Installation Manual: VHE Single-Piece Multi-Position Air Handlers



⚠ CAUTION

Risk of fire

This unit uses a mildly flammable (A2L) refrigerant. See A2L refrigerant safety considerations to ensure safe installation, operation, and servicing of this unit.

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About this unit

This single-piece air handler series provides the flexibility for installation in any position.

The VHE unit can be used for upflow, downflow, horizontal right, or horizontal left applications.

These units can be located in a closet, utility room, attic, crawl space, or basement. These versatile models may be used for cooling or heat pump operation with or without electric heat.

Top or side power and control wiring, color-coded leads for control wiring, and electric heaters all combine to make the installation easy and minimize installation cost.

Electric heat kits are available as field-installed accessories. Single-phase kits are available from 5 kW to 10 kW.

Certification

AHRI CERTIFIED™ www.ahridirectory.org

C ETL LISTED US Intertek

Assembled at a facility with an ISO 9001:2015-certified Quality Management System

GoTemp Pro app (Formerly DS Solutions app)

BHC Group Heating & Cooling believes in empowering our customers with up-to-date, unit-specific information. Download GoTemp Pro app, a powerful, comprehensive app designed for contractors on the jobsite, available now in the App Store for iOS and Google Play for Android. Use the app to scan the unique QR code on the unit rating plate for easy access to product information and resources such as nomenclature, technical guide, installation manual, wiring diagrams, parts list, product registration, warranty, and much more. Simplify your tasks, save time, and stay ahead with the most comprehensive app built for professionals.

GoTemp Pro

iOS

Android

Safety

It is important to understand the safety symbols used in this manual. Read safety information carefully and follow all safety requirements to ensure correct installation.

Understanding safety symbols and instructions

This is a safety alert symbol. When you see this symbol on labels or in manuals, be alert to the potential for personal injury.

Understand and pay particular attention to the signal words **DANGER**, **WARNING**, or **CAUTION**, as well as the **NOTICE**, **Important**, and **Note** alerts.

DANGER indicates an **imminently** hazardous situation, which, if not avoided, **will result in death or serious injury**.

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

CAUTION indicates a **potentially** hazardous situation, which, if not avoided **may result in minor or moderate injury**. It is also used to alert against unsafe practices and hazards involving only property damage.

NOTICE indicates information considered important, but not hazard-related, such as messages relating to property damage.

Important indicates information that is essential to complete a task or may result in damage to the device if not followed.

Note indicates something of special interest or importance. Notes can contain any type of information except safety information.

Safety requirements

WARNING

FIRE OR ELECTRICAL HAZARD

Failure to follow the safety warnings exactly could result in serious injury, death or property damage. A fire or electrical hazard may result causing property damage, personal injury or loss of life.

WARNING

The air handler area must not be used as a broom closet or for any other storage purposes, as a fire hazard may be created. Never store items such as the following on, near or in contact with the furnace.

1. Spray or aerosol cans, rags, brooms, dust mops, vacuum cleaners or other cleaning tools.

2. Soap powders, bleaches, waxes or other Cleaning compounds; plastic items or containers; gasoline, kerosene, cigarette lighter fluid, dry cleaning fluids or other volatile fluid.

3. Paint thinners and other painting compounds.

4. Paper bags, boxes or other paper products.

Never operate the air handler with the blower door removed. To do so could result in serious personal injury and/or equipment damage

⚠ WARNING

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.

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

⚠ WARNING

Improper installation, adjustment, alteration, or maintenance may create a condition where the operation of the product could cause personal injury or property damage. Refer to this manual for assistance, or for additional information, consult a qualified contractor, installer, or service agency.

⚠ CAUTION

This product must be installed in strict compliance with the installation instructions and any applicable local, state, and national codes including, but not limited to building, electrical, and mechanical codes.

NOTICE

To ensure a correct match for this indoor product, refer to the current *Tabular Data Sheet* for the outdoor equipment selected for the system application. If the indoor product model is not listed in the *Tabular Data Sheet* included with the outdoor unit, to access the current version of the *Tabular Data Sheet*, go to the *Residential Equipment & Supplies* section of the Offering Catalog at http://www.simplygettingthejobdone.com or scan the QR code provided on the outdoor unit nameplate.

- Only install this air handler in a location and position as specified in *Selecting a location for installation*.
- Do not use the air handler for temporary heating of buildings or structures under construction.
- Always install the air handler to operate within the air handler's intended maximum outlet air temperature.
- Clearance from combustible material is provided under *Selecting a location for installation*.

⚠ CAUTION

Do not lift the air handler by the cabinet braces. The cabinet braces could become disengaged from the cabinet causing the air handler to fall, potentially causing injury or damaging property. See *Becoming familiar with unit components* for the location of the cabinet braces. Lift the air handler by tightly gripping the casing.

- Verify the nameplate and power supply to ensure that the electrical characteristics match.
- When attaching ductwork with screws, carefully fasten the screws and keep them within 5/8 in. of the sides and back of the air handler.
- Install the air handler so the electrical components are protected from water.

- Installing and servicing heating and cooling equipment can be hazardous due to the electrical components. Only trained and licensed personnel must install, repair, or service heating and cooling equipment. Unlicensed service personnel can perform basic maintenance functions such as cleaning and replacing the air filters. When working on heating and cooling equipment, the safety requirements in the manuals and on the labels attached to each unit and other safety information must be observed as applicable.

⚠ CAUTION

These air handlers must be transported and handled in an upright, upflow position. Failure to do so may result in unit damage and personal injury. Configuration conversions must be done at the site of installation.

- These instructions cover minimum requirements and conform to existing national standards and safety codes. In some instances, these instructions exceed certain local codes and ordinances, especially those which have not kept up with changing residential and non-HUD modular home construction practices. These instructions are required as a minimum for a safe installation.
- These models are not agency listed or approved for installation into a HUD-approved modular home or a manufactured (mobile) home.

A2L refrigerant safety considerations



⚠ CAUTION

For R454B applications, this unit uses a mildly flammable (A2L) refrigerant. You must read all of this section before installing this unit to ensure safe installation, operation, and servicing of this unit.

⚠ 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.

⚠ WARNING

Any required ventilation openings must be kept clear of obstruction.

⚠ WARNING

Auxiliary devices which may be a potential ignition source shall not be installed in the duct work, unless they have been approved by the appliance manufacturer or are suitable for use with the refrigerant being used.

Examples of such potential ignition sources are hot surfaces with a temperature exceeding 700°C and electric switching devices.

⚠ WARNING

Any indoor field-made refrigerant joints shall be tightness tested with no leaks detected. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 25% of the maximum allowable pressure.

Note to the Inspector

The *A2L refrigerant safety considerations* section contains considerations unique to R-454B refrigerant installations and include field-testing the refrigerant dectection system (RDS).

General

Table 1: Safety considerations

Item number	Safety consideration
1	Any room with an appliance containing more than 3.91 lb in a refrigerating circuit must be constructed such that any refrigerant leak cannot stagnate in a way that would create a fire or explosion hazard.
2	Before 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, item 3 to item 7 below must be adhered to before conducting work on the system.
3	Work must be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
4	Instruct all maintenance staff and others working in the local area on the nature of work being carried out. Avoid work in confined spaces.
5	The area must be checked with an appropriate refrigerant detector before 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: non-sparking, adequately sealed, or intrinsically safe.
6	If conducting any hot work on the refrigerating equipment or any associated parts, you must have appropriate fire-extinguishing equipment on hand. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

Table 1: Safety considerations

Item number	Safety consideration
7	If conducting work in relation to the refrigerating system that involves exposing any pipework, do not use any sources of ignition in such a manner that may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, must be kept sufficiently far away from the site of installation, repair, removal, and disposal, during which refrigerant might possibly be released to the surrounding space. Before conducting any work, survey the area around the equipment to ensure that there are no flammable hazards or ignition risks. Display “No Smoking” signs.
8	Ensure the area is in the open or that it is adequately ventilated before opening the system or while conducting any hot work. The ventilation must safely disperse any released refrigerant and preferably expel it externally into the atmosphere.
9	Ensure that the sensor is not obstructed in any way.

Room size requirements

⚠ WARNING

If the unit must be installed in a residence with a minimum room area less than what is determined to be the minimum from Table 2, then that room must also not have any continuously operating open flames or other potential ignition sources. A device with a continuous pilot light may be present if that device is provided with an effective flame arrest.

Table 2: Minimum room area

System charge (lb -oz)	Minimum room area (ft^2)	Minimum total conditioned room area (ft^2) (Z)	Minimum total conditioned room area (m^2) (Y)	Minimum airflow (CFM)
4-0	200	120	11.14	216
5-0	250	150	13.93	271
6-0	300	180	16.72	325
7-0	350	210	19.50	379
8-0	400	240	22.29	433
9-0	450	270	25.08	487
10-0	499	300	27.86	541
11-0	549	330	30.65	595
12-0	599	360	33.43	649
13-0	649	390	36.22	704
14-0	699	420	39.01	758
15-0	749	450	41.79	812
16-0	799	480	44.58	866
17-0	849	510	47.37	920
18-0	899	540	50.15	974
19-0	949	570	52.94	1028
20-0	999	600	55.72	1082
21-0	1049	630	58.51	1136

Note:

- Minimum total conditioned room area refers to the combined area of all air conditioned rooms in the residence.

If the system charge is not listed in the above table, use the formulas below to calculate the respective values:

- Minimum conditioned room area (ft^2) = system charge x 29.9903
- Minimum conditioned room area (m^2) = system charge x 2.786
- Minimum system airflow (CFM) = system charge x 54.117

Altitude adjustment factors

If the unit is being installed at an elevation or altitude of 2600 ft (800 m) or higher, adjust the total conditioned room area (TA_{min}) in the minimum room area table by multiplying it by the altitude adjustment factor in Table 3 below:

Table 3: Altitude adjustment factor (feet and meters)

H_{alt}(ft)	H_{alt}(m)	Altitude adjustment factor
0-2600	0-800	1.00
2600	800	1.02
3300	1000	1.05
4000	1200	1.07
4600	1400	1.10
5200	1600	1.12
5900	1800	1.15
6600	2000	1.18
7200	2200	1.21
7900	2400	1.25
8500	2600	1.28
9200	2800	1.32
9800	3000	1.36
10500+	3200+	1.40

Mechanical ventilation

Table 4: Mechanical ventilation

Item number	Safety consideration
1	If installing the unit in a residence below the determined total conditioned area from Table 2, then extra mechanical ventilation is required.

Refrigerant equipment checks

Table 5: Refrigerant equipment checks

Item number	Safety consideration
1	Where electrical components are being changed, they must be fit for the purpose and to the correct specification. At all times, the manufacturer's maintenance and service guidelines must be followed. If in doubt, consult the manufacturer's technical department for assistance.
2	Apply the following checks to installations using flammable refrigerants: • Ensure the actual refrigerant charge is in accordance with the room size within which the refrigerant-containing parts are installed. • Ensure the ventilation machinery and outlets are operating adequately and are not obstructed. • Ensure marking on the equipment continues to be visible and legible. Correct any markings and signs that are illegible. • Install refrigerating pipe or components in a position where they are unlikely to be exposed to any substance that may corrode refrigerant-containing components, unless the components are constructed of materials that are inherently resistant to being corroded or are suitably protected against being corroded.

Electrical devices checks

Table 6: Electrical devices checks

Item number	Safety consideration
1	Repair and maintenance to electrical components must include initial safety checks and component inspection procedures.
2	If a fault exists that could compromise safety, then do not connect any electrical supply to the circuit until the fault is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, use an adequate temporary solution. This must be reported to the owner of the equipment so all parties are advised.
3	Initial safety checks must include: • Ensure capacitors are discharged: take care to avoid the possibility of sparking. • Ensure no live electrical components and wiring are exposed while charging, recovering, or purging the system. • Ensure there is continuity of earth bonding.

Detection of refrigerant

Table 7: Detection of refrigerant

Item number	Safety consideration
1	Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. Do not use a halide torch or any other detector using a naked flame.
2	The following leak detection methods are deemed acceptable for all refrigerant systems. • Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate or may need re-calibration. Calibrate the detection equipment in a refrigerant-free area. Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Set leak detection equipment at a percentage of the LFL of the refrigerant and calibrate to the refrigerant employed. Ensure the appropriate percentage of gas with a maximum of 25% is confirmed. • Leak detection fluids are also suitable for use with most refrigerants but avoid the use of detergents containing chlorine as the chlorine may react with the refrigerant and corrode the copper pipework. Examples of leak detection fluids are bubble method and fluorescent method agents.
3	If a leakage of refrigerant is found that requires brazing, recover all of the refrigerant from the system or isolate the leakage by means of shut-off valves in a part of the system remote from the leak. Remove refrigerant according to the *Removal and evacuations* section of the outdoor unit's *Installation Manual*.

Decommissioning

Before you begin:
Before attempting the procedure, complete the following:

- Ensure that the technician is completely familiar with the equipment and all its detail.
- Ensure to safely recover all refrigerants.
- Take an oil and refrigerant sample, in case analysis is required before reusing the recovered refrigerant.
- Ensure that electrical power is available.
- Ensure that mechanical handling equipment is available, if required, for handling refrigerant cylinders.
- Ensure that all personal protective equipment is available and being used correctly.
- Ensure that the recovery process is supervised at all times by a competent person.
- Ensure that recovery equipment and cylinders conform to the appropriate standards.

Follow the steps below to ensure the unit is correctly and safely decommissioned:

1. Isolate the system electrically.
2. Connect a recovery machine to remove refrigerant from the system.
3. Ensure that the cylinder is situated on the scales before recovery takes place.
4. Start the recovery machine and operate in accordance with instructions provided with the machine.

   ⓘ **Note:**
   - Do not overfill cylinders to more than 80% volume liquid charge.
   - Do not exceed the maximum working pressure of the cylinder, even temporarily.

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

   ⓘ **Note:** Do not charge recovered refrigerant into another refrigerating system unless it has been cleaned and checked.

Label the equipment stating that it has been decommissioned and emptied of refrigerant. Date and sign the label. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating that the equipment contains a flammable refrigerant.

Installation

Complete all installation stages. You may not need to perform some tasks outlined, depending on the specific installation.

Important: See A2L refrigerant safety considerations and follow procedures as required.

Preparing for installation

Complete the necessary preparation before you begin the installation:

1. Inspect the unit for possible damage in transit.
2. Select a suitable location if it is not already predetermined. Take into consideration factors such as structural support, space for service access, and operating sound levels.
3. Provide the required clearances around the unit.
4. Perform a pressure check.
5. Understand any installation and operational limitations such as unit size.
6. Familiarize yourself with the unit components, dimensions, and make sure you have all necessary equipment.
7. Install an electric heat kit if required.

Important: If you do not install an electric heat kit, you must mark the unit nameplate appropriately to indicate that no electric heat kit is installed.

Inspecting the unit

There are no internal shipping or spacer brackets to remove.

To inspect the unit, do the following:

1. Inspect the air handler, including the coil, immediately after receiving it for possible damage during transit. Ensure that you also check the drain pan for cracks or breakage.
2. If damage is evident, do the following:
   a. Note the extent of the damage on the carrier's freight bill.
   b. Make a separate written request for the carrier's agent to inspect the unit.
   c. Contact the local distributor for more information.
3. Check to ensure that the air handler is still under pressure. See Performing a pressure check.
4. Check the unit for screws or bolts loosened in transit.
5. Verify that all accessories, such as a heat kit, are available.

   Note: Complete the installation of these accessories or field conversion of the unit before setting the unit in place or connecting any wiring, ductwork, or piping.

Selecting a location for installation

Location is usually predetermined. Check with the owner's or dealer's installation plans. If location has not been decided, consider the following in choosing a suitable location:

- Select a location with adequate structural support, space for service access, and clearance for air return and supply duct connections.
- Do not use hanging brackets to wall mount this single-piece air handler unit.
- Normal operating sound levels may be objectionable if the air handler is placed directly over some rooms, such as bedrooms or a study.

- Select a location that permits installation of the condensate line to an open drain or outdoors, allowing condensate to drain away from the structure.

NOTICE

The primary and secondary drain lines must be trapped to allow adequate drainage of condensate water. The secondary drain line must be piped to a location that gives the occupant a visual warning that the primary drain is clogged. If the secondary drain line is not used, it must be capped.

- When installing an indoor coil in an attic or above a finished ceiling, you must use an auxiliary drain pan under the air handler as is specified by most local building codes.
- A sufficient electrical supply must be available.
- If locating the unit in an area of high humidity, such as an unconditioned garage or attic, nuisance sweating of the casing may occur. On these installations, completely seal the unit duct connections and other openings, and use a wrap of 2 in. fiberglass insulation with vinyl vapor barrier.

Providing the required clearances

It is essential to provide the following clearances:

- Refrigerant piping and connections - minimum 12 in.
- Maintenance and servicing access - minimum 36 in. from the front of the unit for blower motor or coil replacement
- Condensate drain lines routed to clear filter and panel access
- Filter removal - minimum 24 in.
- The supply air ductwork connected to this unit is designed for 1 in. clearance for the first 18 in. of combustible materials if an electric heat kit is installed.

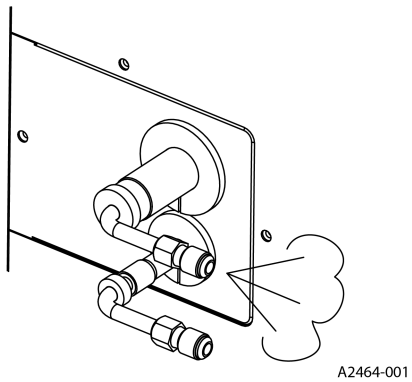
Note: You must maintain clearances for servicing and allow access to the electric heaters and blower.

Performing a pressure check

It is important to perform a pressure check before you begin installing the unit. To do so:

- Depress the Schrader valve core one time to check for pressure.

Figure 1: Pressure check



Understanding installation and operation limitations

Adhere to the following:

- The size of the unit must be based on an acceptable heat loss or gain calculation for the structure. Use Air Conditioning Contractors of America (ACCA) Manual J or another approved method.
- Only connect the air handler to a duct system that has an external static pressure within the allowable range.
- Airflow must be within the minimum and maximum limits approved for electric heat, indoor coils, and outdoor units.

Entering air temperature limits			
Wet bulb temperature (°F)		**Dry bulb temperature (°F)**	
Minimum	Maximum	Minimum	Maximum
57	72	65	95

- When installing an air handler so that supply ducts carry air circulated by the air handler to areas outside the space containing the air handler, the return air is also handled by one or more ducts sealed to the air handler casing and terminating in the space to be cooled or heated.
- The nameplate displays the air handler model number. The unit dimensions for the supply air plenum are provided in Becoming familiar with the unit dimensions. Always install the plenum according to the instructions.
- Check the available supply power and verify that it is in the normal operating voltage range for the unit. The acceptable voltage range for these units is as follows:

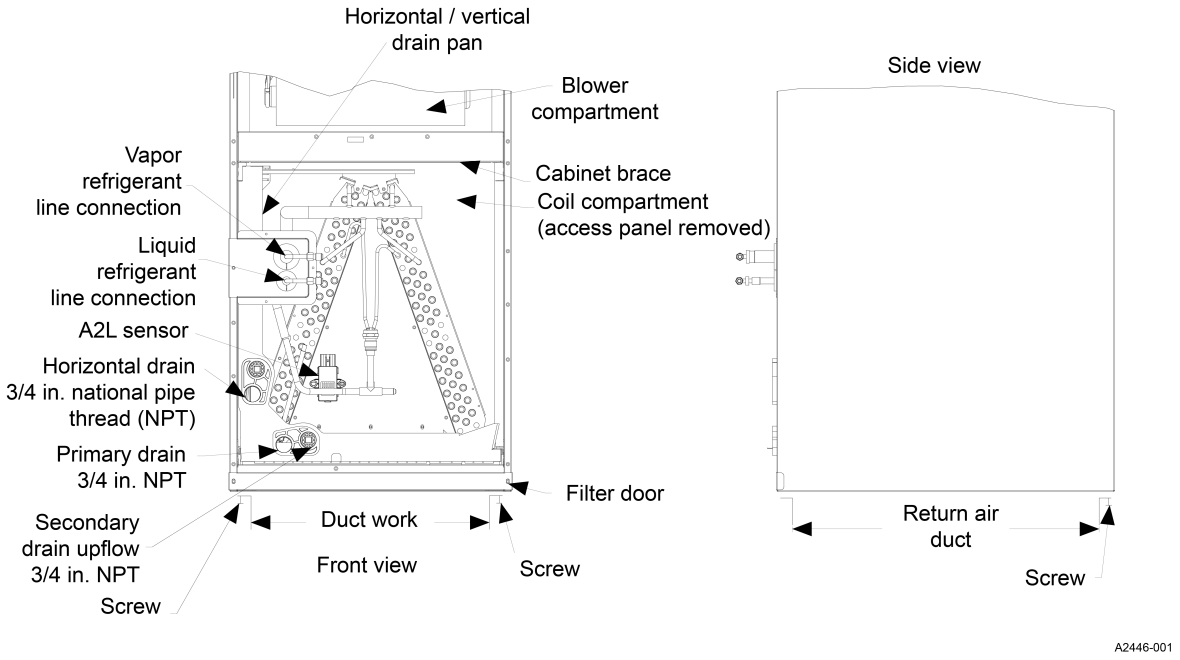
Air handler voltage	**Normal operating voltage range**[1]
208/230-1-60	187 V to 253 V

1 Rated in accordance with AHRI Standard 110, utilization range A

Becoming familiar with the unit components

- Make sure that you are familiar with the unit components before you begin the installation. See Figure 2.

Figure 2: Return air duct attachment and component location



Becoming familiar with the unit dimensions

- Make sure that you are familiar with the unit dimensions before you begin the installation. See Figure 3 and Table 8.

Figure 3: Dimensions and duct connection dimensions

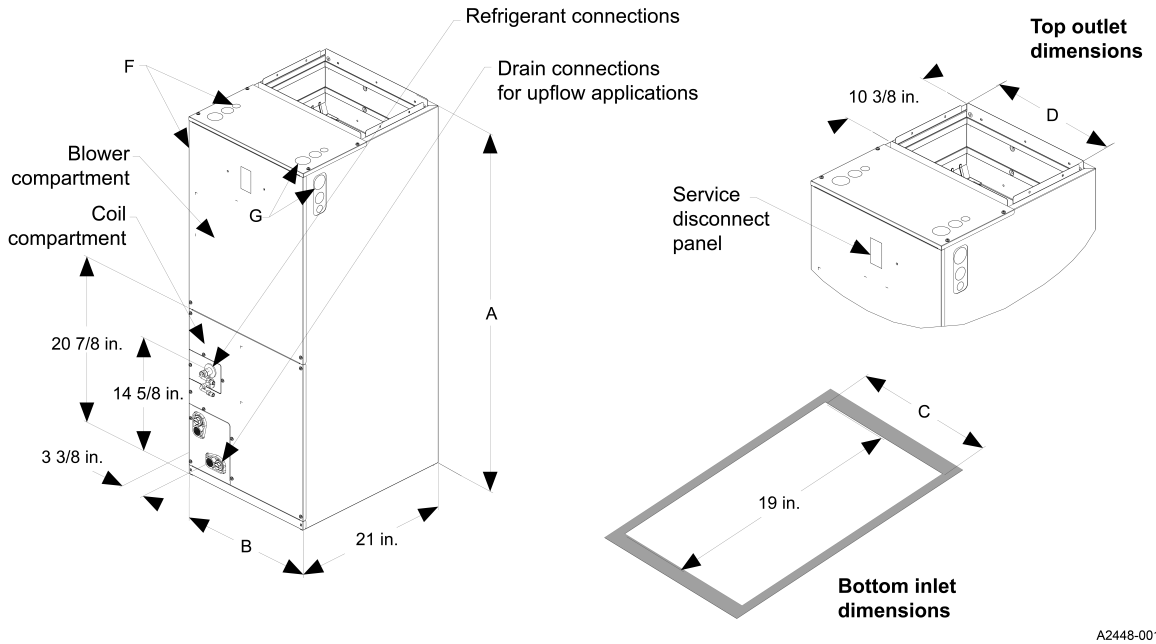


Table 8: Dimensions

Models	Dimensions				Wiring knockouts (actual conduit size)		Refrigerant connections service valve size	
	A	B	C	D	F	G		
	Height (in.)	Width (in.)	Opening widths (in.)		Control (in.)	Power (in.)	Liquid (in.)	Vapor (in.)
VHE18B5YK2SS1	45	17 1/2	14 1/4	16	7/8	1 3/4	3/8	5/8
VHE24B5YK2SS1	45	17 1/2	14 1/4	16		1 3/8		
VHE30B5YK2SS1	45	17 1/2	14 1/4	16		7/8		

Installing an electric heat kit

If the air handler requires electric heat, use only 9HK heater kits, as listed on the air handler nameplate and in these instructions. Use data from Unit data for information on the required minimum motor speed tap to use for heating operation and the maximum overcurrent protection device required as listed for the air handler and electric heat kit combination.

NOTICE

All wiring must comply with local and national electrical code requirements. Read and heed all unit caution labels.

Important:

- It is best practice to install the electric heat kit before installing the air handler. For ease of installation, remove the air handler top panel to provide better access to the control board and electric heat kit area.
- If the air handler does not require electric heat, mark the nameplate to indicate that no electric heat kit is installed.

To install an electric heat kit, do the following:

1. Locate the two removable block off plates above the blower section where electric heat can be installed. Be aware that 5 kW, 7.5 kW, and 10 kW electric heat kits must be installed in the upper section.
2. Remove the upper block off plate and retain the screws.
3. Check the airflow direction label on the electric heat kit and slide the electric heat kit into the blower chute in the correct orientation. Secure the electric heat kit with the screws removed in Step 2.
4. Place the service disconnect into the breaker bracket.
5. Secure the breaker bracket to the cabinet mounting rail with the screws provided.
6. Wire the incoming power supply to the service disconnect.
7. Be aware that the electric heat kit comes with a low-voltage wiring adapter that goes from a 6 pin to a 4 pin connector. Connect the low-voltage plug on the electric heat kit to the unit control board. When doing so, use the low-voltage wiring adapter only if necessary.
8. After installing the electric heat kit, mark the air handler nameplate to designate the electric heat kit that was installed.

Installing the unit

NOTICE

Do not handle aluminum coil components after handling the copper refrigeration piping or other tubing without first cleaning your hands.

To install the unit correctly, you must do the following:

1. Design and install the ductwork if required.
2. Consider air handler configuration options. Convert the unit for downflow or horizontal right use.
3. Suspend the unit in a horizontal application - if applicable.
4. Connect the supply and return air ductwork.
5. Install the air filters.
6. Connect the condensate drain lines.

Designing and installing the ductwork

Air supply and return may be handled in one of several ways best suited to the installation. Upflow, horizontal, or downflow applications may be used. The vast majority of problems encountered with heating and cooling systems can be linked to incorrectly designed or installed duct systems. It is therefore highly important to the success of an installation that the duct system be correctly designed and installed.

ⓘ **Note:** Ductwork that is not designed to match the supply air opening can cause turbulence inside the plenum. This turbulence can change the airflow patterns across electric heater limit switches.

⚠ WARNING

Do not bring in return air from a location which could introduce hazardous substances into the airflow.

Use 1/2 in. screws to connect ductwork to the cabinet. If pilot holes are drilled, drill only through the field duct and the unit flange.

⚠ CAUTION

This unit is not designed for non-ducted (freeblow) applications. Do not operate without ductwork attached to the unit.

Never operate the equipment without filters.

To design and install the ductwork, do the following:

- When installing a central air return grille in or near the living space, design the ductwork so that the grille is not in direct line with the opening in the unit. One or two elbows and acoustical duct liner ensure a quieter system. For operation where the return air duct is short or where sound may be a problem, use acoustical duct liner inside the duct.
- You must insulate ductwork where it runs through an unheated space during the heating season or through an uncooled space during the cooling season. Use a vapor barrier to prevent absorption of moisture from the surrounding air into the insulation.

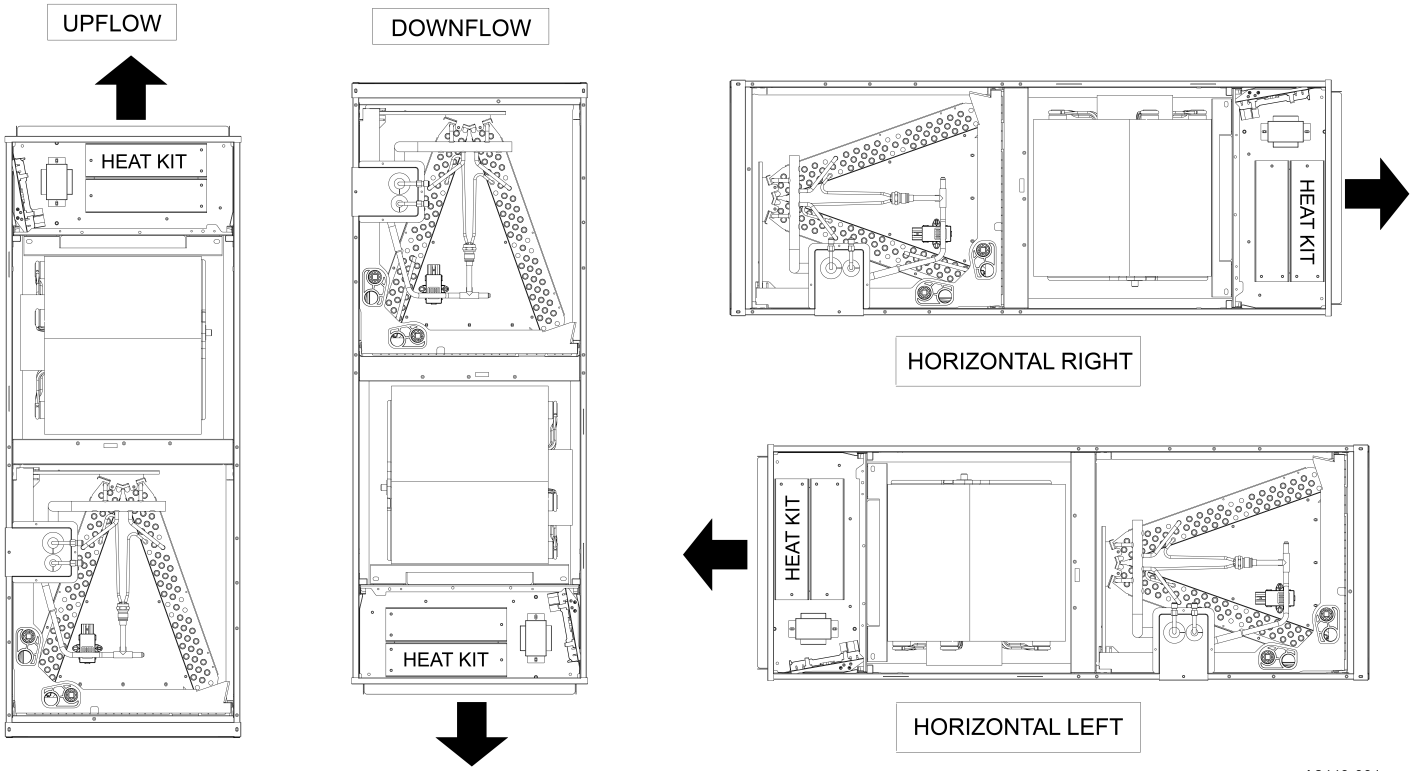
- Be aware that you must use a transition to securely connect the supply air duct to the unit opening.
- Suspend all ducts using flexible hangers and never fasten directly to the structure.
- You must fabricate and install ductwork in accordance with local and national codes. This includes the standards of the National Fire Protection Association for Installation of Air-Conditioning and Ventilating Systems, NFPA No. 90B. If using electric heat, you must use a non-flammable material. Duct systems must be designed in accordance with ACCA Manual D.

Understanding unit configuration

These air handler units are supplied ready to install in an upflow or horizontal left position. A horizontal drain pan is factory installed. Proceed as follows:

1. See Figure 4 to determine what configuration option to choose.

Figure 4: Configuration options



2. If you require either a downflow or horizontal right airflow configuration, you must reposition the coil assembly. See Converting the unit for downflow or horizontal right use.

Converting the unit for downflow or horizontal right use

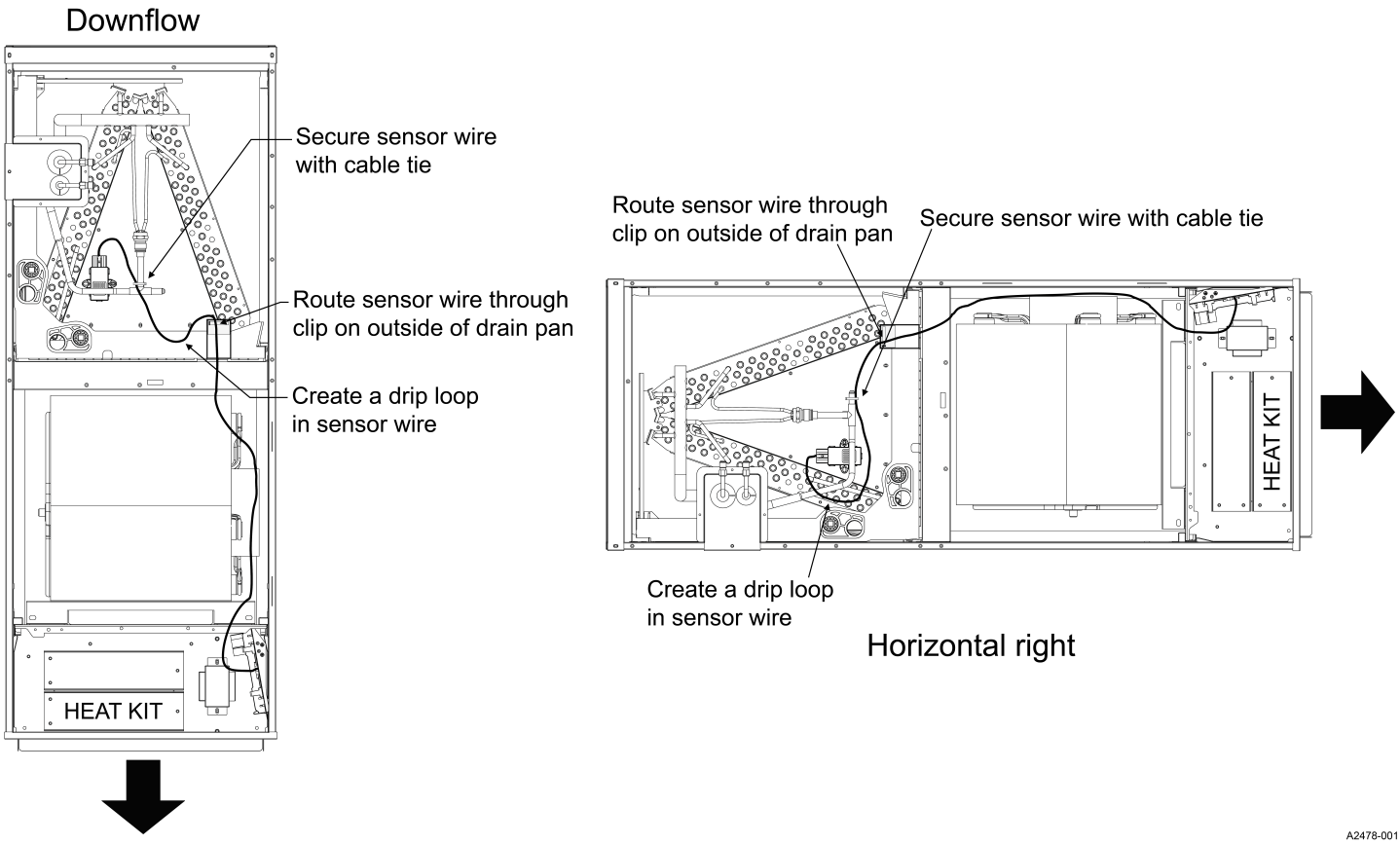
NOTICE

Convert the air handler to the required orientation before installation. Conversion must be made before brazing the refrigerant connections to the coil.

1. Remove the coil and blower access panel.

2. Disconnect the A2L refrigerant sensor wire from the adapter block by the unit control board so that the sensor can be removed with the coil without detaching the sensor from the coil. You must cut and remove a nylon cable tie. Create a drip loop in the sensor wire and secure it with a new field-provided cable tie as shown in Figure 5.

Figure 5: A2L sensor wiring - downflow and horizontal right



3. Slide the coil and drain pan assembly out of the air handler cabinet.
4. Turn the air handler cabinet upside down so that it is in the downflow position.
5. Slide the coil and drain pan assembly back into the air handler cabinet.
6. Route the sensor wire through the clip built into the unit drain pan and back into the control board area. See Figure 5.
7. Reconnect the A2L refrigerant sensor wire to the adapter block by the control board. See Figure 5.
8. Reattach the access panels.

Suspending the unit in horizontal applications

These air handlers may be suspended in horizontal applications. Use angle steel support brackets with minimum 3/8 in. threaded rods, supporting the unit from the bottom.

NOTICE
When assembling the support structure, size to provide clearance for access door removal.

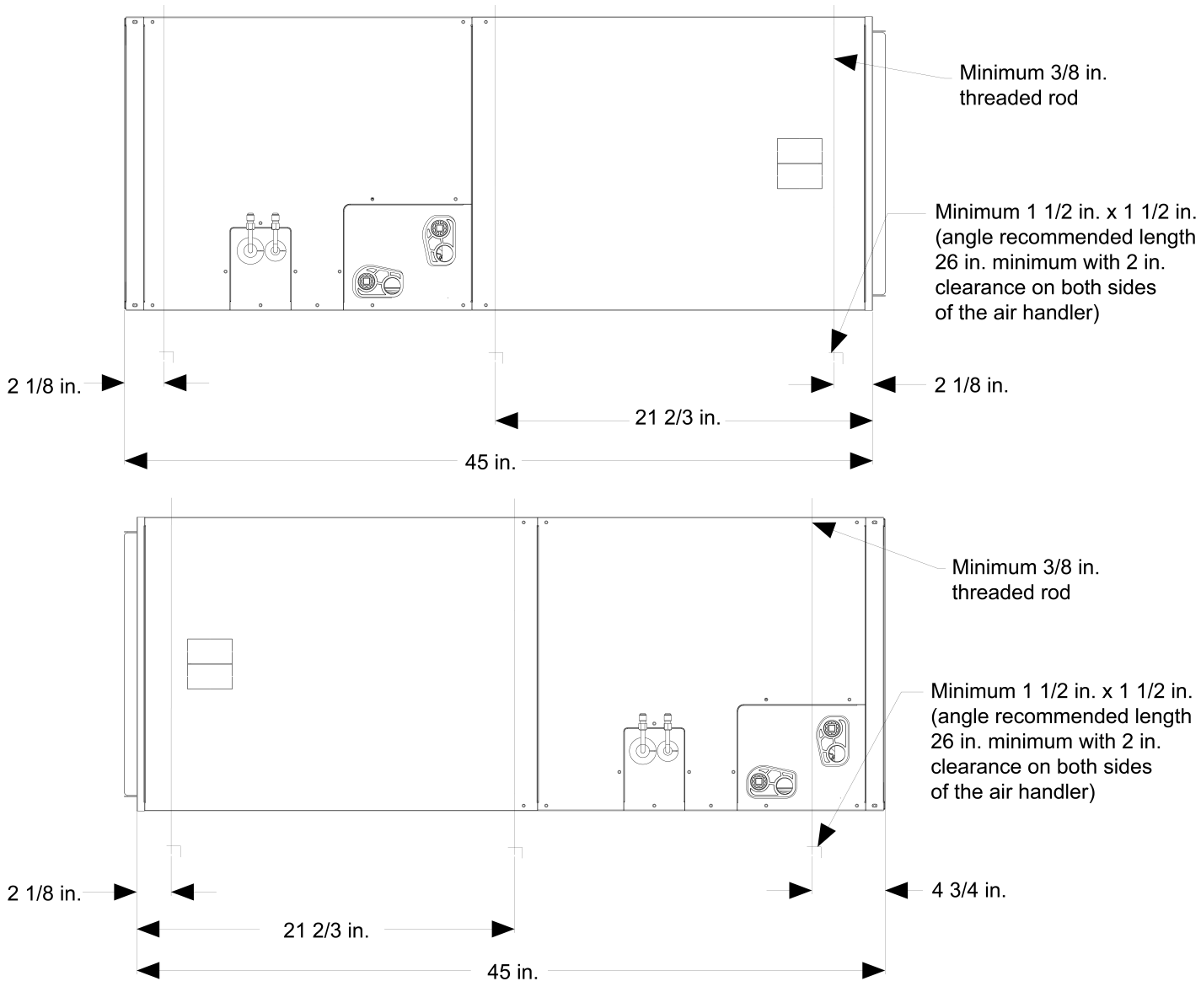
⚠ CAUTION

Do not lift the air handler by the cabinet braces. The cabinet braces could become disengaged from the cabinet causing the air handler to fall, potentially causing injury or damaging property. See Figure 2 for the location of the cabinet braces. Lift the air handler by tightly gripping the casing.

To suspend the unit in a horizontal application, do the following:

1. Install angle steel support brackets in your chosen installation location.
2. Attach the threaded rods at the locations shown in Figure 6, leaving enough clearance between the door and the rod so that doors can be easily removed for service. See Table 8 for the dimensions for the specific model.

Figure 6: Suspension support locations for horizontal applications



Connecting the unit to the ductwork

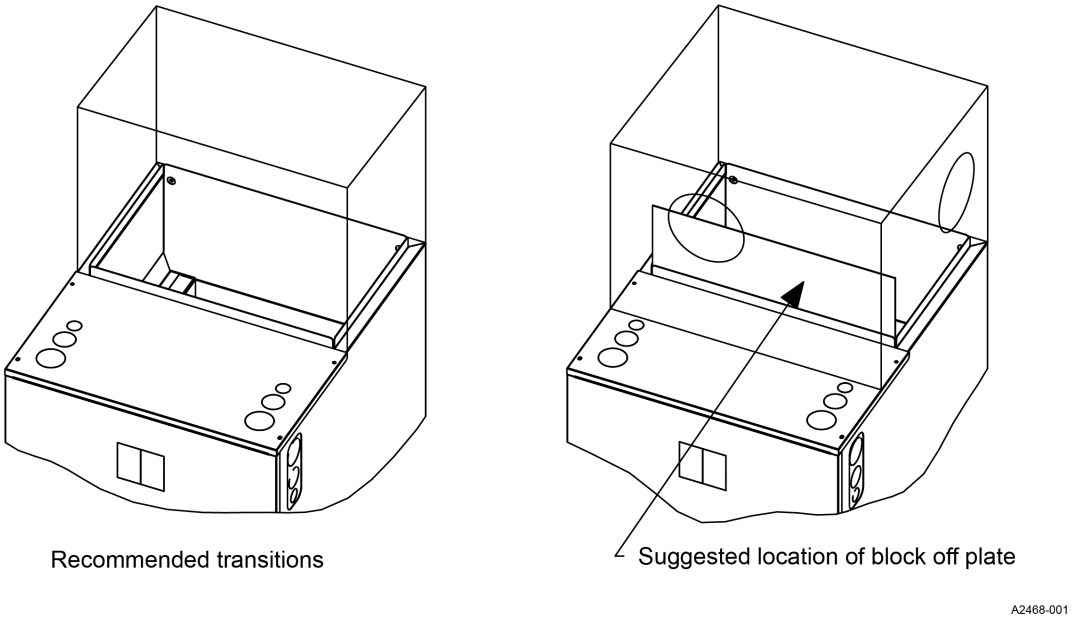
There are several ways to handle the supply and return air duct connections. The location and sizing of the connections depends on the situation and the method best suited to the installation. Upflow, horizontal, or downflow applications may be used. Use flexible duct connectors to minimize the transmission of vibration and noise into the conditioned space.

Note: Ductwork that is not designed to match the supply air opening can cause turbulence inside the plenum. This turbulence can change the airflow patterns across electric heater limit switches.

To connect the unit to the ductwork, do the following:

1. Use a transition to securely connect the supply air duct to the unit opening. See Becoming familiar with the unit dimensions for air handler unit inlet and outlet dimensions.
2. If you cannot fabricate the recommended transition, attach a block-off plate approximately 8 in. high and running the full width of the plenum to the supply opening. See Figure 7. Using this block-off plate enables better air circulation across the limit switches.

Figure 7: Ductwork transition



CAUTION

Use 1/2 in. screws to connect ductwork to the unit. Longer screws may pierce the drain pan and cause leakage. If drilling pilot holes, drill only though the field duct and the unit bottom duct flange.

Installing the air filters

⚠ CAUTION

Never operate the equipment without filters.

You must install return air filters. Filters are field supplied and filtration can be accomplished external to the unit or the internal filter rack can be used. To install air filters, do the following:

- Secure the air filters in the return air ductwork as required.

Connecting the condensate drain lines

Before you begin:
Adhere to the following when connecting the condensate drain lines:

- Pitch all drain lines 1/4 in./ft away from the unit drain pan and ensure that the drain lines are no smaller than the coil drain connection.
- Route the drain line so that it does not impede access to the coil, air handling system, or filter and it is not exposed to freezing temperatures.
- Instruct the homeowner that the indoor coil drain pan must be inspected and cleaned regularly to prevent odors and ensure sufficient drainage.
- Install the air handling unit pitched slightly toward the drain end.
- If the coil has a secondary drain, pipe it to a location that gives the occupant a visual warning that the primary drain is clogged. If not using a secondary drain, you must plug the secondary drain.

  ⓘ **Note:** You can remove drain plugs using a standard 11/16 in. open end wrench or socket.

⚠ CAUTION

Avoid double trapping.

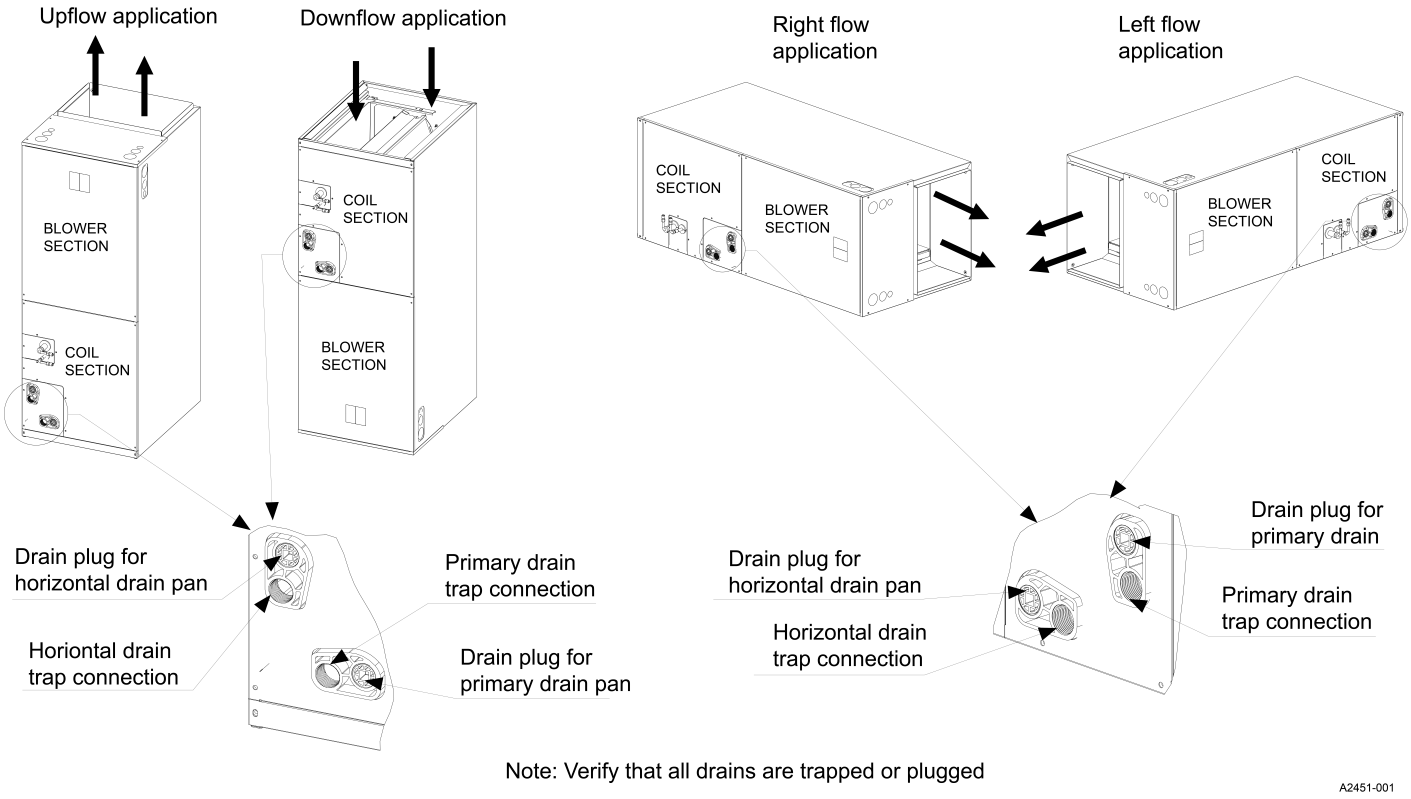
⚠ CAUTION

Threaded drain connections must be hand tightened and by no more than one turn.

⚠ CAUTION

Do not use PTFE tape, pipe thread compound, or other sealants. Use of a sealant can cause damage and premature failure of the drain pan.

Figure 8: Location of coil trapped and plugged drain connections



Installing the refrigerant piping

Perform the following steps to install the refrigerant piping:

1. Prepare to connect the refrigerant lines.
2. Check for leaks, then evacuate and charge the system.
3. Complete the refrigerant piping installation.

Preparing to connect the refrigerant lines

⚠ CAUTION

The coil is under inert gas pressure. Relieve pressure from the coil by depressing the Schrader valve core at the end of the suction manifold stub out.

⚠ CAUTION

Dry nitrogen must always be supplied through the tubing while it is being brazed, because the temperature required is high enough to cause oxidation of the copper unless an inert atmosphere is provided. The flow of dry nitrogen must continue until the joint has cooled. Always use a pressure regulator and safety valve to ensure that only low pressure dry nitrogen is introduced into the tubing. Only a small flow is necessary to displace air and prevent oxidation.

NOTICE

Do not handle aluminum coil components after handling the copper refrigeration piping or other tubing without first cleaning your hands.

- Connect the refrigerant lines by brazing the connections as outlined in Brazing the refrigerant lines.
- Be aware that coil models have lines that are expanded to receive the field refrigeration piping. Make suction and liquid line connections outside of the cabinet. Leave the tubing connection panel attached to the cabinet. When brazing the connections, remove the coil access panel.

Brazing the refrigerant lines

⚠ CAUTION

Dry nitrogen should always be supplied through the tubing while it is being brazed, because the temperature required is high enough to cause oxidation of the copper unless an inert atmosphere is provided. The flow of dry nitrogen should continue until the joint has cooled. Always use a pressure regulator and safety valve to ensure that only low pressure dry nitrogen is introduced into the tubing. Only a small flow is necessary to displace air and prevent oxidation.

To braze the refrigerant lines, do the following:

1. Remove the grommets where tubes exit the cabinet to prevent burning them during brazing.
2. Wrap a water-soaked rag around the coil connection tubes inside the cabinet to avoid transferring excess heat to the coil and the TXV.
3. The suction and liquid line connections have brazed on caps. Using a torch, carefully heat the piping behind the caps while pulling on the 1/4 in. stub outs connected to the caps.
4. Insert the liquid line and the suction line into the coil connections at the coil cabinet tubing panel.
5. Purge the refrigerant lines with dry nitrogen during brazing.

NOTICE

All indoor coil connections are copper-to-copper and must be brazed with a phosphorous-copper alloy material such as Silfos-5 or equivalent. **Do not** use soft solder.

6. Braze the suction line and the liquid line, and allow the joints to cool.
7. Install the grommets to the lines carefully to prevent air leakage. In some units, the vapor line grommet may be shipped as a loose part with the unit.

Checking for leaks, evacuating, and charging the unit

- Refer to the *Installation Manual* for the outdoor unit and complete the leak check, evacuation, and charging according to the instructions provided. Check all field-brazed joints and metering device connections.

Completing the refrigerant piping

Before you begin:
Make sure that you have connected the refrigerant lines using the brazing method before you complete the final refrigerant piping installation steps. Proceed as follows:

1. Attach the coil access panel to the cabinet.
2. Ensure that the lines are sound isolated by using the appropriate hangers or strapping.

Connecting the wiring

See Wiring diagrams for relevant wiring diagrams.

NOTICE

All wiring must comply with local and national electrical code requirements. Read and heed all unit caution labels.

To connect the wiring correctly, you must do the following:

1. Connect the power line.
2. Connect the low-voltage wiring.

Connecting the power line

⚠ WARNING

Before obtaining access to terminals, all supply circuits must be disconnected.

⚠ WARNING

A fused disconnect switch must be field provided for the unit to be in compliance with UL 60335-2-40 Clause 7.12.2.

Important:

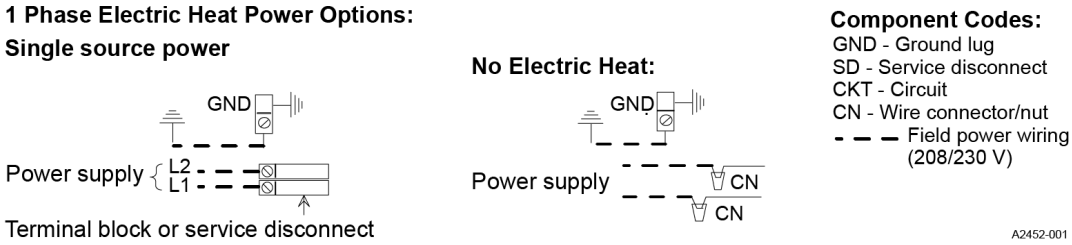
- All electrical connections to air handlers must be made with copper conductors. **Direct connection of aluminum wiring to air handlers is not approved.**
- If aluminum conductors are present, follow all applicable local and national codes when converting from aluminum to copper conductors before connecting to the air handler.
- The chosen conductor and connections must meet or exceed the amperage rating of the overcurrent protector (service disconnect or fuse) in the circuit.

- Existing aluminum wire within the structure must be sized correctly for the application according to the National Electric Code in the United States or the Canadian Electrical Code in Canada and local codes. Use caution when sizing aluminum rather than copper conductors, as aluminum conductors are rated for less current than copper conductors of the same size.

Important: Refer to the installation instructions for the electric heat kit for additional information about connecting the wiring for the electric heat kit as needed.

See Figure 9 for line power connections.

Figure 9: Line power connections



To connect the power line, do the following:

1. See Figure 9.
2. Bring power into the unit through the supply air end of the unit (top left when unit is vertical) or the left side panel. Use the hole appropriate to the unit's orientation in each installation to bring the conduit from the disconnect.
3. Terminate the power lead conduit at the electrical control box. See Electrical data for single source power supply: single-phase and refer to the latest edition of the National Electric Code in the United States or the Canadian Electrical Code in Canada and local codes to determine correct wire sizing.
4. Seal the wiring entry point on the outside of the unit to minimize air leakage.

Connecting the low-voltage wiring

NOTICE

All wiring must comply with local and national electrical code requirements. Read and heed all unit caution labels.

It is possible to vary the amount of electric heat turned on during the defrost cycle of a heat pump. Standard wiring only brings on the first stage of electric heat during defrost. See for additional information on heat during the defrost cycle.

Important: Refer to the installation instructions for the electric heat kit for additional information about connecting the wiring for the electric heat kit as needed.

To connect the low-voltage wiring, do the following:

- See Table 9 to familiarize yourself with the low-voltage connections.
- Connect the controls in the conventional system as shown in Figure 10 and Figure 11.

Figure 10: Control wiring - conventional wiring

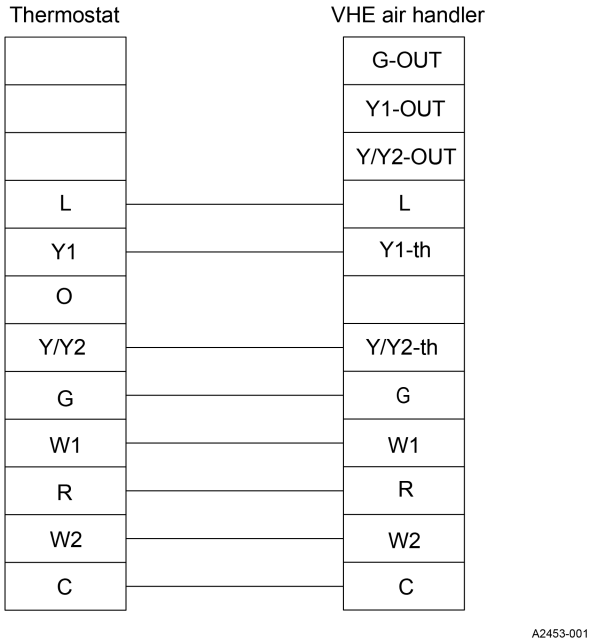
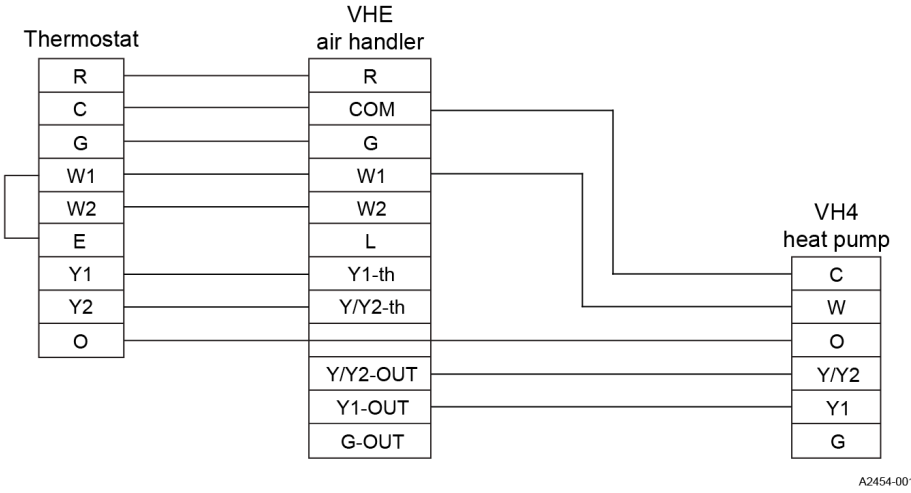


Table 9: Wire and connection key

Wire	Connection
L	Malfunction light (optional)
Y1-th	Cool 1 / Heat 1 from thermostat
Y1-OUT	Cool 1 / Heat 1 for outdoor unit
Y/Y2-th	Cool 2 / Heat 2 from thermostat
Y/Y2-OUT	Cool 2 / Heat 2 for outdoor unit
O	Reversing valve input
C	24 V common
R	AC 24 V power supply
G	24 V input signal from thermostat
W	Defrost signal
W1/W2	Electric auxiliary heat signal

Figure 11: Control wiring - VHE standard ECM air handler and VH4 heat pump - conventional wiring



Configuring the system

You must configure system settings correctly at the time of installation to ensure correct system operation.

Understanding the unit control board

The control board has a refrigerant leak detection sensor port that is connected to a refrigerant leak sensor located on the front of the indoor coil. The control monitors LFL (lower flammable limit) percentage from the leak detection sensor. When the concentration level exceeds 10%, the sensor activates, prompting the Air Handling Unit (AHU) to operate at its maximum airflow capacity. Simultaneously, the Outdoor Unit (ODU) compressor is deactivated, and the electrical heating kit is turned off.

VHE air handlers use field-installed electric heat kits from the 9HK series.

Understanding airflow and comfort settings

NOTICE

Incorrect airflow and comfort settings may result in decreased system efficiency and performance.

These constant torque air handlers are designed to deliver constant airflow regardless of external static pressure. However, there are limitations.

If too many supply registers are closed, a filter becomes clogged, or there is a restriction in the ductwork, the motor automatically operates at a higher speed to compensate for the higher ESP. This may result in a higher operating sound level and motor damage.

Adjusting airflow

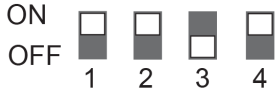
You can select the blower speed tap used by changing DIP switches on the electric board. For optimal performance, static pressure compatibility verification must be performed to confirm that the actual operating static pressure post-commissioning aligns with design values.

Table 10: Airflow setting for 18K, 24K, 30K, and 36K units

Dip switch S2 setting	Blower speed tap	Fan speed select	Static pressure (W.C. [kPa])
	3	Medium	0.4 [0.1]
	4	Medium-high (default setting)	0.58 [0.145]

ⓘ **Note:** The shaded area indicates the position of the DIP switch.

Table 11: Airflow setting for 12K units

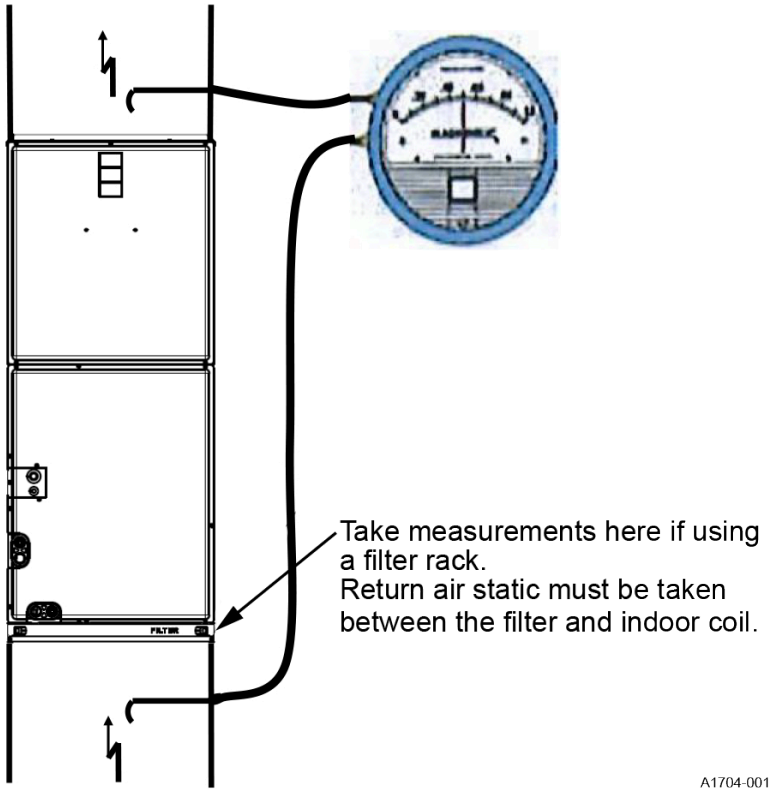
Dip switch S2 setting	Static pressure stage select	Static pressure (W.C. [kPa])
	Medium	0.4 [0.1]
	Medium-high (default setting)	0.58 [0.145]

Note: The shaded area indicates the position of the DIP switch.

Adjusting the air system

You must adjust the air system to keep the CFM within preferred requirements. To check the cubic feet per minute (CFM), measure the external duct static pressure using a manometer and static pressure tips. Figure 12 shows how to use a manometer to measure external duct static pressure.

Figure 12: Duct static measurements



To adjust the air system, do the following:

1. To prepare the coil for static pressure measurements, run only the fan to ensure a dry coil.
2. Drill two holes, one 12 in. away from the air handler in the supply air duct and one 12 in. away from the air handler in the return air duct, before any elbows in the ductwork.
3. Insert the static pressure tips and energize the blower motor.
4. Measure the supply air static pressure. Record this positive number.

5. Measure the return air static pressure. Record this negative number.

   Note: Return air static pressure must be taken after the air filter but before the indoor coil.

6. Treat the negative number as a positive, and add the two numbers together to determine the total external system static pressure.
7. See Unit data to determine the airflow and make the necessary adjustments to keep the CFM within the airflow limitations.

Unit data

See the following tables for physical, electrical and airflow data for the VHE unit.

Physical and electrical data

Table 12: Physical and electrical data

Models		VHE12B5YK2SS1	VHE18B5YK2SS1	VHE24B5YK2SS1	VHE30B5YK2SS1
Unit supply voltage		208-230 V, 1 ϕ, 60 Hz			
Normal voltage range 1		187-253			
Minimum circuit ampacity		16	16	16	16
Maximum overcurrent device amps 2		25	25	25	25
Blower - diameter x width		10 1/5	10 1/5	10	10
Blower motor	Rated HP	1/2	1/2	1/2	1/2
	RLA (A)	3.70	3.70	3.70	3.70
	Nominal RPM (high/low)	880/550	960/650	1050/720	1100/780
	Nominal CFM (high/low)	400/250	600/350	800/540	1000/670
Coil	Face area (sq ft)	3.67	3.67	3.67	3.67
	Rows deep	3	3	3	3
	Fins per inch	18	18	18	18
Filter	Type	Disposable or cleanable			
	Size	20*16*1			
Liquid refrigerant piping outdoor (field-installed)		3/8	3/8	3/8	3/8
Vapor refrigerant piping outdoor (field-installed)		5/8	5/8	5/8	5/8
Net weight (lb)		116	116	116	116

Note:

- Air handler units have been tested to UL 60335-2-40 / CSA 22.2 No. 236 standards up to 0.60 in. W.C. external static pressure.
- Dry coil conditions only, tested without filters.
- For optimal performance, external static pressures of 0.2 in. to 0.5 in. are recommended.

Electrical heat - minimum fan CFM for single-phase heat kits

Table 13: Electrical heat - minimum fan CFM for single-phase heat kits

Electric heat kit model	Electric heat (kW)	Air handler models			
		VHE12B5YK2SS1	VHE18B5YK2SS1	VHE24B5YK2SS1	VHE30B5YK2SS1
9HK16500506A	5	400	600	800	1000
9HK16500806A	7.5	400	600	800	1000
9HK16501006A	10	Not applicable	600	800	1000

Note: For 9HK electric heat kit model, number 1 indicates with service disconnect. For example: 9HK**1**6500506A

Electrical data for single source power supply: single-phase

Table 14: Electrical data for single source power supply: single-phase

Air handler models	Electric heat kit model	BHC model name	Electric heat (kW)	Field wiring			
				Minimum circuit ampacity		Maximum fuse or breaker (HACR) ampacity	
				208V	230V	208V	230V
VHE12B5YK2SS1	21-4245-01 A2L	9HK16500506A	5	27.4	29.8	30	30
	21-4245-02 A2L	9HK16500806A	7.5	38.7	42.3	40	45
VHE18B5YK2SS1	21-4245-01 A2L	9HK16500506A	5	27.4	29.8	30	30
	21-4245-02 A2L	9HK16500806A	7.5	38.7	42.3	40	45
	21-4245-03 A2L	9HK16501006A	10	50	54.8	50	60
VHE24B5YK2SS1	21-4245-01 A2L	9HK16500506A	5	27.4	29.8	30	30
	21-4245-02 A2L	9HK16500806A	7.5	38.7	42.3	40	45
	21-4245-03 A2L	9HK16501006A	10	50	54.8	50	60
VHE30B5YK2SS1	21-4245-01 A2L	9HK16500506A	5	27.4	29.8	30	30
	21-4245-02 A2L	9HK16500806A	7.5	38.7	42.3	40	45
	21-4245-03 A2L	9HK16501006A	10	50	54.8	50	60

Note:

- Electric heat kit model numbers in this table include a service disconnect.
- MOP = Maximum overcurrent protection device; must be HACR type circuit breaker or time delay fuse. Refer to the latest edition of the National Electric Code or in Canada the Canadian electrical Code and local codes to determine correct wiring sizing.

9HK electric heat kit nomenclature

Table 15: 9HK electric heat kit nomenclature

9	Product category	9 = Electric heat for VHE
HK	Family identifier	HK = Electric heat kit
1	Power connection	0 = Terminal block
		1 = Service disconnect For 9HK heat kit only
		2 = Service disconnect and single point wiring
65	Class identifier	65 = Electric heat kit
005	Electric heat (nominal kW)	005 = 5 kW, 008 = 7.5 kW, 010 = 10 kW, 015 = 15 kW
06	Voltage code	06 = 208/230-1-60
A	Style letter	A = indicates sequential change of component style

Airflow data

Table 16: Airflow data for VHE units

Air handler model size	Motor speed		External static pressure in. H20 [KPa]								
			0 [.00]	0.08 [.02]	0.24 [.06]	0.32 [.08]	0.4 [.10]	0.48 [.12]	0.6 [.15]	0.68 [.17]	0.8 [.20]
18	Tap (3)	CFM	729	695	662	630	600	567	536	506	478
		Watts	81	87	94	101	108	113	119	125	131
	Tap (4)	CFM	753	724	696	669	644	619	595	565	526
		Watts	108	114	120	126	133	140	147	155	163
24	Tap (3)	CFM	862	828	792	735	705	673	661	618	561
		Watts	106	114	125	137	145	154	169	170	177
	Tap (4)	CFM	975	940	906	859	853	803	769	735	681
		Watts	148	155	165	178	185	193	203	213	219
30	Tap (3)	CFM	1106	1071	1031	1015	1000	930	856	804	746
		Watts	182	189	200	210	219	226	236	240	247
	Tap (4)	CFM	1218	1175	1137	1091	1060	1020	1000	920	851
		Watts	214	222	230	241	249	258	268	277	285

Troubleshooting

If troubleshooting is needed, follow all safety requirements.

TXV checklist

You can use the TXV checklist as an aid for verifying the TXV installation.

TXV checklist

☐ Is the coil metering device installed correctly?

☐ Is the correct TXV installed according to the *Technical Guide* or *Tabular Data Sheet* for the outdoor section?

☐ Is the TXV temperature bulb positioned correctly?

☐ Is the TXV temperature bulb insulated?

☐ Is the TXV equalizer line connected?

Maintenance

Inspect filters at least once per month, and clean or replace them when they become dirty. The frequency of cleaning depends upon the hours of operation and the local atmospheric conditions. Clean filters keep unit efficiency high.

Coil cleaning

⚠ CAUTION

Ensure adequate precautions are taken to protect electrical components from liquid.

If cleaning the coil is necessary, clean with water only.

As an alternative to water, Evap-Green by Nu-Calgon is the only pH neutral coil cleaner approved for use when it is correctly diluted. Ensure to thoroughly rinse the cleaned coils after using Evap-Green.

Lubrication

The bearings of the blower motor are permanently lubricated.

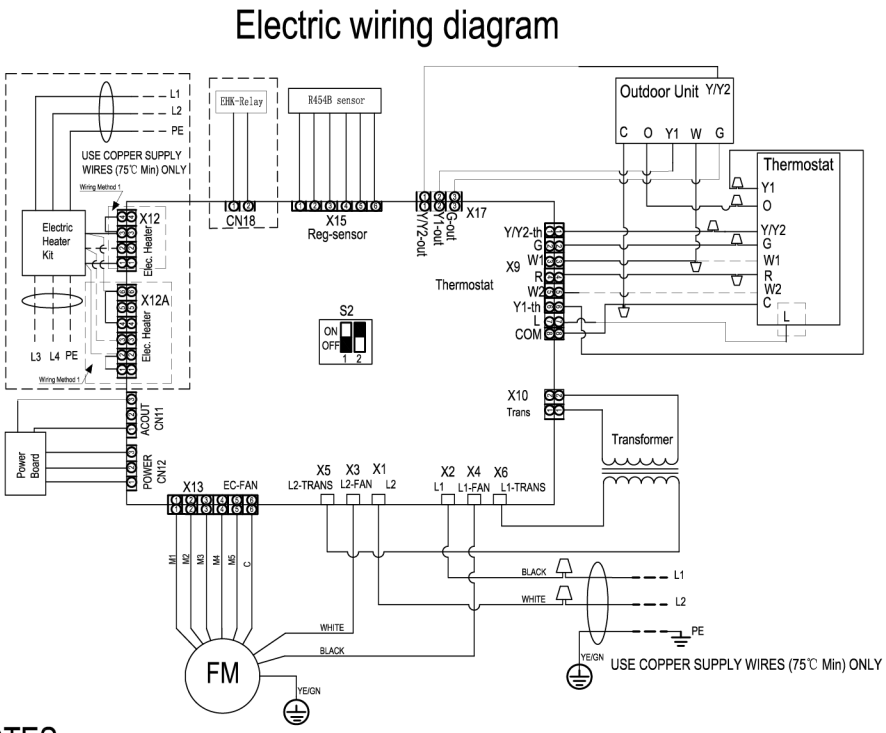
Condensate drains

During the cooling season, check the condensate drain lines to be sure that condensate is flowing from the primary drain but not from the secondary drain.

If condensate ever flows from the secondary drain, shut off the unit immediately and clean the condensate pan and drains to ensure a free flowing primary drain.

Wiring diagrams

Figure 13: VHE wiring diagram

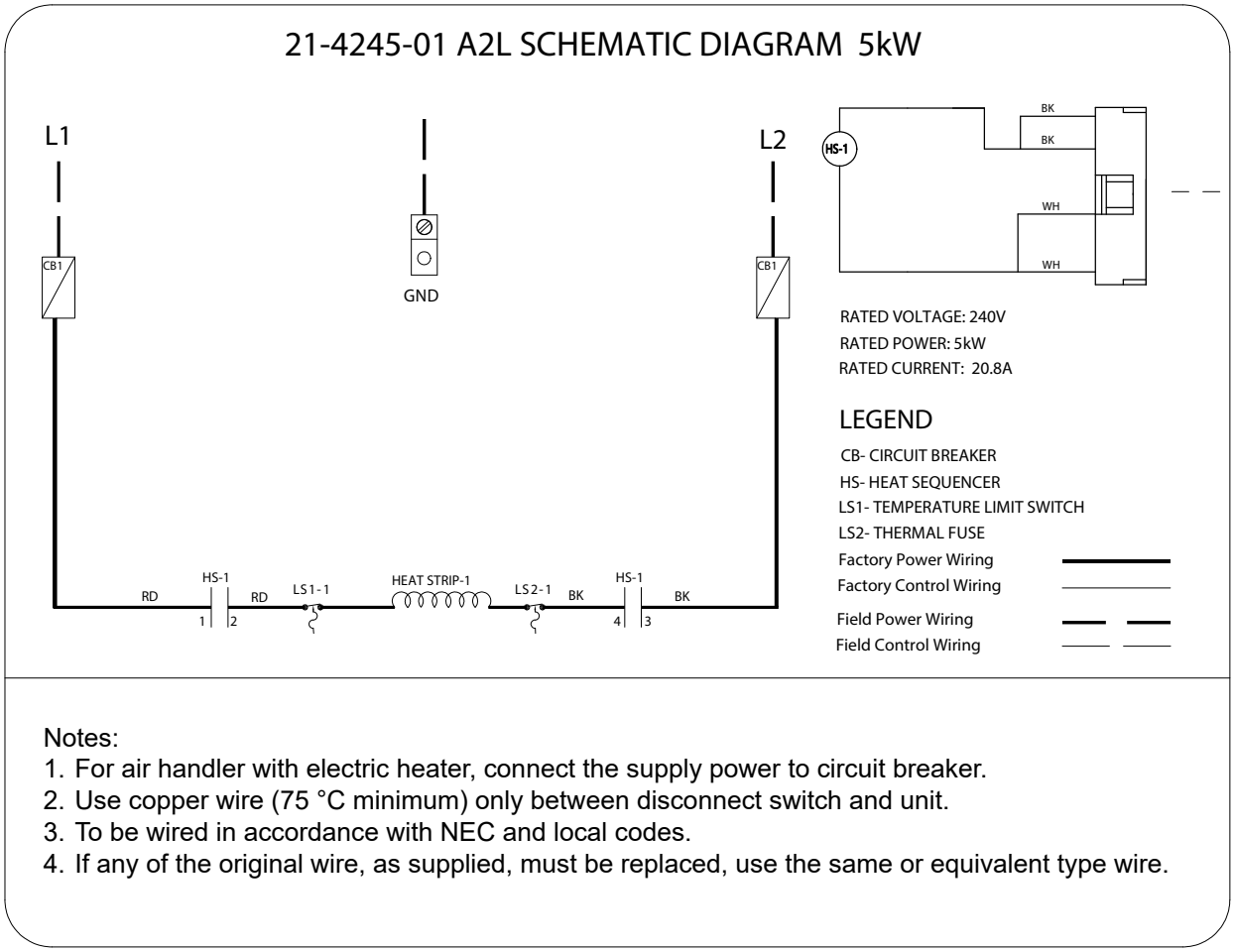


NOTES:

1. Use copper wire (75℃ Min) only between disconnect switch and unit.
2. To be wired in accordance with NEC and local codes.
3. If any of the original wire supplied must be replaced, use the same or equivalent type.
4. Connect R to R, G to G,etc. See Installation Instruction for details.
5. Check airflow table to ensure appropriate operations.
6. The EHK is optional. If EHK needs to be installed, please see Wiring Diagram of EHK for wiring details.
7. The dashed line means that the component or wire are optional.
8. The DIP switch S2 in the diagram is the factory default configuration. In actual use, please set S2 to choose blower speed according to the value of static pressure.
9.Please don't connect the wirer (W1/W2) from controller to indoor,if there is no EHK.

A2463-001

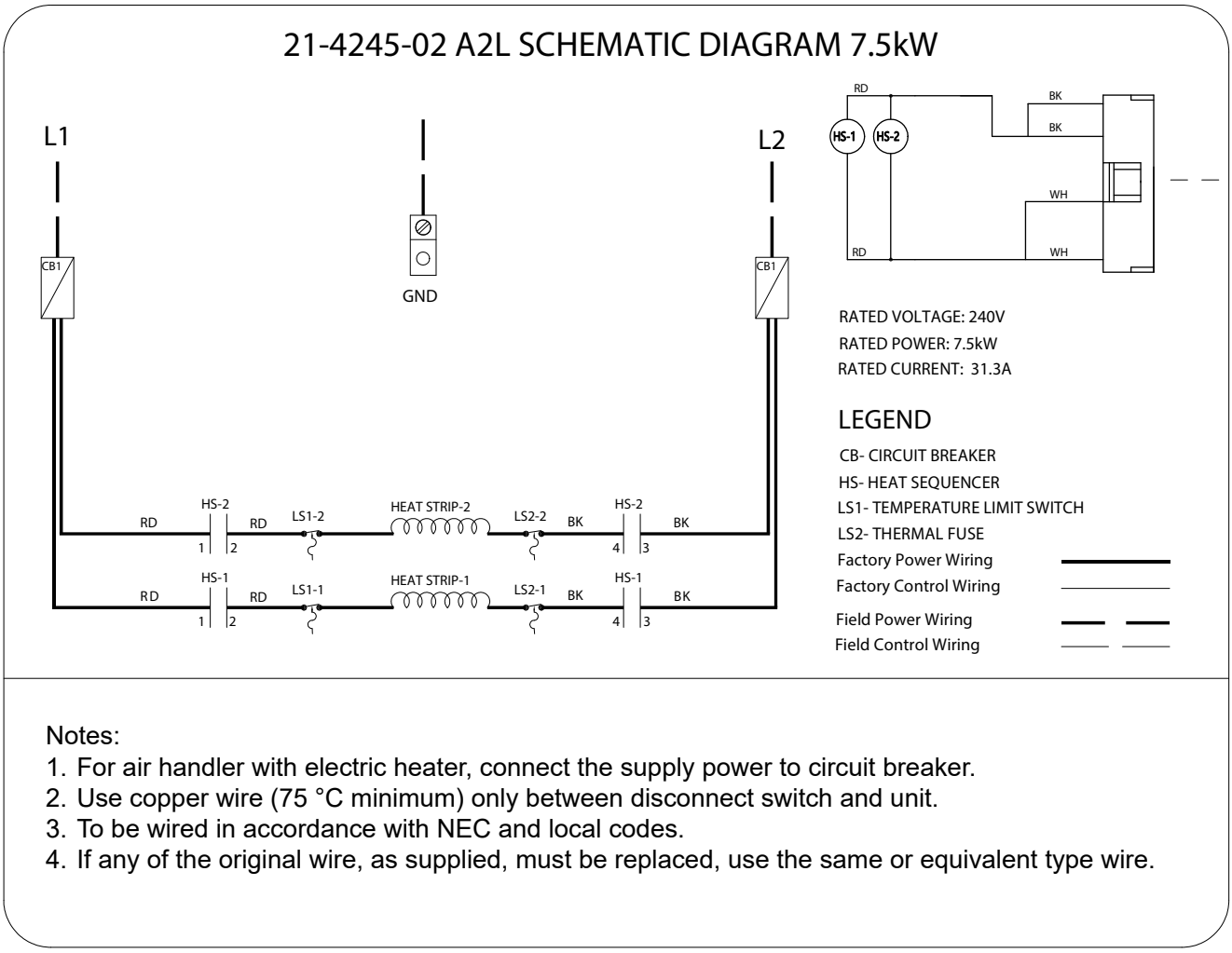
Figure 14: Wiring diagram - 5 kW



Notes:
1. For air handler with electric heater, connect the supply power to circuit breaker.
2. Use copper wire (75 °C minimum) only between disconnect switch and unit.
3. To be wired in accordance with NEC and local codes.
4. If any of the original wire, as supplied, must be replaced, use the same or equivalent type wire.

A2459-001

Figure 15: Wiring diagram - 7.5 kW

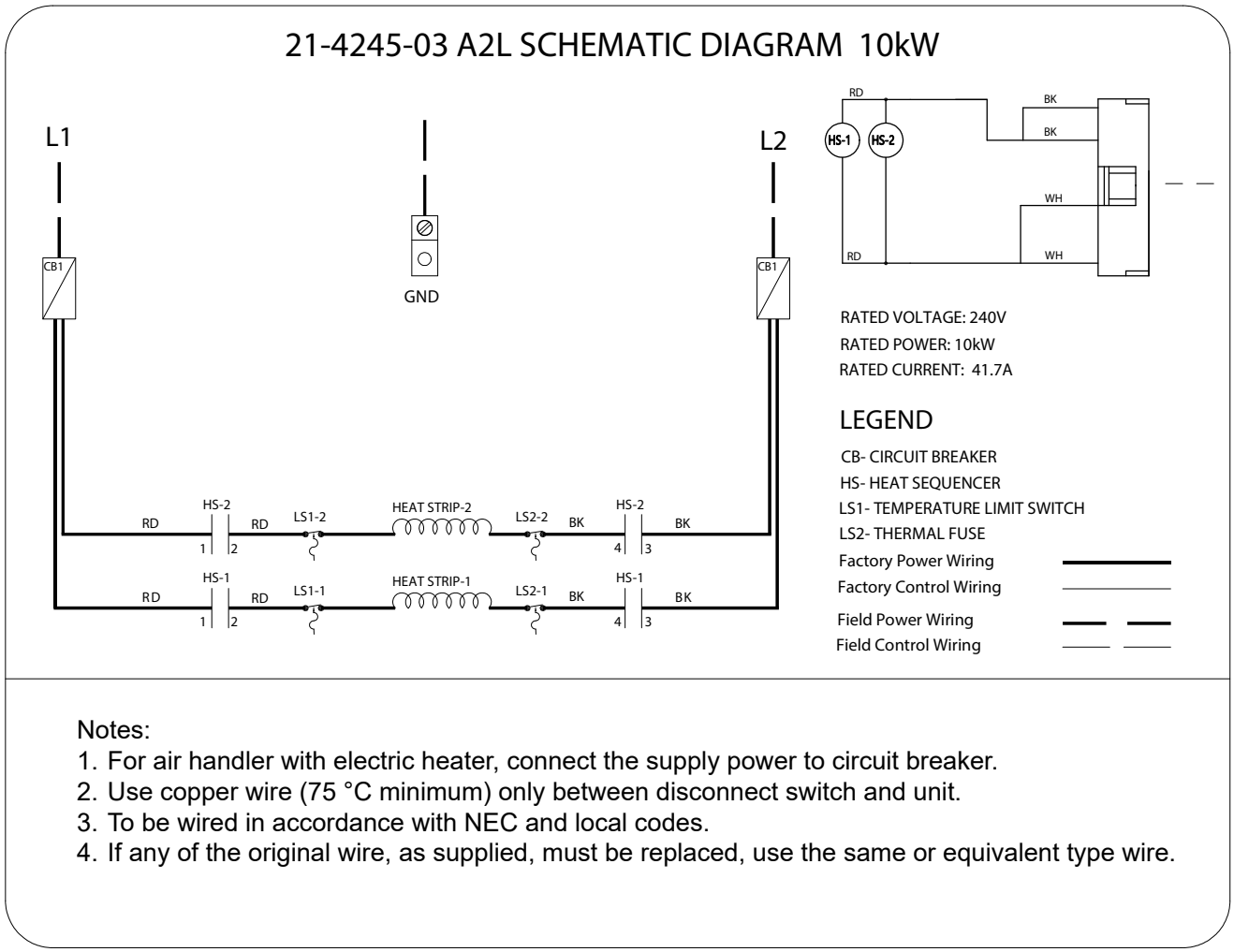


Notes:

1. For air handler with electric heater, connect the supply power to circuit breaker.
2. Use copper wire (75 °C minimum) only between disconnect switch and unit.
3. To be wired in accordance with NEC and local codes.
4. If any of the original wire, as supplied, must be replaced, use the same or equivalent type wire.

A2460-001

Figure 16: Wiring diagram - 10 kW



Notes:

1. For air handler with electric heater, connect the supply power to circuit breaker.
2. Use copper wire (75 °C minimum) only between disconnect switch and unit.
3. To be wired in accordance with NEC and local codes.
4. If any of the original wire, as supplied, must be replaced, use the same or equivalent type wire.

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Third-party trademarks

Third-Party Trademarks Notice: For information about third-party trademarks, refer to the relevant company websites.

Start-up sheet

Start-up Sheet

Residential Air Handler with Electric Heat

Correct start-up is critical to customer comfort and equipment longevity

Start-up date | Company name | Start-up technician

Owner information

Name | Address | Daytime phone

City | State or province | Zip or postal code

Equipment data

Unit model number | Unit serial number

General information (check all that apply)

◯ New construction	◯ Upflow	◯ Horizontal Left
◯ Retrofit	◯ Downflow	◯ Horizontal Right

Unit location and connections (check all that apply)

☐ Unit is level Duct connections are complete: ☐ Supply ☐ Return

☐ Condensate drain is connected correctly (refer to installation manual) ☐ Condensate trap is primed with water

Filters

☐ Filters installed Number of filters Filter size

Electrical connections and inspection (complete all that apply)

◯ 208 VAC ◯ 230 VAC ◯ 460 VAC

☐ Wires and electrical connections inspected ☐ Transformer wired correctly for primary supply voltage ☐ Ground connected

Line voltage measured (VAC) Low voltage value between R and C at control board (VAC)

☐ Thermostat wiring is complete ☐ Thermostat cycle rate or heat anticipator adjusted to Installation Manual specifications

Airflow setup

Blower type and set-up	Variable speed ECM (circle **0** or **1**)	Heat	0 / 1	0 / 1			
		Low cool	0 / 1	0 / 1	0 / 1		
		High cool	0 / 1	0 / 1	0 / 1		
		Delay	0 / 1	0 / 1			
		Stage 1 kW	0 / 1	0 / 1			
		Heat kit selection	0 / 1	0 / 1	0 / 1	0 / 1	
	Standard ECM	Compressor high	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5
		Compressor low	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5
		Continuous fan	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5
		Electric heat	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5

Supply static (in. W.C.)	Supply air dry bulb temperature	Outside air dry bulb temperature
Return static (in. W.C.)	Return air dry bulb temperature	Return air wet bulb temperature
Total external static pressure	Temperature drop	Supply air wet bulb temperature

Other switches (check all that apply)

HUMIDISTAT ◯ YES ◯ NO AC/HP ◯ AC ◯ HP CONT FAN ◯ L ◯ M ◯ H

Continued on next page

Electric heat (complete all that apply)

Electric heat kit:	Model number		Serial number		Rated kW	
Number of elements		Measured amperage (A)	Heater 1	Heater 2	Heater 3	
			Heater 4	Heater 5	Heater 6	
		Measured voltage (V)	Heater 1	Heater 2	Heater 3	
			Heater 4	Heater 5	Heater 6	
Heating return air dry bulb temperature		Heating supply air dry bulb temperature		Air temperature rise		

Job site clean-up

- ☐ Job site has been cleaned, and indoor and outdoor debris removed from job site.
- ☐ Tools have been removed from unit.
- ☐ All panels have been installed.

Unit operation and cycle test (complete all that apply)

- ☐ Operate the unit through continuous fan cycles from the thermostat, noting and correcting any problems.
- ☐ Operate the unit through cooling cycles from the thermostat, noting and correcting any problems.
- ☐ Operate the unit through mechanical heating cycles from the thermostat, noting and correcting any problems.
- ☐ Operate the unit through emergency heating cycles from the thermostat, noting and correcting any problems.

Owner education

- ☐ Provide the owner with the owner's manual.
- ☐ Explain operation of system to the owner.
- ☐ Explain thermostat use and programming (if applicable) to the owner.
- ☐ Explain the importance of regular filter replacement and equipment maintenance.

Comments and additional job details

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