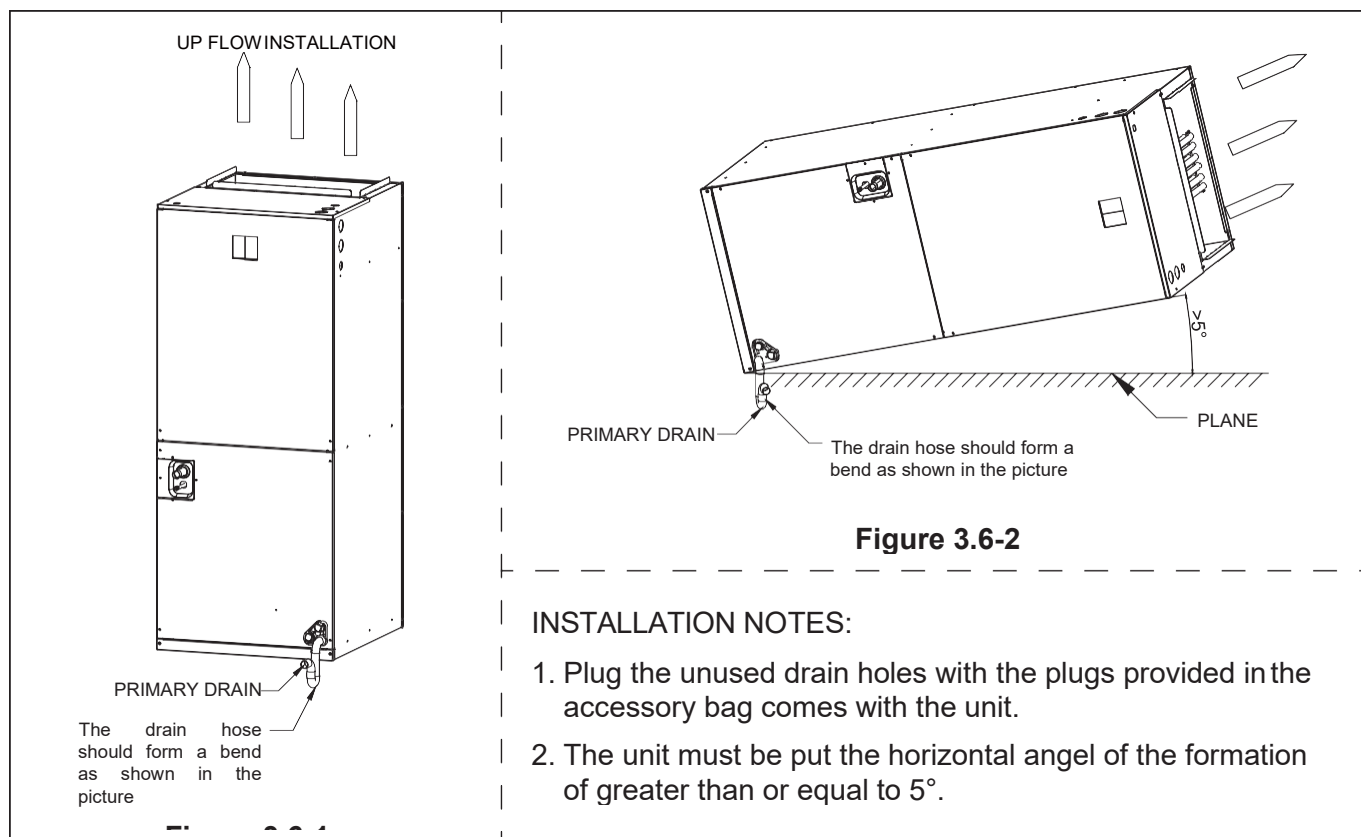
- There are two pairs of coil guide rails in the air handler, which are used for upward and downward air supply applications. If the air handler is installed in an unconditioned space, two unused coil guide rails should be removed to minimize condensate on the surface of the air handler. Unscrew 6 mounting screws from both sides of the cabinet to easily remove the coil guide rail.

3.5 Steps to replacing the leak detection sensor

1. Remove the screws and the front panel and disconnect the plug of leak detection sensor wire from the circuit board (Figure 3.5, Step 1).
2. Remove the screws and pull out the leak detection sensor with the wire (Figure 3.5, Step 2)
3. Replace the new leak detection sensor and screw it to the triangular plate, plug and tie the wires to the electronic control board in the same way as before. Install the access panels, make sure there is no outstanding gap to allow refrigerant escape in case of leakage.



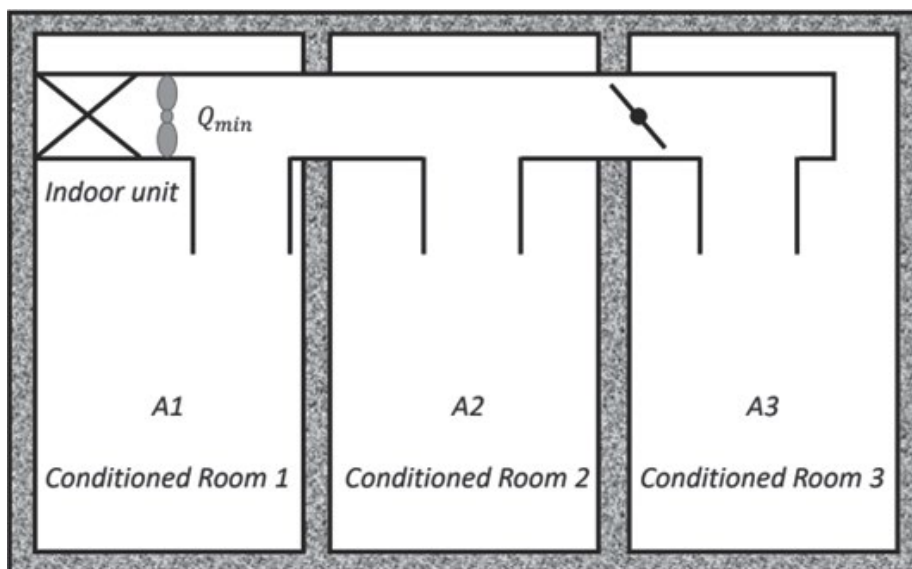
3.6 Precautions for four-way installation



3.7 Installation room size rules

The installation mode needs to be performed in the following way.

Installation method 1:



Make sure that the applied room space area TA is larger than the TA min.

Table 3.3

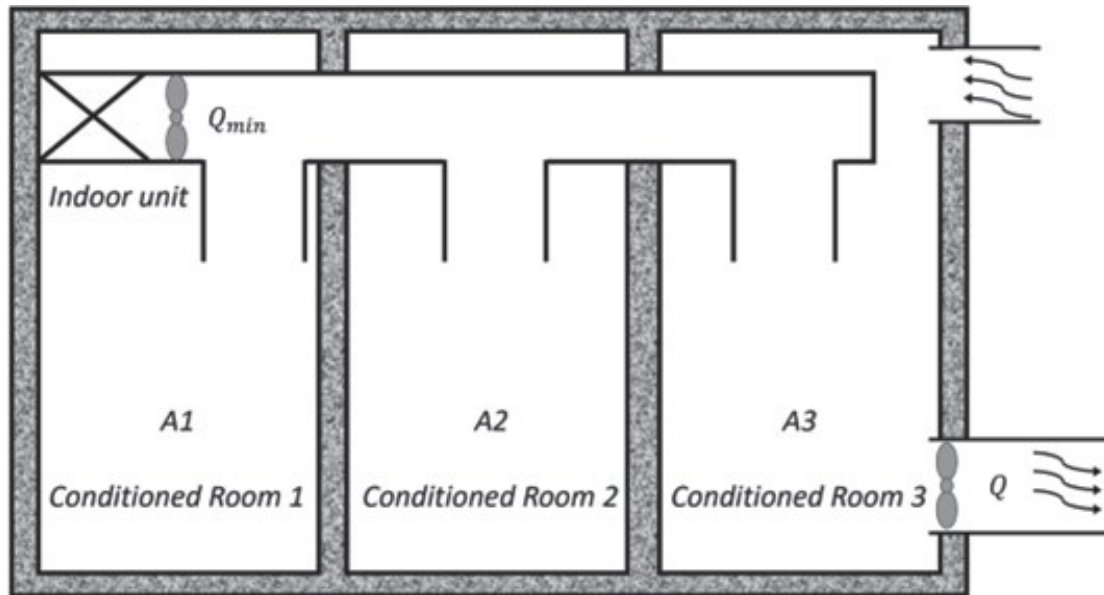
24K/36K			
Piping length (ft)	Refrigerant perfusion (oz)	TA min (m2)	TA min (ft2)
25.0	116.40	9.90	106.57
50.0	129.84	11.04	118.87
75.0	143.28	12.19	131.18
100.0	156.71	13.33	143.48
48K/60K			
Piping length (ft)	Refrigerant perfusion (oz)	TA min (m2)	TA min (ft2)
25.0	155.20	13.20	142.10
50.0	168.64	14.34	154.40
75.0	195.51	16.63	179.00
100.0	235.83	20.06	215.91
Note: : $TA=A1+A2+A3+\dots+A_n$ (If there is a damper in the duct. When the damper is open, the room area TA is the sum of all room area connected by ductwork. If it is closed, TA is the sum of the room areas before the damper.)			

Table: Minimum room area/ zone de chambre minimal

(e.g.: 36K Installation connection piping length of 25 feet and refrigerant charge of 116.4oz results in an installation room area of not less than 106.57 sq. ft.)

Installation method 2:

When $TA (1 + 2 + 3 + \dots + n) < T_{Amin}$, mechanical ventilation should be added. Mechanical ventilation can be installed in any room, while the minimum air volume must meet the Q_{min} .



T_{Amin} refers to Table 3.3 of the installation method, Table 3.5 is the maximum refrigerant charge relationship which is according to the actual TA room area and the allowable area of the room.

Table 3.4

TA(ft)	26.9	53.8	80.7	107.6	134.5	161.45	188.35	215.3
$m_{max}(oz)$	29.4	58.8	88.2	117.6	146.9	176.3	205.7	235.1

Table 3.5 is the minimum mechanical ventilation air volume which is according to the actual refrigerant charge and the maximum refrigerant charge allowed under the TA room area.

Table 3.5

$Q_{min}(m^3/h)$		$m_{max}(oz)$							
		29.4	58.8	88.2	117.6	146.9	176.3	205.7	235.1
$m_c(oz)$	63.5	96	13	/	/	/	/	/	/
	84.6	155	72	/	/	/	/	/	/
	105.8	215	132	50	/	/	/	/	/
	137.6	304	221	139	56	/	/	/	/
	158.7	363	280	198	116	33	/	/	/
	179.9	423	340	257	175	92	10	/	/
	201	482	399	317	235	151	69	/	/
	222.2	542	458	376	294	211	129	47	/

Installation method 3:

When the air conditioner is installed in an independent room and the room area $A < A_{min}$, mechanical ventilation must be added.

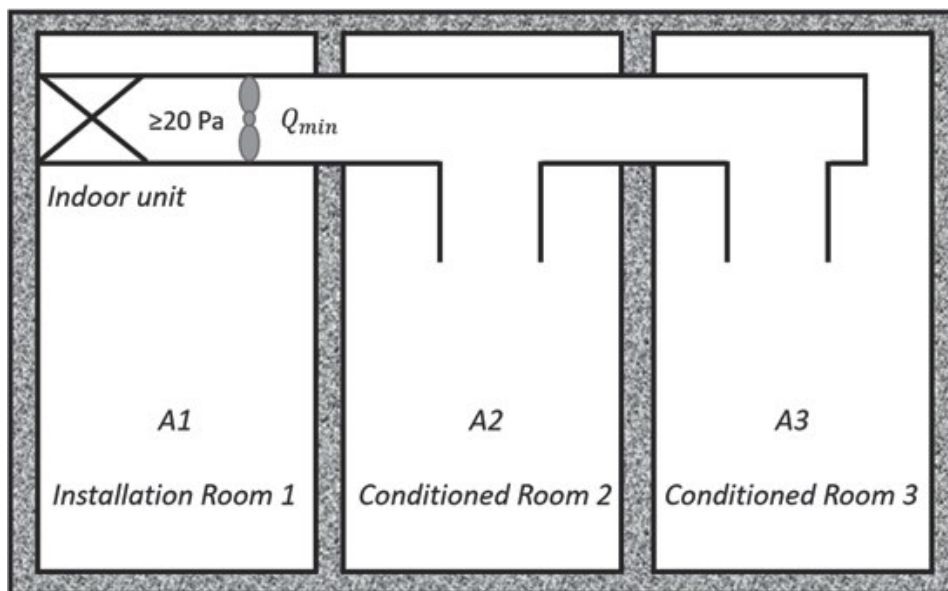


Table 3.6 is the maximum refrigerant charge under the actual room area A1.

Table 3.6

A1(ft)	26.9	53.8	80.7	107.6	134.5	161.45	188.35	215.3
$m_{max}(\text{oz})$	29.4	58.8	88.2	117.6	146.9	176.3	205.7	235.1

Table 3.7 is the minimum mechanical ventilation air volume which is according to the actual refrigerant charge and the maximum refrigerant charge allowed under the A1 room area. If the actual refrigerant charge m_c is less than the maximum permissible refrigerant charge m_{max} for A1 room area, then no additional mechanical ventilation is required, otherwise refer to table 3.7 below.

Table 3.7

$Q_{min} (\text{m}^3/\text{h})$		$m_{max}(\text{oz})$							
		29.4	58.8	88.2	117.6	146.9	176.3	205.7	235.1
$m_c(\text{oz})$	63.5	96	13	/	/	/	/	/	/
	84.6	155	72	/	/	/	/	/	/
	105.8	215	132	50	/	/	/	/	/
	137.6	304	221	139	56	/	/	/	/
	158.7	363	280	198	116	33	/	/	/
	179.9	423	340	257	175	92	10	/	/
	201	482	399	317	235	151	69	/	/
	222.2	542	458	376	294	211	129	47	/

4. Electrical Wiring

The wiring on site must comply with the National Electric Code (C.E.C. in Canada) and any applicable local regulations.



Warning: Electric shock

- Before installation or maintenance, please disconnect all power supply of the device. More than one disconnect switch may be required to cut off the power of the equipment. Dangerous voltage can cause serious personal injury or death.

4.1 Power Supply Wiring

It is important to have a suitable power supply connected to the device being installed. For more detailed requirements, please refer to the device rating label, wiring diagram and electrical data in the installation instructions.

- If necessary, install a branch circuit breaker of sufficient size, which is located within sight and easy to install.



When installing an electric heater, the device may be equipped with one or two 30–60-amp circuit breakers. These circuit breakers protect internal lines and act as disconnecting devices when short circuit occurs. The circuit breaker installed in the device does not provide overcurrent protection for the power connection, so its size may be larger than that of the branch circuit protection.

- The power supply line of the circuit must be a minimum 221°F copper conductor. For current carrying capacity, wire size and circuit protector requirements, please refer to electrical data in this section. The power supply protection device can be a fuse or a "HACR" type circuit breaker.
- High-voltage wires can pass through the tapping holes on the right, left or top of the device.
- "Three 7/8", 1-3/8" and 1-3/4" diameter tapped holes can be used to connect high-voltage wires to the device.
- The high-voltage wires must be connected to the red and black wires in the control part of the air handler.

4.2 Control Wiring



The low-voltage control line should not run in the conduit together with the high-voltage line. Keep the distance between the two catheters according to local codes.

- Scenes less than 100 feet in length should use 18 AWG colored low-voltage wires. 16 AWG wire should be used for scenes with a length of more than 100 feet.
- See Figure 2.7 for the connection position of low-voltage wires.
- For the correct wiring instructions, please refer to the wiring diagram located back side of the air handler blower access panel.
- After installation, make sure that the low-voltage and high-voltage wiring are kept separate.

4.3 Grounding



Danger: Electric shock

- The device must be permanently grounded. Otherwise, it will cause electric shock, personal injury or death.

- When installed according to existing electrical codes, grounding can be through wires or metal conductors.
- Grounding can also be achieved by connecting the grounding wire to the ground lug (ground lug) on the machine.
- When multiple power supply circuits are used, each circuit needs to be grounded plate separately.
- The grounding plate is located at the upper right of the cabinet.

4.4 Electrical Data

Table 4.1 Electrical data

Model	Voltage	Hertz	HP	Fan speed	Circuit AMPS	MCA(A)	MOP(A)
24K	208/230	60	1/3	5	1.1	4	6
36K	208/230	60	1/2	5	2.0	4	6
48K	208/230	60	3/4	5	3.5	5	10
60K	208/230	60	3/4	5	4.3	5	10

4.5 MCA/MOP data of electric heat kit

Table 4.1 Applicable heat kits for AHU multi position installation

Heat kit model	AHU model	electric heat (kW)	MIN. Circuit Ampacity		MAX.Fuse or Breaker (HACR) Ampacity		Fan speed				
			208 VAC	230 VAC	208 VAC	230 VAC	1	2	3	4	5
21-4444-01	24K	5	19.66	21.74	30	35	●	●	●	●	●
21-4444-02		7.5	29.50	32.61	40	45	×	×	●	●	●
21-4444-03		10	39.32	43.48	55	60	×	×	×	●	●
21-4444-01	36K	5	19.66	21.74	30	35	●	●	●	●	●
21-4444-02		7.5	29.50	32.61	40	45	×	●	●	●	●
21-4444-03		10	39.32	43.48	55	60	×	×	●	●	●
21-4444-04		15	29.50/29.50	32.61/32.61	40/40	45/45	×	×	×	●	●
21-4444-01	48K	5	19.66	21.74	30	35	●	●	●	●	●
21-4444-02		7.5	29.50	32.61	40	45	●	●	●	●	●
21-4444-03		10	39.32	43.48	55	60	×	●	●	●	●
21-4444-04		15	29.50/29.50	32.61/32.61	40/40	45/45	×	×	●	●	●
21-4444-05		20	39.32/39.32	43.48/43.48	55/55	60/60	×	×	×	●	●
21-4444-01	60K	5	19.66	21.74	30	35	●	●	●	●	●
21-4444-02		7.5	29.50	32.61	40	45	●	●	●	●	●
21-4444-03		10	39.32	43.48	55	60	×	●	●	●	●
21-4444-04		15	29.50/29.50	32.61/32.61	40/40	45/45	×	×	●	●	●
21-4444-05		20	39.32/39.32	43.48/43.48	55/55	60/60	×	×	×	●	●

- Heat kit applicable for AHU 4-way position installation.
- Ampacities for MCA and Fuse/breaker including the blower motor
- The heat pump system needs specific airflow. Each ton of cooling requires 350 to 450 cubic feet (CFM) of air per minute, or nominally 400 CFM.

Table 4.2 Heater Kit Accessories

Model	Description	24	36	48	60
21-4444-01	5 kW heating kit, single-pole circuit breaker	•	•	•	•
21-4444-02	7.5 kW heating kit, single-pole circuit breaker	•	•	•	•
21-4444-03	10 kW heating kit, single/double pole circuit breaker	•	•	•	•
21-4444-04	15kW heating kit, double pole circuit breaker	×	•	•	•
21-4444-05	20 kW heating kit, double pole circuit breaker	×	×	•	•

• indicates availability, and × indicates unavailability

Warning:



- The electric heating must be installed by qualified personnel. Refer to current regulations and laws for installation location.
- This appliance is not intended for use by people (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.
- The appliance shall be installed in accordance with national wiring regulations.

5. Airflow performance

The air flow data is based on the cooling performance of coil and without filter. Performance table, select the appropriate product.

External static pressure ESP should be kept within the minimum and maximum limits shown in the following table to ensure the normal operation of cooling, heating and electric heating.

Table 5.1 Air flow performance

Model size of air processor	Motor speed		SCFM								
			External Static Pressure-Inch Water Column [kPa]								
			0[0]	0.1[.02]	0.2[.05]	0.3[.07]	0.4[.10]	0.5[.12]	0.6[.15]	0.7[.17]	0.8[.20]
24K	Tap (5)	SCFM	1193	1130	1072	1002	931	853	781	722	653
		Watts	139	145	154	161	171	177	187	197	202
	Tap (4)- default high fan	SCFM	1128	1060	998	920	850	766	693	622	573
		Watts	117	122	132	139	148	155	164	170	180
	Tap (3)	SCFM	1028	971	905	827	753	664	598	535	493
		Watts	95	102	111	118	127	133	141	148	156
	Tap (2)- Default low fan	SCFM	907	826	752	657	574	498	445	-	-
		Watts	66	71	79	85	93	100	107	-	-
	Tap (1)	SCFM	697	589	484	382	320	-	-	-	-
		Watts	34	37	45	49	56	-	-	-	-
36K	Tap (5)	SCFM	1491	1438	1390	1337	1290	1245	1187	1112	1053
		Watts	250	256	266	273	284	297	309	317	327
	Tap (4)- default high fan	SCFM	1357	1309	1250	1206	1158	1093	1018	960	890
		Watts	193	205	209	220	231	239	251	262	268
	Tap (3)	SCFM	1238	1184	1115	1069	1006	931	870	792	728
		Watts	147	157	163	174	181	193	204	210	220
	Tap (2)- Default low fan	SCFM	1116	1055	987	932	850	789	720	639	562
		Watts	113	127	128	139	146	157	167	174	183
	Tap (1)	SCFM	1061	937	851	762	692	599	536	472	432
		Watts	100	94	96	104	113	119	128	134	142
48K	Tap (5)	SCFM	2081	2047	2011	1974	1933	1884	1823	1768	1718
		Watts	520	532	543	554	566	570	567	563	560
	Tap (4)- default high fan	SCFM	1914	1874	1830	1787	1744	1703	1660	1609	1571
		Watts	407	418	432	439	449	460	473	479	483
	Tap (3)	SCFM	1766	1720	1675	1636	1588	1540	1486	1441	1392
		Watts	317	327	337	349	358	367	378	386	403
	Tap (2)- Default low fan	SCFM	1559	1514	1462	1408	1362	1318	1265	1203	1137
		Watts	214	235	246	252	263	273	284	296	308
	Tap (1)	SCFM	1370	1319	1271	1215	1164	1102	1035	950	882
		Watts	159	169	179	185	195	207	219	228	239
60K	Tap (5)	SCFM	2081	2047	2011	1974	1933	1884	1823	1768	1718
		Watts	520	532	543	554	566	570	567	563	560
	Tap (4)- default high fan	SCFM	1914	1874	1830	1787	1744	1703	1660	1609	1571
		Watts	407	418	432	439	449	460	473	479	483
	Tap (3)	SCFM	1766	1720	1675	1636	1588	1540	1486	1441	1392
		Watts	317	327	337	349	358	367	378	386	403
	Tap (2)- Default low fan	SCFM	1559	1514	1462	1408	1362	1318	1265	1203	1137
		Watts	214	235	246	252	263	273	284	296	308
	Tap (1)	SCFM	1370	1319	1271	1215	1164	1102	1035	950	882
		Watts	159	169	179	185	195	207	219	228	239

The highlighted area indicates the airflow within the required range of 300-450cfm/ton.

Note:

1. The advanced airflow must be used as the rated airflow for the full-load operation of the machine.
2. The rated airflow of a system without an electric heater kit requires 300 to 450 cubic feet of air per minute (CFM).

3. The rated airflow of a system with an electric heater kit requires 350 to 450 cubic feet of air per minute (CFM).
4. The air distribution system has the greatest influence on air flow. Therefore, the contractor should only use the procedures recognized by the industry.
5. The design and construction of the air duct should be done carefully. Poor design or process will lead to a significant decline in system performance.
6. The air supply duct should be set along the periphery of the air-conditioned space with appropriate size. Improper location or insufficient airflow may lead to insufficient ventilation or noise in the ductwork.
7. The installer should balance the air distribution system to ensure that all rooms in the room have proper quiet airflow. The speedometer or airflow hood can be used to balance and verify the branch duct and system airflow (CFM).

5.1 Indoor Fan Function

Passive Dehumidification (Optional)

This unit has a Passive Dehumidification function which lowers the fan speed with a DH call from the thermostat. This function requires proper DH wiring from the indoor unit to the thermostat (with a humidistat)



If the DH line is not connected, the equipment will still work normally.

5.1.1. Anti-Cold Air & Heating Fan Delay Function

a) Anti-Cold Air:

This function utilizes the T1(Indoor Room Temp.) and T2(Indoor Coil Temp.) sensor of the indoor unit to determine whether the indoor blower to turn on or not. The function prevents cold air from blowing during heating mode.

When all the following conditions are met, the Anti-Cold Air function will be activated:

- A. Heating mode
- B. Dip switch SW1-2 is set to "OFF".
- C. $T2 < 82.4^{\circ}\text{F}$.
- D. The electric heat kit is off.
- E. Y1/Y2 is energized when it is connected with a 24V thermostat. OR when a manufacturer-supplied RS485 communicative thermostat is connected, indoor fan blower is activated by thermostat

When all the following conditions are met, the Anti-Cold Air function will be deactivated: A.

$T2 > 89.6^{\circ}\text{F}$.

- B. Electric heat kit is on.

b) Heating Fan Delay:

When the dip switch SW1-2 is set to "ON" and the indoor unit is in heating mode, the fan will operate with 90 seconds delay each time it starts. Fan speed determined by the Y1/Y2 signal from the thermostat.

5.1.2. Indoor Coil Anti-Freezing Function

The function utilizes the indoor coil sensor(T2) to determine whether the indoor coil is freezing or not. This feature prevents the unit from running at low evaporating temperature as well as low suction superheat.

When all the following conditions are met, the Anti-Freezing Function will activate

- A. $T_2 < 32^{\circ}\text{F}$
- B. $32 - T_2 \geq 5.4$

When the following conditions are met, the Anti-Freezing Function will deactivate:

- A. $T_2 \geq 42.8^{\circ}\text{F}$

The Anti-Freezing Function is valid at both 24V and RS485 communication mode. When the feature is activated, the compressor will be turned off.

5.1.3. R454B Leakage Detection Function

The function utilizes a R454B refrigerant sensor to detect the R454B concentration. Terminal F is reserved for connecting buzzer if needed.

When a R454B leakage occurs in the indoor coil and the concentration is above 10%, the unit will perform as the following:

- A. Cut off power to the thermostat to stop the compressor from continuing operation
- B. Electric Heat kit will be turned off
- C. High voltage will be output between terminal F and terminal L2.

5.1.4. USB Port Software Update Function

A USB port is provided on the control board to allow contractors to update software when needed. Please consult and follow operation instructions from manufacturers.

- 1) Disconnect the power supply and set the thermostat to OFF mode
- 2) Set the dip switch SW1-4 to "ON"
- 3) Connect the power supply
- 4) set the dip switch SW1-4 to "OFF", the green light will be always on
- 5) Insert a USB flash drive which contains the Updated Software File into the USB port
- 6) Wait till the green light flashes slowly
- 7) Pull out the USB flash drive.

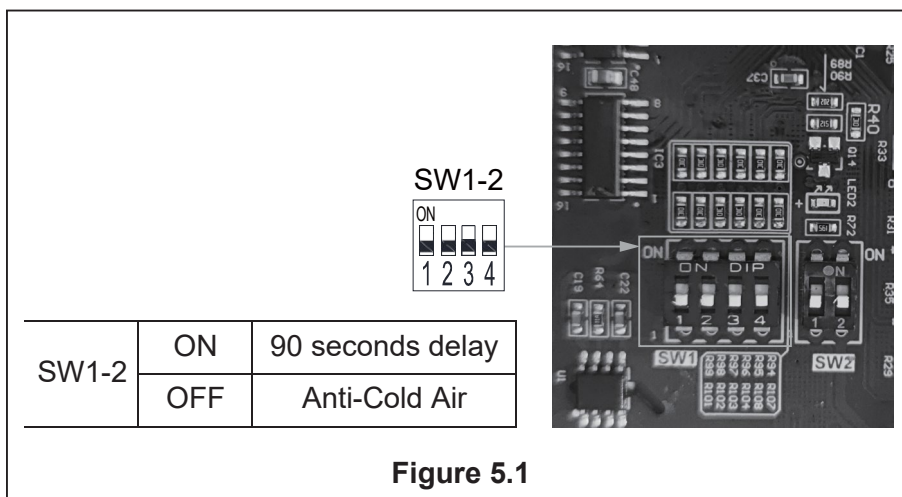


Figure 5.1

6. Ductwork

On-site ductwork must comply with National Fire Protection Association NFPA 90A, NFPA 90B and any applicable local ordinance(s).



Warning: Fire and carbon monoxide

- Under no circumstances should the return ductwork be connected to any other heat-producing equipment, such as mantelpiece, stove, etc. Unauthorized use of such equipment may cause fire, carbon monoxide poisoning, explosion, personal injury or property damage.

The metal ductwork operating in the air-conditioned space must be insulated and covered with a moisture-proof layer. If the construction and installation are carried out according to SMACNA glass fiber duct construction standard, the fiber duct system can be used. The ductwork must meet the U/L standard 181 test of Class I air duct by National Fire Protection Association of America. Check the local regulations of ductwork and insulation requirements.

- The duct system must be designed within the external static pressure range of the designed operation of the device. Adequate airflow in the system is very important. Ensure that the supply and return ductwork, grid, special filter screen, accessories, etc. are included in the total resistance. Please refer to the airflow performance table in Section 5 of this manual.
- Design the ductwork according to "ACCA" manual "D" residential air conditioning design and equipment selection in winter and summer. The latest version can be obtained from "ACCA" American Air Conditioning Contractors Association, 1513 16th Street NW, Washington, DC, 20036. If the ductwork contains flexible air pipes, make sure that the system takes into account the pressure drop information (straight line length plus all turns) shown in "ACCA" manual "D".
- The air duct connector should be connected to the 3/4 "flange on the equipment. Install a flange around the air outlet.



If the duct connector has an elbow, its size should not be smaller than that of the flange on the outlet of the device.



The front flange on the return duct (if connected to the fan casing) must not be screwed into the area where the power cord is located. Drill bits or sharp screw tips can damage the insulation of the internal wires of the equipment.

- Use appropriate fasteners suitable for the type of duct used, fix the outlet and return ducts to the flanges of the device, and connect the ducts to the device with adhesive tape as needed to prevent air leakage.

7. Refrigerant Pipe Connection

Before the refrigerant pipe connection is completed, keep the coil sealed.



Warning: Personal injury hazard

- Failure to follow this warning could result in personal injury.
- Wear eye protection.



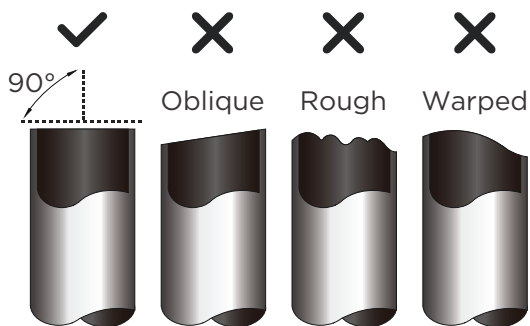
Note:

- Factory nitrogen charge may escape past rubber plugs during storage. This does not indicate a leaking coil nor warrant return of the coil.
- Insulate both the gas and liquid piping to prevent condensation.

Step 1: Cut pipes

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

- Measure the distance between the indoor and outdoor unit
- Using a pipe cutter, cut the pipe a little longer than the measured distance.
- Make sure that the pipe is cut at a perfect 90° angle



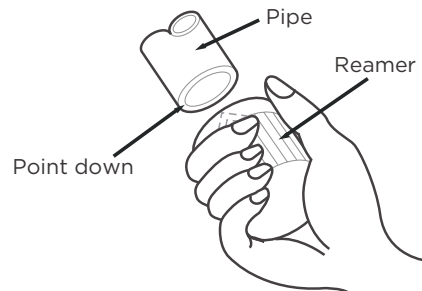
DO NOT DEFORM PIPE WHILE CUTTING

Be extra careful not to damage, kink, or deform the pipe while cutting. This will drastically reduce the heating performance.

Step 2: Remove burrs

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

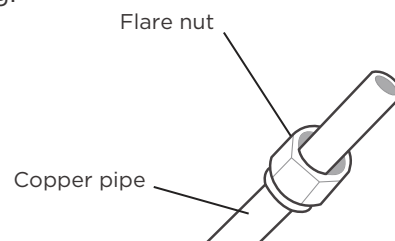
- Hold the pipe at a downward angle to prevent burrs from falling into the pipe.
- Using a reamer or deburring tool, remove all burrs from the cut section of the pipe.



Step 3: Flare pipe ends

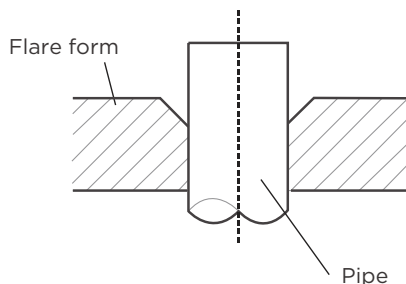
Proper flaring is essential to achieve an airtight seal.

- After removing burrs from cut pipe, seal the ends with PVC tape to prevent foreign materials from entering the pipe.
- Sheath the pipe with insulating material.
- Place flare nuts on both ends of pipe. Make sure they are facing in the right direction, because you can't put them on or change their direction after flaring.

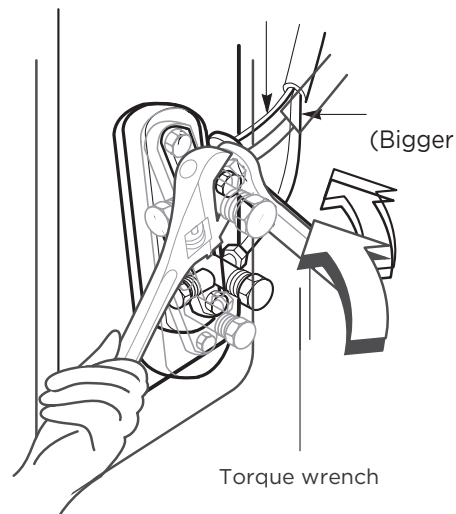


- Remove PVC tape from ends of pipe when ready to perform flaring work.

- Clamp flare from on the end of the pipe. The e of the pipe must extend beyond the flare form.



- Place flaring tool onto the for
- Turn the handle of the flaring tool clockwise until the pipe is fully flared.



PIPING EXTENSION BEYOND FLARE FORM

Pipe gauge	Tightening torque	Flare dimension(A)		Flare shape
		Min.	Max.	
Φ3/8in (Φ9.52mm)	32-39 N.m (320-390kgf.cm)	0.52in (13.2mm)	0.53in (13.5mm)	
Φ5/8in (Φ16mm)	57-71 N.m (570-710kgf.cm)	0.76in (19.2mm)	0.78in (19.7mm)	
Φ3/4in (Φ19mm)	67-101 N.m (670-1010kgf.cm)	0.91in (23.2mm)	0.93in (23.7mm)	

- Remove the flaring tool and flare form, then inspect the end of the pipe for cracks and even flaring.

Step 4: Connect pipes

Connect the copper pipes to the indoor unit first, then connect it to the outdoor unit. You should first connect the low-pressure pipe, then the highpressure pipe.

- When connecting the flare nuts, apply a thin coat of refrigeration oil to the flared ends of the pipes.
- Align the center of the two pipes that you will connect.
- Tighten the flare nut snugly by hand.
- Using a wrench, grip the nut on the unit tubing.
- While firmly gripping the nut, use a torque wrench to tighten the flare nut according to the torque values in above table.

● NOTICE

Use both a spanner and a torque wrench when connecting or disconnecting pipes to/from the unit.

⚠ CAUTION

Ensure to wrap insulation around the piping. Direct contact with the bare piping may result in burns or frostbite.

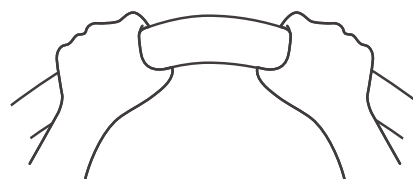
- Make sure the pipe is properly connected. Over tightening may damage the bell mouth and under tightening may lead to leakage.

● NOTICE MINIMUM BEND RADIUS

Carefully bend the tubing in the middle according to the diagram below.

DO NOT bend the tubing more than 90° or more than 3 times.

Use appropriate tool



min-radius 3.9in(100mm)

- After connecting the copper pipes to the indoor unit, wrap the power cable, signal cable and the piping together with binding tape.

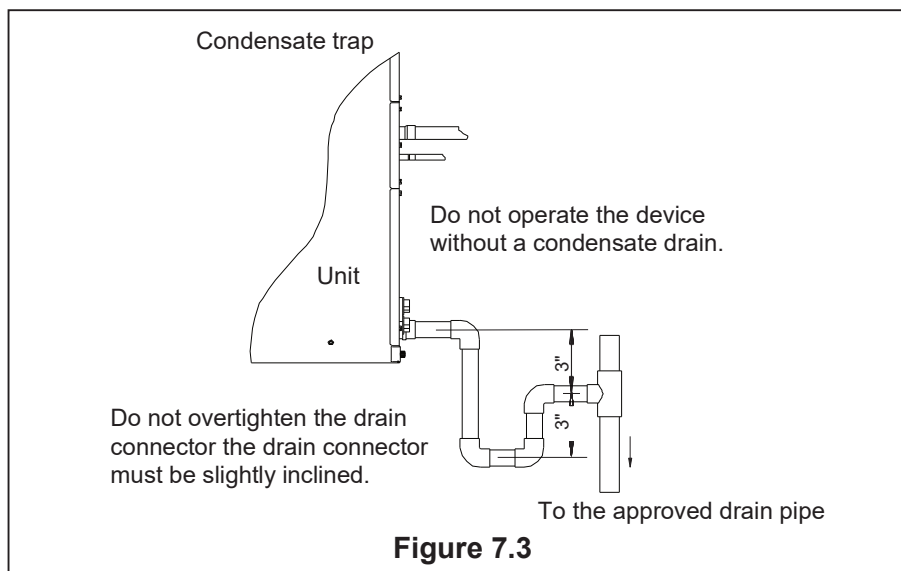
● NOTICE

DO NOT intertwine or cross the signal cable with any other wiring.

7.1 Condensate Drain Connection

For specific requirements, please consult local codes.

For the required condensate trap installation, please refer to Figure 7.3 and the following information.



1. When connecting the drain connector to the drain pan, use a thin layer of PTFE paste, silicone or PTEF and tighten it by hand.
2. When connecting the drain connector to the drain pan, don't overtighten it. Tight fittings will crack the pipe connection on the drain pan.

- Make sure that the drainage pipe will not block the inlet in front of the device. The minimum clearance required for removal and maintenance of filter screen, coil or fan is 24 inches.
- Make sure that the machine is placed horizontally or slightly inclined to the main drain outlet, so that water can be completely drained from the machine.
- Do not reduce the drainpipe size to less than the connection size provided on the condensate drain pan.
- All horizontal drainage pipes must be inclined downward at a slope of at least 1/8 inch per foot to ensure proper drainage.
- Do not connect the condensate drain line to the closed or open sewage pipe. Drain the condensate to an open drainage pipe or to a safe outdoor area.
- Where necessary, the drainage pipeline should be insulated to prevent damage caused by condensation water formed on the outer surface of the pipeline.
- If necessary, be prepared to disconnect and clean the main drainage pipe. Install a 3-inch elbow on the main drainage pipe as close as possible to the unit. Make sure that the top of the elbow is lower than the joint of the drain pan to allow the drain pan to drain completely (see Figure 7.3).
- Auxiliary drainage pipes should be extended to places where condensate can be easily seen. If the condensed water starts to flow out from the auxiliary drainpipe, the homeowner should pay attention to the possible problems.
- Plug the unused drain connector with the plug into the parts package provided with the equipment. Use a thin layer of Teflon paste, silicone or Teflon tape to form a waterproof seal.
- After installation, test the condensate drain pan and drainpipe. Pour water into the drain pan, enough to fill the drain traps and pipes. Check to ensure that the drain pan completely drains water, no leakage is found in the drainpipe fittings, and water is discharged from the main drainpipe terminal.

8. Air Filter (Not Factory Installed)

The filter is not included in the device and must be provided on site.

The size of external filters or other filtering devices must meet the maximum flow rate of 300ft/min, or meet the recommended value of filter type.

The application and placement of filter is very important for airflow, which may affect the performance of heating and cooling system. Reduced airflow will shorten the life of the main components of the system, such as motors, components, thermal relays, evaporator coils or compressors. Therefore, we recommend that the return air duct system has only one filter position. For systems without return air filter grids, multiple filter grids can be installed at each return air opening.

If a high-efficiency filter screen or electronic air filtration system is used, it is very important that the air flow rate is not reduced. If the air flow decreases, the overall performance and efficiency of the device will decrease. It is strongly recommended to contact professional installation technicians to ensure the correct installation of such filtration systems.



Do not double filter the return air system. Do not filter the air supply duct system. This will change the performance of the device and reduce the air flow.

Warning: Fire risk



- Do not operate the system without a filter. Part of the dust suspended in the air may temporarily stay on the duct and the air outlet of the room. Any circulating dust particles may be heated and burnt due to contact with AHU elements. This residue will stain the ceiling, walls, curtains, carpets and other items in the house. When some types of candles, oil lamps or igniters burn, soot may be generated in the filter.
-

9. Installation Size of Filter

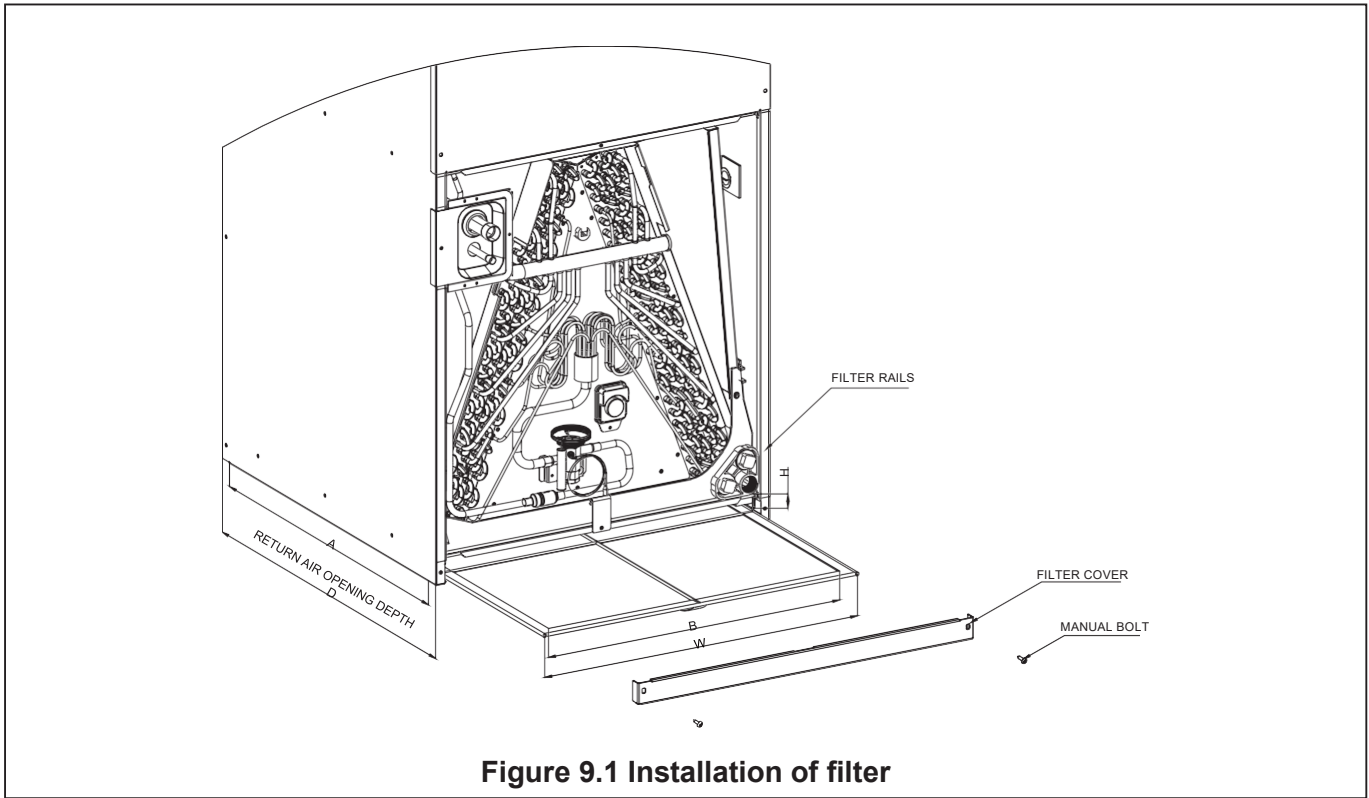


Figure 9.1 Installation of filter



The filter is included in the device and must be provided on site.



When installing the indoor unit, regardless of the installation method, make sure that the filter is installed as shown in Figure 9.1.

Table 9.1 Size number

Model	Filter size inches [mm]	"W" Inch [mm]	"D" Inch [mm]	"H" Inch [mm]	Return Width "A" inch [mm]	Return Length "B" inch [mm]
24K/36K	18.1×21.4[460×544]	18.3 [466]	21.6 [548]	1 [25.4]	20.8 [528]	16.3 [414]
48K/60K	20.5×23.8[521×605]	20.7 [526]	23.9 [608]	1 [25.4]	23 [584]	18.8 [478]

Removal/Installation of Air Filter

- Manually remove the bolts and remove the filter cover, as shown in Figure 9.1.
- Hold the edge of the strainer and pull it out.
- Install a new filter so that the arrow on the filter screen is consistent with the airflow direction.
- If a reusable filter is used, please clean it according to the manufacturer's specifications before re-installing it.
- The filter needs to meet UL 900 standard.

10. Maintenance



In order to keep high performance and minimize possible equipment failures, the equipment must be regularly maintained.

10.1 Cleaning Precautions



Warning:

- Any equipment maintenance can only be carried out by qualified maintenance personnel.
-



Warning: Before cleaning and maintenance

- Before cleaning or maintenance, be sure to turn off the equipment and disconnect its power supply.
-



Be careful:

- When removing the filter, do not touch the metal parts in the device. Sharp metal edges can cut you.
-



Note:

- Do not use chemicals or chemically treated cloth to clean the equipment.
 - Do not use benzene, paint thinner, polishing powder or other solvents to clean this machine.
 - Do not operate the system without a filter
-

10.2 Routine Maintenance

Your equipment must be inspected regularly by qualified service technicians. Your annual system check must include:

1. Check the filter every 90 days, or at any time as needed. If it is blocked or blocked, please clean or replace it immediately.
2. Inspection and/or cleaning of impeller housing and motor.
3. Check and clean indoor and outdoor coils as needed.
4. Check and/or clean indoor coil drain pan, and drainpipe and auxiliary drain pan and pipe.
5. Check all wires and connections. Refer to the wiring diagram and make corrections as needed.

11. Wiring Diagram



Warning: Electric shock

- Before repairing or installing this device, please disconnect all power supplies. There may be multiple power sources. Otherwise, property damage, personal injury or death may result.



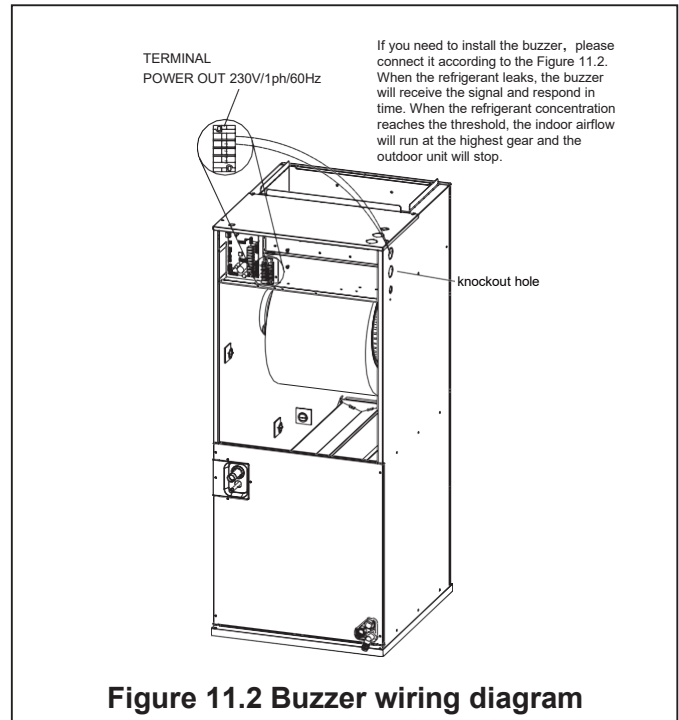
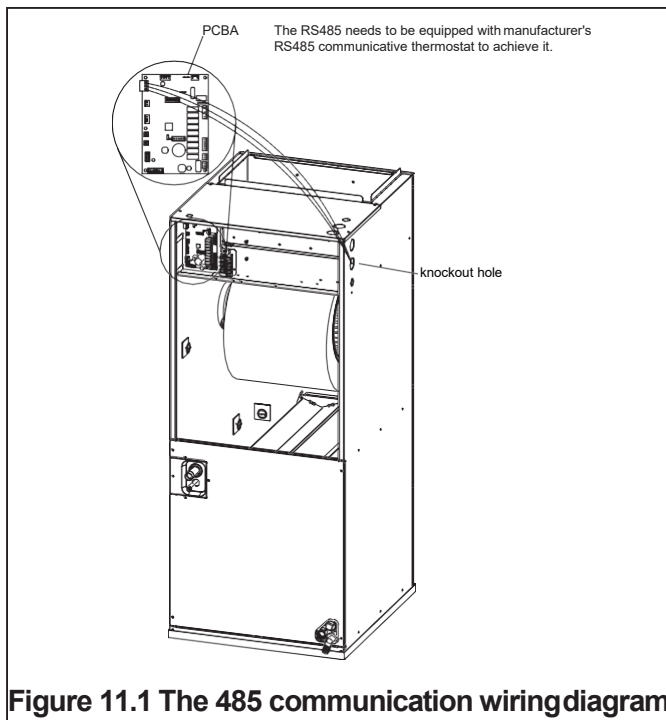
Danger: Electric shock

- The device must be properly grounded and protected by a circuit breaker or fuse.



Warning: Electric shock

- These devices must be wired and installed according to all national and local safety codes.



- To avoid electric shock, make sure:
 - 1) The equipment is properly grounded.
 - 2) The main power plug of the device has been connected to the ground wire (do not change it).
- Do not tighten the power cord.



The dotted line in the following thermostat wiring diagram indicates optional wiring (wiring for passive dehumidification function and/or electric heating). For the wiring of the thermostat, please refer to the user manual of the thermostat.



Dh wiring is optional and requires a thermostat with a humidifier. Dh plays the role of passive dehumidification and puts the indoor blower in the Low fan speed. If Dh wiring is missing, the system will run in the normal operation sequence.

Wiring for 3H and 2C thermostat

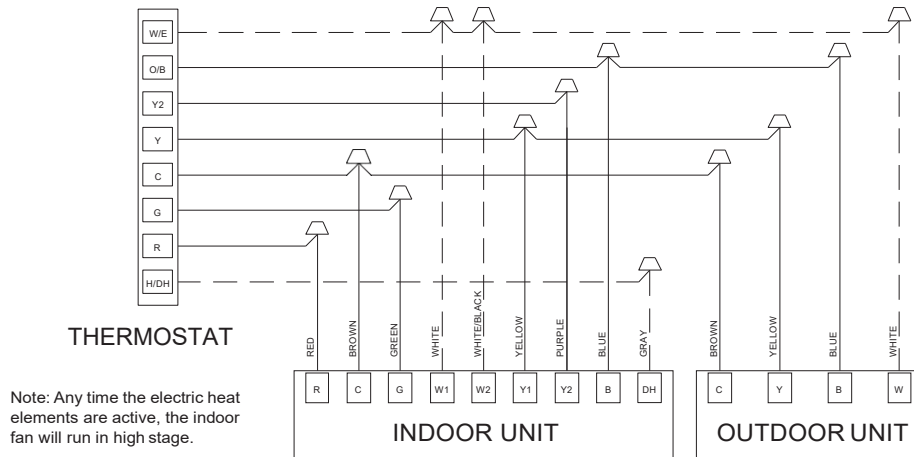


Figure 11.3 Control Wiring For HP Systems

Wiring for 4H and 2C thermostat

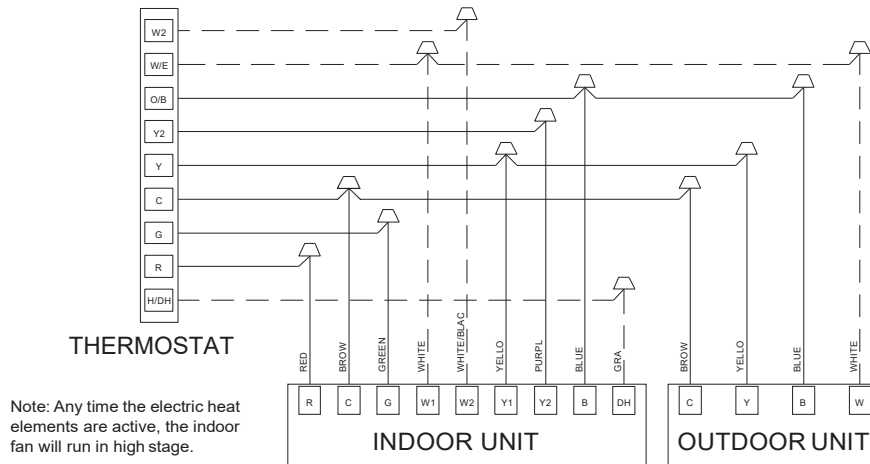


Figure 11.4 Control Wiring For HP Systems

Wiring for 3H and 1C thermostat

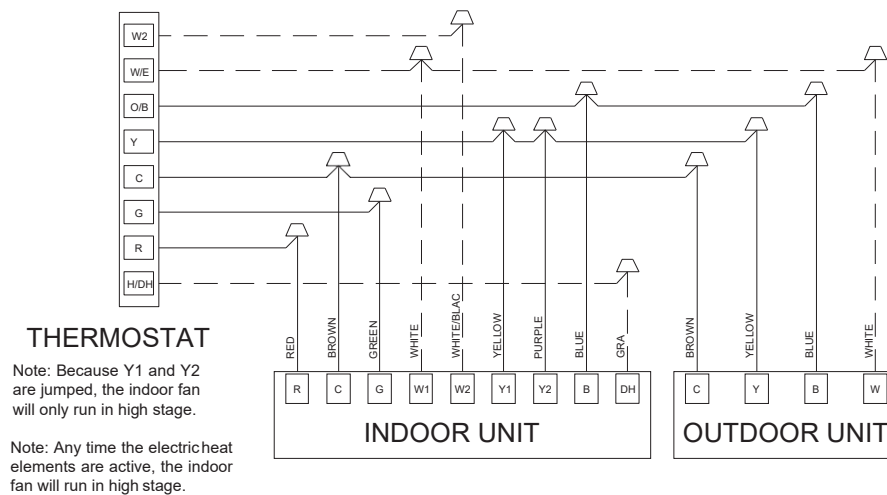


Figure 11.5 Control Wiring For HP Systems

Wiring for 2H and 2C thermostat

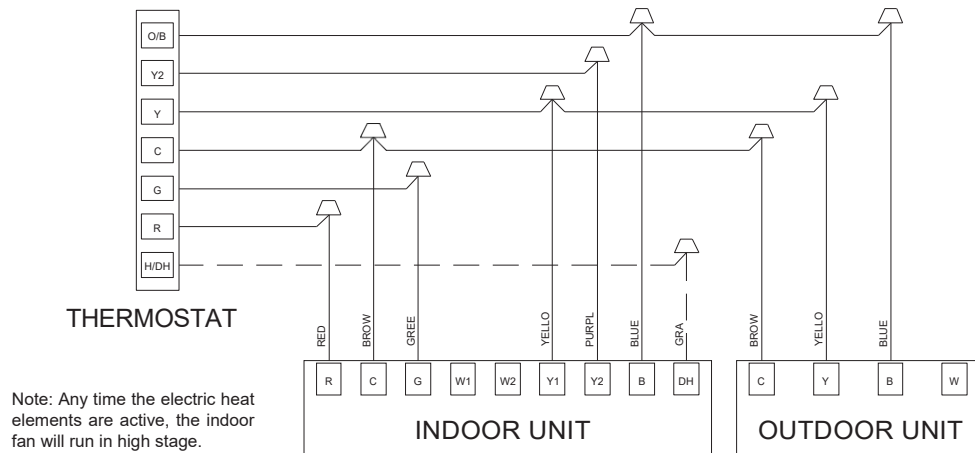


Figure 11.6 Control Wiring For HP Systems

Wiring for 1H and 1C thermostat

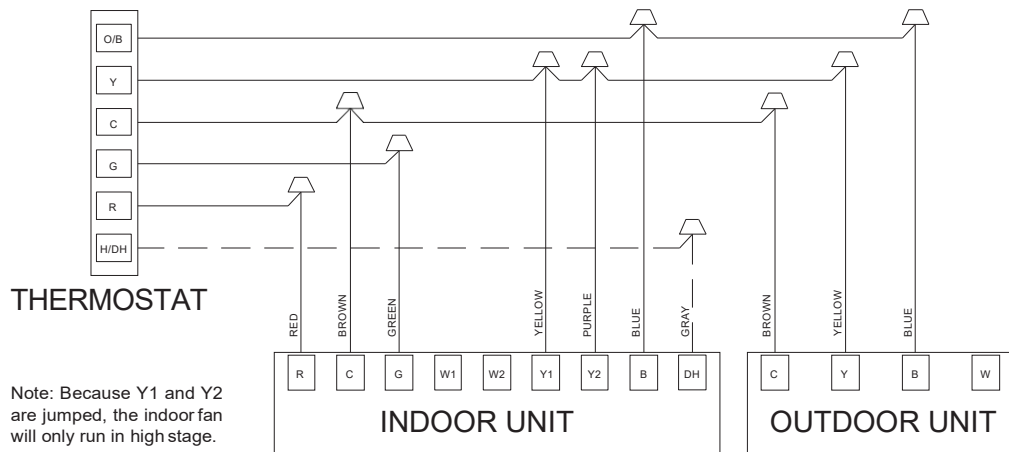


Figure 11.7 Control Wiring For HP Systems

Wiring for 2H and 1C thermostat

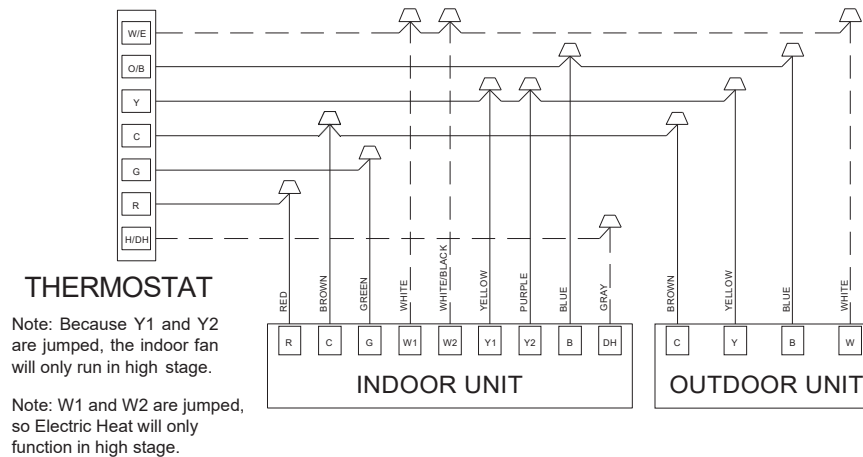
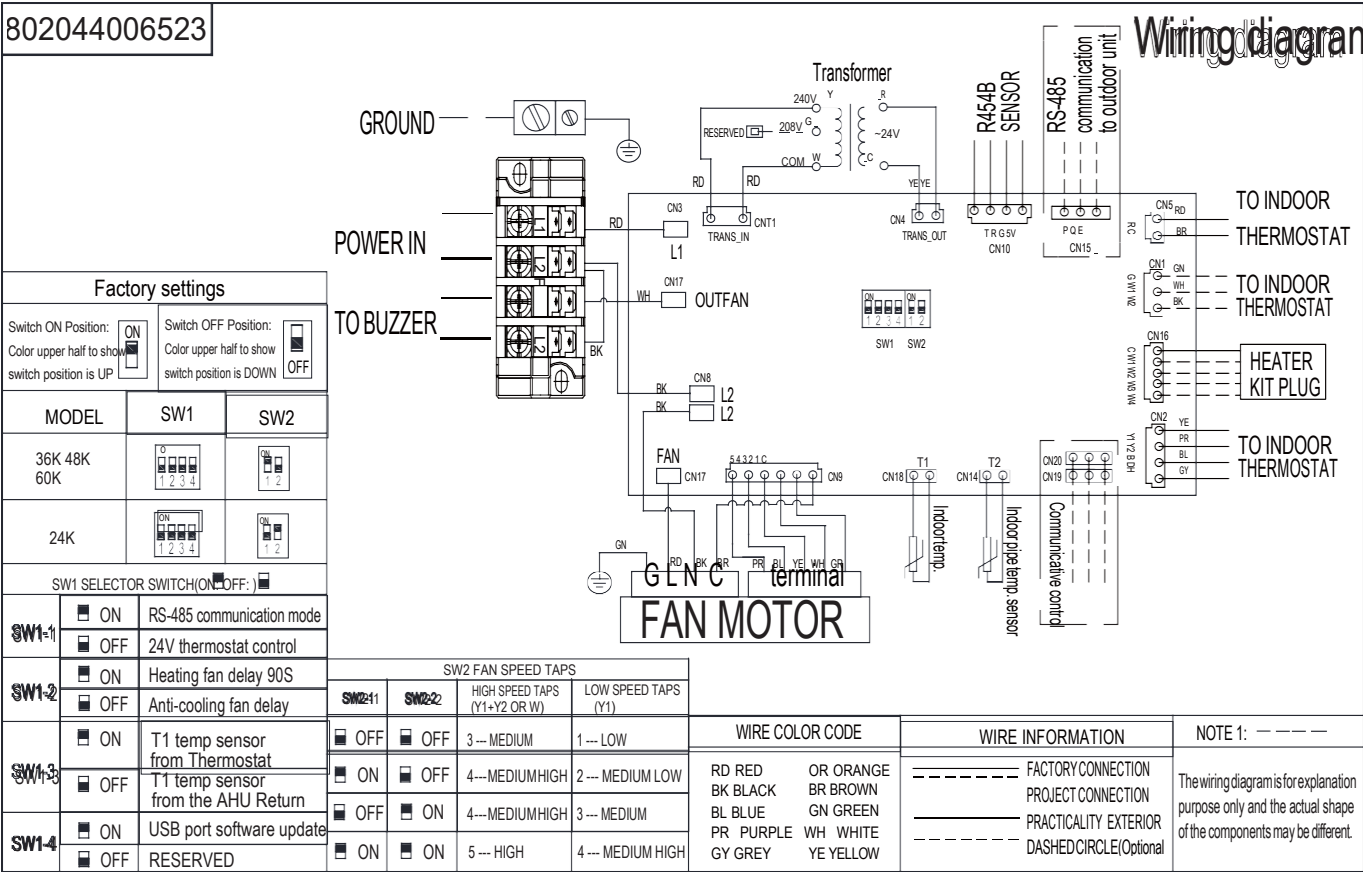


Figure 11.8 Control Wiring For HP Systems

Table 11.1 Wire gauge of high voltage system

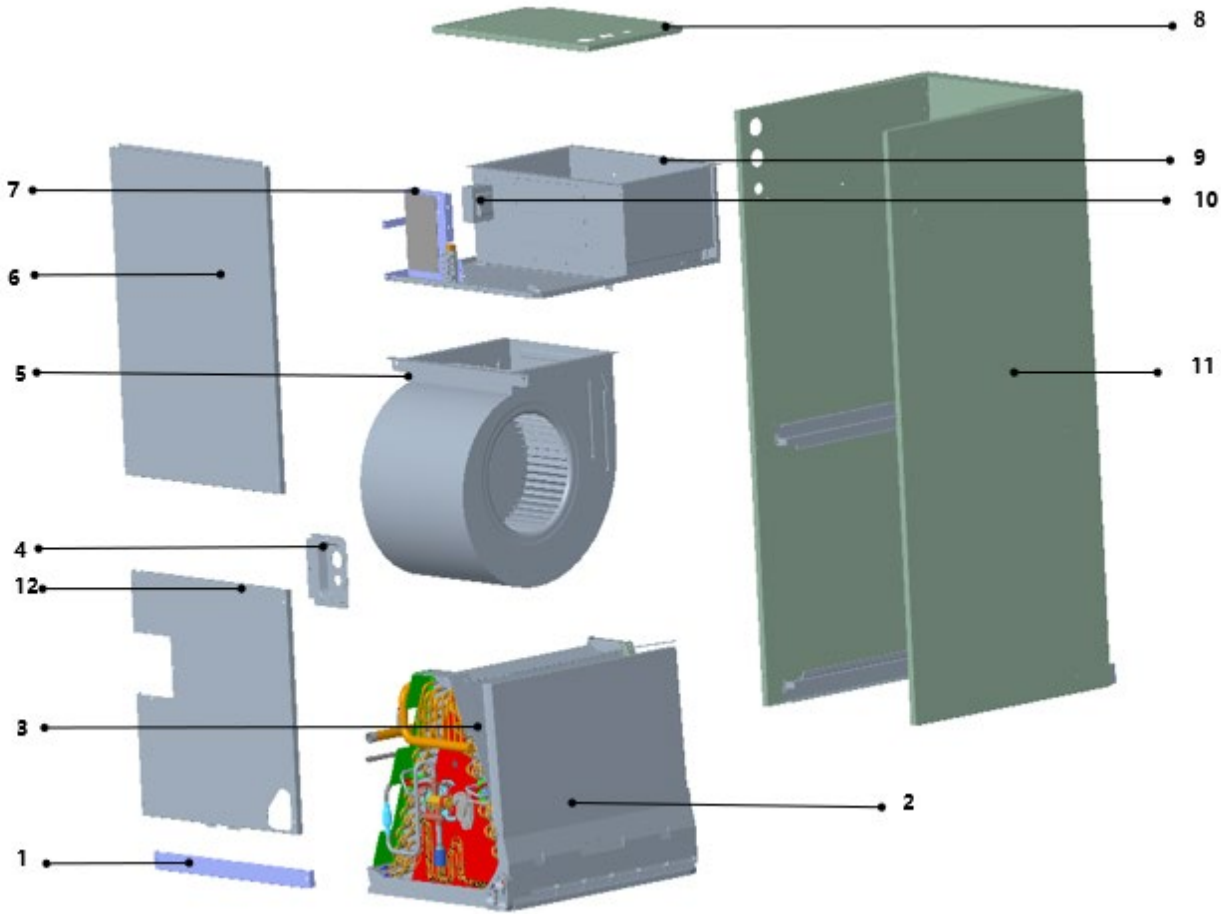
Type (Btu/ hour)			24K	36K	48K	60K
Power		Stage	Single			
		Voltage/frequency	208/230VAC, 60 Hz			
Wire gauge	Indoor unit power cord	Line quantity	3	3	3	3
		Wire diameter (AWG)	16	16	16	16
	Outdoor unit power cord	Line quantity	3	3	3	3
		Wire diameter (AWG)	14	12	10	10



Applicable to 24K/36K/48K/60K

NOTE: For reference only, the actual wiring diagram shall prevail

12.Exploded View



No.	Part Name	Quan.	No.	Part Name	Quan.
1	Filter Cover plate	1	3.10	Evaporator Fixing Plate #1	1
2	Water pan components	1	4	Pipe Cover plate assembly	1
2.1	Water pan# 1	1	5	Right Volute Wind Wheel	1
2.2	Water pan# 2	1	6	Upper side plate assembly	1
2.3	Water pan brace	2	7	Indoor electric control box assembly	1
3	Evaporator components	1	8	Control box cover assembly	1
3.1	Evaporator output tube assembly	1	9	Duct assembly	1
3.2	Evaporator input tube assembly	1	10	Transformers	1
3.4	Evaporator baffle	1	11	Rear Enclosure Assembly	1
3.5	Evaporator baffle	1	12	Down side plate assembly	1
3.6	Evaporator baffle	1	13	Refrigerant leakage sensor	1
3.7	Evaporator baffle	1	14	Temp. sensor (T1)	1
3.8	Evaporator baffle	1	15	Temp. sensor (T2)	1
3.9	Evaporator Fixing Plate #1	1	16	DC motor	1

Design, material, performance specifications and components
subject to change without notice.