LENNOX Service Literature

UNIT INFORMATION

100111
May 20, 2025

CBK45UHVT

CBK45UHVT (R454B) SERIES UNITS

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional HVAC installer or equivalent, service agency, or the gas supplier.

⚠ IMPORTANT

The Clean Air Act of 1990 bans the intentional venting of refrigerant (CFCs, HCFCs and HFCs) as of July 1, 1992. Approved methods of recovery, recycling or reclaiming must be followed. Fines and/or incarceration may be levied for noncompliance.

NOTICE

A thermostat is not included and must be ordered separately.

- A Lennox communicating thermostat must be used in communicating applications.
- In non-communicating applications, the Lennox ComfortSense® thermostat may be used, as well as other non-communicating thermostats.

In all cases, setup is critical to ensure proper system operation.

Field wiring for both communicating and non-communicating applications is illustrated in diagrams, which begin on page 29.

⚠ CAUTION

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

Table of Contents

General Information

This indoor unit **with all-aluminum coil** is designed for installation with optional field-installed electric heat and a matched outdoor unit that is charged with R454B refrigerant. These units, designed for indoor installation in multiple positions, are completely assembled for upflow and horizontal right-hand discharge before being shipped from the factory.

All CBK45UHVT air handlers are equipped with a factory-installed, internally mounted check / expansion valve, which is suitable for use in R454B applications.

This air handler is compatible with the ComfortSense® non-communicating thermostat and non-communicating outdoor units. In addition, this unit has the enhanced capability of communicating with communicating thermostats and communicating outdoor units using the Lennox RSBus protocols.

***NOTE** - For downflow or horizontal left-hand air discharge, certain field modifications are required.*

IMPORTANT: Special procedures are required for cleaning the all-aluminum coil in this unit. See page 43 in this instruction for information.

⚠ 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.

⚠ CAUTION

Servicing shall be performed only as recommended by the manufacturer.

⚠ WARNING

Ducts connected to an appliance shall not contain a potential ignition source

⚠ WARNING

Every working procedure that affects safety means shall only be carried out by competent persons. This appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure they do not play with the appliance.

⚠ IMPORTANT

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.

⚠ IMPORTANT

Verify cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects.

⚠ IMPORTANT

Pipe work, including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

⚠ CAUTION

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

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

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need recalibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

⚠ CAUTION

Some soaps used for leak detection are corrosive to certain metals. Carefully rinse piping thoroughly after leak test has been completed. Do not use matches, candles, flame or other sources of ignition to check for gas leaks.

⚠ CAUTION

Leak Detection System installed. Unit must be powered except for service.

⚠ WARNING

PARTIAL UNITS shall only be connected to an appliance suitable for the same refrigerant.

⚠ WARNING

Maximum Altitude of application is 3200m above sea level.

NOTE *– This unit is a PARTIAL UNIT AIR CONDITIONER, complying with PARTIAL UNIT requirements of this Standard, and must only be connected to other units that have been confirmed as complying to corresponding PARTIAL UNIT requirements of this Standard, UL 60335-2-40/CSA C22.2 No. 60335-2-40, or UL 1995/CSA C22.2 No 236.*

⚠ IMPORTANT

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed and, since flammability is a consideration, procedures such as safely remove refrigerant following local and national regulations, purging the circuit with inert gas, evacuating (optional for A2L), purging with inert gas (optional for A2L), or opening the circuit by cutting or brazing be adhered to. The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants.

This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

⚠ IMPORTANT

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak tested on completion of charging, but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

⚠ IMPORTANT

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

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

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

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

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

⚠ IMPORTANT

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

– Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of .2 oz. per year of refrigerant or better, under pressure.

No leak shall be detected.

⚠ IMPORTANT

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

⚠ IMPORTANT

Work shall 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.

⚠ IMPORTANT

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

⚠ IMPORTANT

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

⚠ IMPORTANT

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 CO^2 fire extinguisher adjacent to the charging area.

⚠ IMPORTANT

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.

⚠ WARNING

Auxiliary devices which may be a potential ignition source shall not be installed in the duct work. Examples of such potential ignition sources are hot surfaces with a temperature exceeding 700°C and electric switching devices.

⚠ IMPORTANT

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

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

– 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.

⚠ IMPORTANT

Sealed electrical components shall be replaced.

⚠ IMPORTANT

Intrinsically safe components must be replaced.

⚠ WARNING

If this appliance is conditioning a space with an area smaller than TAmin or stored in a space with an area smaller than Amin as defined by this instruction, then that space must be without continuously operating open flames (e.g. an operating gas appliance) or other potential ignition sources (e.g. an operating electric heater or similar hot surface). A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest system.

⚠ WARNING

For appliances using A2L refrigerants connected via an air duct system to one or more rooms, only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork.

⚠ WARNING

For duct connected appliances, false ceilings or drop ceilings may be used as a return air plenum if a REFRIGERANT DETECTION SYSTEM is provided in the appliance and any external connections are also provided with a sensor immediately below the return air plenum duct joint.

⚠ CAUTION

Any service personnel installing, decommissioning, or performing maintenance on the unit must be properly trained with A2L refrigerants

NOTE *– R-454B is an A2L refrigerant. The system installation must meet the following parameters based upon total refrigerant charge (line set included). TAmin (Total minimum conditioned area) is the minimum allowable conditioned area based upon the total system charge at sea level. Values must be multiplied by altitude adjustment factor at installed altitude.*

Qmin table refers to minimum airflow requirements during refrigerant leak mitigation by the refrigerant detection system, based upon total system charge.

See tables below.

TAmin Table

Charge (lb)	10.0	15.0	20.0	25.0	30.0
Charge (kg)	4.5	6.8	9.1	11.3	13.6
Minimum Conditioned Area (ft2)	149.9	224.9	299.9	374.8	449.8
Minimum Conditioned Area (m2)	13.9	20.9	27.9	34.8	41.8

NOTE *– Multiply values in TAmin table by the Altitude Adjustment Factors to correct TAmin based on installed altitude.*

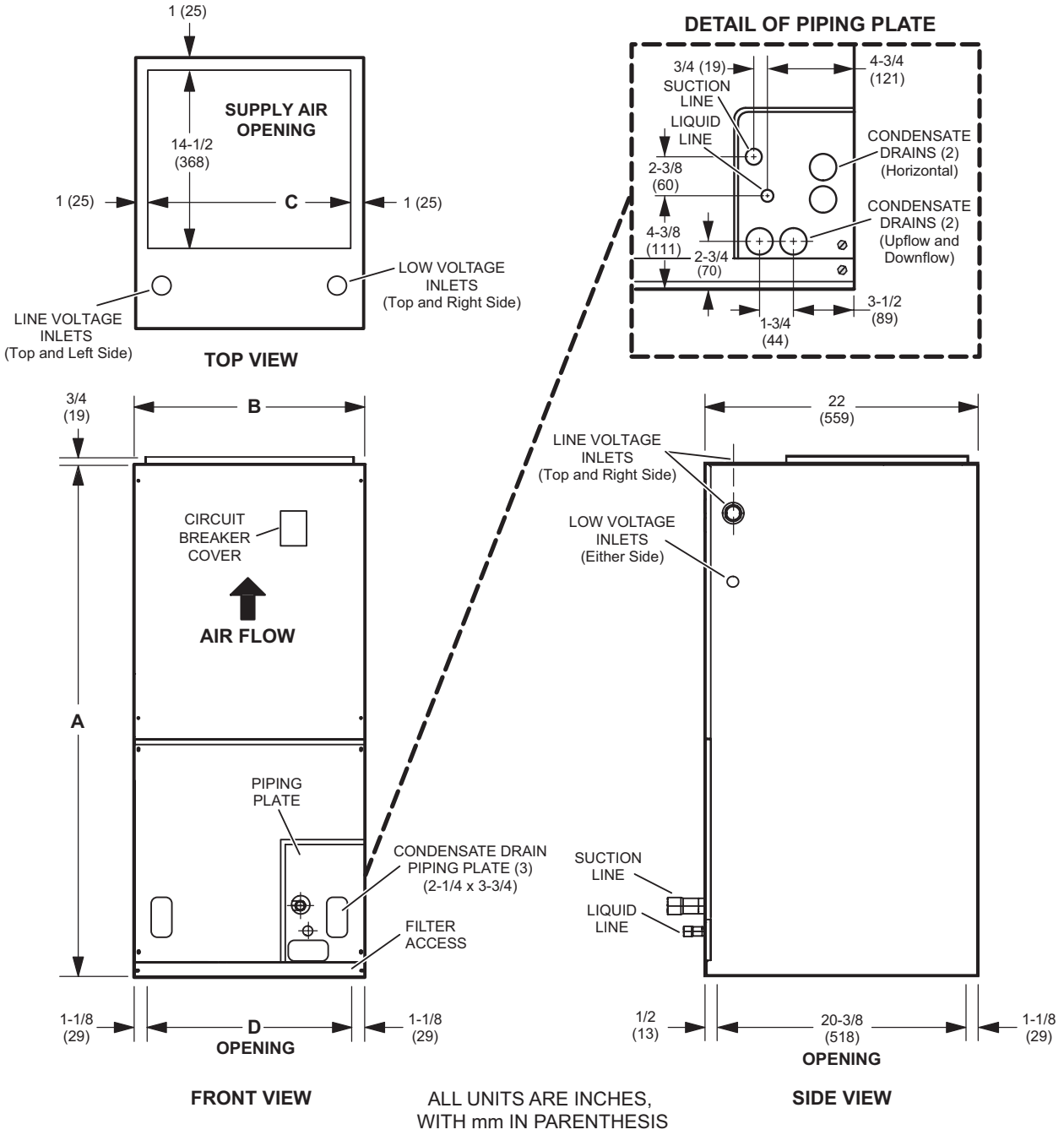
Altitude Adjustment Factor

Altitude (m)	0	200	400	600	800	1000	1200	1400	1600
Altitude (ft)	0	660	1310	1970	2620	3280	3940	4590	5250
Adj. Factor	1	1	1	1	1.02	1.05	1.04	1.1	1.12
Altitude (m)	1600	1800	2000	2200	2400	2600	2800	3000	3200
Altitude (ft)	5250	5910	6560	7220	7870	8530	9190	9840	10500
Adj. Factor	1.12	1.15	1.18	1.21	1.25	1.28	1.32	1.36	1.4

Qmin Table

Refrigerant Charge lb (kg)	CFM Required	Refrigerant Charge lb (kg)	CFM Required
5 (2.3)	135	18 (8.1)	487
6 (2.7)	162	19 (8.6)	514
7 (3.2)	189	20 (9.1)	541
8 (3.6)	216	21 (9.5)	568
9 (4.1)	244	22 (10)	595
10 (4.5)	271	23 (10.4)	622
11 (5)	298	24 (10.9)	649
12 (5.4)	325	25 (11.3)	676
13 (5.9)	352	26 (11.7)	704
14 (6.4)	379	27 (12.2)	731
15 (6.8)	406	28 (12.7)	758
16 (7.3)	433	29 (13.2)	785
17 (7.7)	460	30 (13.6)	812

Unit Dimensions – Upflow



Dimensions	018		024		030		036, 042		048		060	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
A	43-1/2	1105	45-1/2	1156	47	1194	53-5/8	1362	55	1397	59-3/4	1518
B	18-1/2	470	18-1/2	470	18-1/2	470	21-1/2	546	21-1/2	546	21-1/2	546
C	16-1/2	419	16-1/2	419	16-1/2	419	19-1/2	495	19-1/2	495	19-1/2	495
D	16-1/4	413	16-1/4	413	16-1/4	413	19-1/4	489	19-1/4	489	19-1/4	489

NOTE - Unit is shipped configured for horizontal right-hand air discharge. Unit may be converted to horizontal left-hand air discharge by repositioning horizontal drain pan.

Dimensions remain the same in all configurations.

Specifications and Electrical Data

Size		018	024	030	036
Nominal Tonnage		1.5	2	2.5	3
Refrigerant Type		R-454B	R-454B	R-454B	R-454B
Factory Installed Expansion Valve (TXV)		**26Z70**	**26Z70**	**26Z70**	**26Z70**
Connections	Liquid line (OD) sweat - in.	3/8	3/8	3/8	3/8
	Suction line (OD) sweat - in.	3/4	3/4	3/4	7/8
	Condensate drain (FPT) - in.	(2) 3/4	(2) 3/4	(2) 3/4	(2) 3/4
Indoor Coil	Net face area - ft.^{2}	3.30	3.77	4.72	5.66
	Tube diameter - in.	3/8	3/8	3/8	3/8
	Rows	3	3	3	3
	Fins - in.	15	15	15	15
Blower	HP	1/2	1/2	1/2	1/2
	Wheel nominal diameter x width - in.	9 x 6	9 x 6	10 x 8	10 x 8
	Air volume range - cfm	320 - 1150	280 - 1120	411 - 1340	545 - 1530
[1] **Filters**	Size - in.	15 x 20 x 1	15 x 20 x 1	15 x 20 x 1	18 x 20 x 1
Shipping Data - lbs.		129	136	143	169
ELECTRICAL DATA					
	Line voltage data (Volts-Phase-Hz)	208/230-1-60	208/230-1-60	208/230-1-60	208/230-1-60
[2] Maximum overcurrent protection (MOCP) amps (unit)		15	15	15	15
[3] Minimum circuit ampacity (MCA) (unit)		4.9	4.9	4.9	4.9
	Blower Motor Full Load Amps	3.9	3.9	3.9	3.9

SPECIFICATIONS				
Size	**042**	**048**	**060**
Nominal Tonnage	3.5	4	5
Refrigerant Type	R-454B	R-454B	R-454B
Factory Installed Expansion Valve (TXV)	**26Z71**	**26Z71**	**26Z72**
Connections Liquid line (OD) sweat - in.	3/8	3/8	3/8
Suction line (OD) sweat - in.	7/8	7/8	7/8
Condensate drain (FPT) - in.	(2) 3/4	(2) 3/4	(2) 3/4
Indoor Coil Net face area - ft.^{2}	5.66	6.13	7.08
Tube diameter - in.	3/8	3/8	3/8
Rows	3	3	3
Fins - in.	15	15	15
Blower HP	1	1	1
Wheel nominal diameter x width - in.	10 x 10	11 x 10	11 x 10
Air volume range - cfm	670 - 1810	790 - 2185	895 - 2190
[1] **Filters** Size - in.	18 x 20 x 1	18 x 20 x 1	18 x 20 x 1
Shipping Data - lbs.	169	179	190
ELECTRICAL DATA			
Line voltage data (Volts-Phase-Hz)	208/230-1-60	208/230-1-60	208/230-1-60
[2] Maximum overcurrent protection (MOCP) amps (unit)	15	15	15
[3] Minimum circuit ampacity (MCA) (unit)	9.3	9.3	9.3
Blower Motor Full Load Amps	7.4	7.4	7.4

[1] Disposable filter.

[2] HACR type circuit breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F.

Model Number Identification

CB K 45 UH V T - 036 - 230 - 71

- **Unit Type**: CB = Air Handler
- **Refrigerant Type**: K = R-454B
- **Series**: 45
- **Configuration**: UH = Upflow/Horizontal
- **Blower Motor**: V = Variable Speed
- **Metering Device**: T = Factory installed Check/Expansion Valve for R-454B refrigerant (non-bleed port)
- **Nominal Cooling Capacity**: 018 = 1.5 tons; 024 = 2 tons; 030 = 2.5 tons; 036 = 3 tons; 042 = 3.5 tons; 048 = 4 tons; 060 = 5 tons
- **Voltage**: 230 = 208/230V-1 phase-60hz
- **Revision Level**: 71 = R-454B TXV installed

Adjusting the BDC3 Blower Control

⚠ WARNING

ELECTROSTATIC DISCHARGE (ESD) Precautions and Procedures	Electrostatic discharge can affect electronic components. Take care during unit installation and service to protect the unit's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the unit, the control and the technician at the same electrostatic potential. Touch hand and all tools on an unpainted unit surface before performing any service procedure to neutralize electrostatic charge.

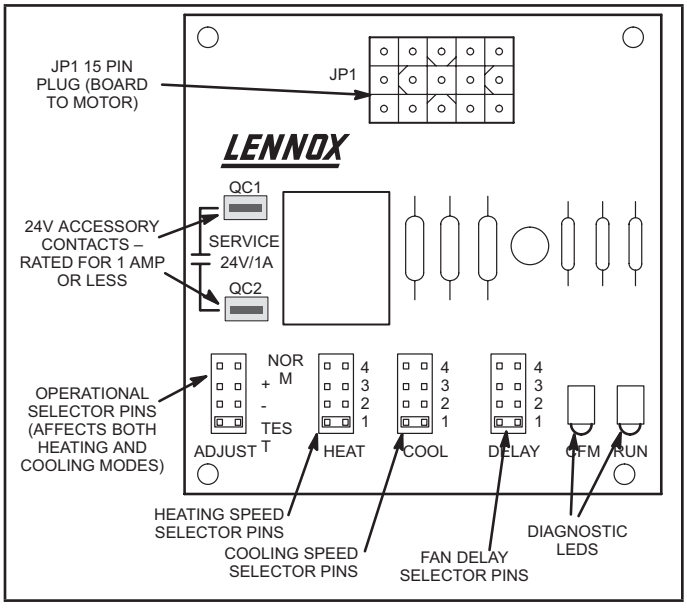


FIGURE 1. BDC3 Variable Speed Control Selections

Merit® CBK45UHVT units are equipped with a variable-speed motor that is capable of maintaining a specified CFM throughout the external static range. A particular CFM can be obtained by positioning jumpers (**COOL**, **HEAT**, and **ADJUST**) on the BDC3 control.

The jumpers are labeled 1, 2, 3, and 4. This indicates the selected air volume (CFM). The **ADJUST** jumper is labeled Test, -, +, and Norm. The - and + pin settings are used to add or subtract a percentage of the CFM selected. The Test jumper is used to operate the motor in the test mode. The delay jumper controls the timing pattern in which the fan delay occurs.

Figure 1 illustrates the BDC3 control. Use tables on pages 5 and 6 to determine the correct air volume for heat and cool speed taps.

Diagnostic LEDs located on the BDC3 control to assist in servicing the unit. Read the jumper settings section before adjusting blower speed. Refer to page 5 for identification and information.

Adjusting the Blower Speed

Diagnostic LEDs

1 - **RUN LED** indicates there is a demand for the blower motor to run.

2 - **CFM LED** indicates the cubic feet per minute at which the unit is operating. The light flashes once for approximately every 100 CFM. For example, if the unit is operating at 1000 CFM, CFM LED will flash 10 times. If the CFM is 1150, CFM LED will flash 11 full times plus one fast or half flash.

At times, the light may appear to flicker or glow. This is normal and occurs when the control is communicating with the motor between cycles.

Move the jumper pins to select the blower speed needed to meet application CFM requirements.

JUMPER SETTINGS

⚠ IMPORTANT

Before changing jumper setting, make sure the motor has completely stopped. Any jumper setting change will not take place while the motor is running.

Table 1 and Blower Data tables list the recommended factory blower speed tap selections for Merit® CBK45UH-VT series units. These settings are for nominal tonnage match-ups with the Merit® CBK45UHVT. When matched with other sizes, it is recommended that the CFM be adjusted to provide approximately 400 CFM per ton.

TABLE 1. Recommended Blower Speed Taps

Air Handler	Speed Tap Selection			
	Cooling		Heating*	
	Note 1 -	Note 2 -	Note 3 -	Note 4 -
CBK45UHVT-018	COOL PIN #2	COOL PIN #2	HEAT PIN #2	HEAT PIN #2
CBK45UHVT-024	COOL PIN #3	COOL PIN #3	HEAT PIN #3	HEAT PIN #3
CBK45UHVT-030	COOL PIN #3	COOL PIN #3	HEAT PIN #3	HEAT PIN #3
CBK45UHVT-036	COOL PIN #3	COOL PIN #3	HEAT PIN #3	HEAT PIN #3
CBK45UHVT-042	COOL PIN #3	COOL PIN #3	HEAT PIN #3	HEAT PIN #3
CBK45UHVT-048	COOL PIN #3	COOL PIN #3	HEAT PIN #3	HEAT PIN #3
CBK45UHVT-060	COOL PIN #3	COOL PIN #3	HEAT PIN #3	HEAT PIN #3

NOTES -

1 - Condensing Unit
2 - Heat Pump
3 - Condensing Unit with electric heat only
4 - Heat Pump with electric heat

** Minimum setting for heat*

To change jumper positions, gently pull the jumper off the pins and insert it onto the desired set of pins. The following section outlines the different jumper selections available and conditions associated with each one.

After the CFM for each application has been determined, the jumper settings must be adjusted to reflect those given in the appropriate tables on the following pages. From the tables, determine which row of CFM volumes most closely matches the desired CFM. Once a specific row has been chosen (+, NORMAL, or -), CFM volumes from other rows cannot be used. Below are descriptions of the jumper selections.

ADJUST JUMPER

The ADJUST pins allow the motor to run at normal speed, slightly higher (approximately 10%) than normal speed, or slightly lower (approximately 10%) than normal speed.

The tables on the following pages list three rows (+, NORMAL, and -) with their respective CFM volumes. Notice in table 2, for example, that the normal adjustment setting for heat speed position #4 is 1000 CFM. The + adjustment setting for that position is 1080 CFM and for the - adjustment setting is 910 CFM. After the adjustment setting has been determined, choose the remaining speed jumper settings from those offered in the table in that row.

The TEST pin is available to bypass the BDC3 control and run the motor at approximately 70% to test that the motor is operational. This is beneficial primarily in troubleshooting. G must be energized for motor to run.

COOL JUMPER

The **COOL** jumper is used to determine the CFM during either cooling or heat pump operation without a call for electric heat. These jumper selections are activated for cooling when Y2 and DS terminals in the Merit® CBK45UHVT are energized. The are activated for heating when Y2 is energized.

Applications **without** the Lennox ComfortSense® 7500 thermostat will provide 70% of the **COOL** CFM during first-stage cooling for two-stage outdoor units. 100% of **COOL** speed is provided for systems with a single-stage outdoor unit.

Applications **with** the Lennox ComfortSense® 7500 thermostat, but no demand for de-humidification will operate as follows: during a first-stage cooling call (two-stage outdoor unit), the air volume is 70% of the **COOL** jumper selection. This arrangement provides for additional dehumidification during standard first-stage cooling. See the tables that follow for various scenarios concerning use of the ComfortSense® 7500 thermostat and the Merit® CBK45UHVT series unit.

For applications with Harmony III® zone control, the air handler CFM volume is determined by the Harmony III control center. The minimum blower speed is predetermined at 250 CFM for -018, -024, -030 and -036 units and 450 CFM for -042, -048 and -060 units. This speed is not adjustable. See footnotes in the blower performance tables.

With the thermostat set for *Continuous Fan* and without a call for heating or cooling, the Merit® CBK45UHVT provides 50% of the **COOL** CFM selected.

***NOTE** - For two-stage heat pumps, air handler will operate at 70% of the **COOL** selection until supplemental electric heat is demanded. At that time, the air handler will operate at the selected **HEAT** speed. This arrangement provides warmer supply air during second-stage heating.*

⚠ IMPORTANT

Minimum Air Flow when RDS initiates mitigation is factory set at 350 CFM Per Ton

BLOWER DATA

CBK45UHVT-018 BLOWER PERFORMANCE

0 through 0.80 in. w.g. External Static Pressure Range

"ADJUST" Jumper Setting	Jumper Speed Positions											
	"HEAT" Speed				First Stage "COOL" Speed				Second Stage "COOL" Speed			
	1	2	3	4	1	2	3	4	1	2	3	4
	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm
+	500	705	925	1150	365	520	665	810	500	705	925	1150
NORM	465	650	850	1050	350	485	610	740	465	650	850	1050
-	420	600	760	950	320	425	560	680	420	600	760	950

NOTES - All air data measured external to unit with dry coil and 1 inch non-pleated air filter in place. Electric heaters have no appreciable air resistance.
First stage cooling air volume is 70% of COOL speed setting. Continuous blower speed is approximately 50% of COOL speed setting.
Lennox® LZSV Variable Zoning System applications - minimum blower speed is 250 cfm.

CBK45UHVT-018 BLOWER MOTOR WATTS

AT "+" (Plus) SETTING ("Adjust" Jumper at "+" Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	46	61	74	86	99	111	124	138
	Tap 2	97	115	132	145	162	178	196	213
	Tap 3	185	205	229	245	268	282	300	316
	Tap 4	340	366	392	417	439	459	488	488
First Stage "COOL" Speed	Tap 1	30	41	51	59	69	81	92	106
	Tap 2	50	66	80	90	105	118	126	142
	Tap 3	87	106	116	135	148	167	178	192
	Tap 4	141	161	181	201	215	228	247	262
Second Stage "COOL" Speed	Tap 1	46	61	74	86	99	111	124	138
	Tap 2	97	115	132	145	162	178	196	213
	Tap 3	185	205	229	245	268	282	300	316
	Tap 4	340	366	392	417	439	459	488	488

AT "NORM" SETTING ("Adjust" Jumper at NORM Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	40	55	66	80	93	101	115	128
	Tap 2	82	100	113	125	144	157	176	183
	Tap 3	146	170	191	207	224	238	259	276
	Tap 4	259	290	314	330	352	369	391	415
First Stage "COOL" Speed	Tap 1	28	37	46	58	67	79	89	102
	Tap 2	45	59	70	85	96	107	119	133
	Tap 3	74	88	102	120	132	145	161	171
	Tap 4	115	131	147	162	185	195	210	229
Second Stage "COOL" Speed	Tap 1	40	55	66	80	93	101	115	128
	Tap 2	82	100	113	125	144	157	176	183
	Tap 3	146	170	191	207	224	238	259	276
	Tap 4	259	290	314	330	352	369	391	415

AT " - " (Minus) SETTING ("Adjust" Jumper at " - " Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	33	43	56	65	77	88	96	112
	Tap 2	65	80	93	113	126	140	151	164
	Tap 3	119	140	153	169	185	206	220	236
	Tap 4	195	219	237	261	281	296	320	338
First Stage "COOL" Speed	Tap 1	23	35	43	52	63	73	85	96
	Tap 2	37	45	54	70	76	86	99	110
	Tap 3	59	73	86	102	113	128	140	152
	Tap 4	88	102	119	137	154	165	185	201
Second Stage "COOL" Speed	Tap 1	33	43	56	65	77	88	96	112
	Tap 2	65	80	93	113	126	140	151	164
	Tap 3	119	140	153	169	185	206	220	236
	Tap 4	195	219	237	261	281	296	320	338

BLOWER DATA

CBK45UHVT-024 BLOWER PERFORMANCE

0 through 0.80 in. w.g. External Static Pressure Range

"ADJUST" Jumper Setting	Jumper Speed Positions											
	"HEAT" Speed				First Stage "COOL" Speed				Second Stage "COOL" Speed			
	1	2	3	4	1	2	3	4	1	2	3	4
	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm
+	450	670	900	1120	340	450	650	770	450	670	900	1120
NORM	420	620	820	1050	300	400	600	700	420	620	820	1050
-	390	570	750	915	280	390	500	650	390	570	750	915

NOTES - All air data measured external to unit with dry coil and 1 inch non-pleated air filter in place. Electric heaters have no appreciable air resistance.
First stage cooling air volume is 70% of COOL speed setting. Continuous blower speed is approximately 50% of COOL speed setting.
Lennox® LZSV Variable Zoning System applications - minimum blower speed is 250 cfm.

CBK45UHVT-024 BLOWER MOTOR WATTS

AT "+" (Plus) SETTING ("Adjust" Jumper at "+" Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	40	50	60	74	86	95	112	124
	Tap 2	82	100	116	136	151	163	185	197
	Tap 3	173	190	213	236	257	283	300	316
	Tap 4	290	318	339	363	379	407	447	463
First Stage "COOL" Speed	Tap 1	27	37	46	57	68	76	88	104
	Tap 2	41	54	62	75	87	97	108	121
	Tap 3	75	94	109	127	145	161	173	191
	Tap 4	113	133	146	168	189	205	222	244
Second Stage "COOL" Speed	Tap 1	40	50	60	74	86	95	112	124
	Tap 2	82	100	116	136	151	163	185	197
	Tap 3	173	190	213	236	257	283	300	316
	Tap 4	290	318	339	363	379	407	447	463

AT "NORM" SETTING ("Adjust" Jumper at NORM Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	33	45	57	68	78	89	101	115
	Tap 2	64	81	96	113	132	145	159	179
	Tap 3	133	152	172	190	211	231	252	270
	Tap 4	253	278	307	325	348	374	397	415
First Stage "COOL" Speed	Tap 1	26	36	39	52	62	73	93	102
	Tap 2	37	45	57	66	76	90	100	113
	Tap 3	62	80	94	108	123	135	152	171
	Tap 4	88	108	128	145	162	181	195	214
Second Stage "COOL" Speed	Tap 1	33	45	57	68	78	89	101	115
	Tap 2	64	81	96	113	132	145	159	179
	Tap 3	133	152	172	190	211	231	252	270
	Tap 4	253	278	307	325	348	374	397	415

AT " - " (Minus) SETTING ("Adjust" Jumper at " - " Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	30	43	54	62	73	84	97	109
	Tap 2	52	71	87	99	117	128	145	157
	Tap 3	100	118	138	161	179	193	204	228
	Tap 4	167	185	206	230	256	280	295	316
First Stage "COOL" Speed	Tap 1	23	29	42	48	60	75	88	93
	Tap 2	31	39	54	62	76	86	96	105
	Tap 3	46	56	70	84	93	107	115	133
	Tap 4	72	87	105	121	141	158	175	188
Second Stage "COOL" Speed	Tap 1	30	43	54	62	73	84	97	109
	Tap 2	52	71	87	99	117	128	145	157
	Tap 3	100	118	138	161	179	193	204	228
	Tap 4	167	185	206	230	256	280	295	316

BLOWER DATA

CBK45UHVT-030 BLOWER PERFORMANCE

0 through 0.80 in. w.g. External Static Pressure Range

"ADJUST" Jumper Setting	Jumper Speed Positions											
	"HEAT" Speed				First Stage "COOL" Speed				Second Stage "COOL" Speed			
	1	2	3	4	1	2	3	4	1	2	3	4
	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm
+	680	885	1115	1340	490	635	770	930	680	885	1115	1340
NORM	620	810	1020	1220	440	575	715	845	620	810	1020	1220
-	550	725	905	1100	411	530	645	755	550	725	905	1100

NOTES - All air data measured external to unit with dry coil and 1 inch non-pleated air filter in place. Electric heaters have no appreciable air resistance.
First stage cooling air volume is 70% of COOL speed setting. Continuous blower speed is approximately 50% of COOL speed setting.
Lennox® LZSV Variable Zoning System applications - minimum blower speed is 250 cfm.

CBK45UHVT-030 BLOWER MOTOR WATTS

AT "+" (Plus) SETTING ("Adjust" Jumper at "+" Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	64	81	108	136	153	201	210	246
	Tap 2	120	136	162	182	198	221	246	286
	Tap 3	210	231	259	280	303	323	348	376
	Tap 4	367	392	420	452	486	506	510	520
First Stage "COOL" Speed	Tap 1	32	52	70	88	96	120	148	172
	Tap 2	50	72	91	115	143	177	200	215
	Tap 3	87	102	120	142	170	195	227	243
	Tap 4	128	151	176	196	213	239	259	294
Second Stage "COOL" Speed	Tap 1	64	81	108	136	153	201	210	246
	Tap 2	120	136	162	182	198	221	246	286
	Tap 3	210	231	259	280	303	323	348	376
	Tap 4	367	392	420	452	486	506	510	520

AT "NORM" SETTING ("Adjust" Jumper at NORM Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	55	70	94	118	148	171	198	209
	Tap 2	91	113	132	151	177	201	222	242
	Tap 3	167	187	209	230	252	279	304	331
	Tap 4	268	304	329	354	380	403	431	451
First Stage "COOL" Speed	Tap 1	30	47	64	73	95	113	121	133
	Tap 2	46	67	87	119	140	151	163	187
	Tap 3	75	91	113	138	164	196	228	267
	Tap 4	104	125	142	158	187	215	244	265
Second Stage "COOL" Speed	Tap 1	55	70	94	118	148	171	198	209
	Tap 2	91	113	132	151	177	201	222	242
	Tap 3	167	187	209	230	252	279	304	331
	Tap 4	268	304	329	354	380	403	431	451

AT " - " (Minus) SETTING ("Adjust" Jumper at " - " Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	47	59	78	108	126	150	158	189
	Tap 2	72	89	111	130	157	193	214	241
	Tap 3	128	144	162	180	200	216	254	284
	Tap 4	194	223	247	268	292	317	347	368
First Stage "COOL" Speed	Tap 1	30	42	56	68	86	104	119	132
	Tap 2	45	57	84	97	113	132	157	181
	Tap 3	67	75	99	129	161	184	208	247
	Tap 4	85	101	120	138	163	197	234	253
Second Stage "COOL" Speed	Tap 1	47	59	78	108	126	150	158	189
	Tap 2	72	89	111	130	157	193	214	241
	Tap 3	128	144	162	180	200	216	254	284
	Tap 4	194	223	247	268	292	317	347	368

BLOWER DATA

CBK45UHVT-036 BLOWER PERFORMANCE

0 through 0.80 in. w.g. External Static Pressure Range

"ADJUST" Jumper Setting	Jumper Speed Positions											
	"HEAT" Speed				First Stage "COOL" Speed				Second Stage "COOL" Speed			
	1	2	3	4	1	2	3	4	1	2	3	4
	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm
+	930	1155	1390	1530	640	815	970	1150	930	1155	1390	1530
NORM	830	1050	1260	1450	590	725	875	1025	830	1050	1260	1450
-	740	940	1135	1330	545	650	780	910	740	940	1135	1330

NOTES - All air data measured external to unit with dry coil and 1 inch non-pleated air filter in place. Electric heaters have no appreciable air resistance.
First stage cooling air volume is 70% of COOL speed setting. Continuous blower speed is approximately 50% of COOL speed setting.
Lennox® LZSV Variable Zoning System applications - minimum blower speed is 250 cfm.

CBK45UHVT-036 BLOWER MOTOR WATTS

AT "+" (Plus) SETTING ("Adjust" Jumper at "+" Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	111	132	152	193	226	246	271	282
	Tap 2	188	215	242	271	295	327	391	412
	Tap 3	298	325	361	395	433	474	491	515
	Tap 4	464	503	516	537	526	527	529	522
First Stage "COOL" Speed	Tap 1	53	78	98	112	135	151	173	192
	Tap 2	78	101	118	149	173	191	217	237
	Tap 3	115	136	162	185	237	265	284	308
	Tap 4	166	196	228	252	284	303	364	399
Second Stage "COOL" Speed	Tap 1	111	132	152	193	226	246	271	282
	Tap 2	188	215	242	271	295	327	391	412
	Tap 3	298	325	361	395	433	474	491	515
	Tap 4	464	503	516	537	526	527	529	522

AT "NORM" SETTING ("Adjust" Jumper at NORM Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	79	102	128	170	189	210	225	254
	Tap 2	138	165	191	219	243	300	328	347
	Tap 3	225	249	287	315	351	377	407	429
	Tap 4	342	384	425	456	510	531	533	525
First Stage "COOL" Speed	Tap 1	41	69	80	100	115	141	159	176
	Tap 2	64	80	114	136	155	169	197	214
	Tap 3	241	219	202	155	145	116	94	85
	Tap 4	319	296	258	211	189	163	138	123
Second Stage "COOL" Speed	Tap 1	79	102	128	170	189	210	225	254
	Tap 2	138	165	191	219	243	300	328	347
	Tap 3	225	249	287	315	351	377	407	429
	Tap 4	342	384	425	456	510	531	533	525

AT " - " (Minus) SETTING ("Adjust" Jumper at " - " Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	64	81	119	142	161	184	194	219
	Tap 2	111	131	151	174	221	255	268	293
	Tap 3	168	199	222	248	287	304	359	396
	Tap 4	249	293	331	340	386	410	443	475
First Stage "COOL" Speed	Tap 1	38	59	79	90	107	121	139	170
	Tap 2	49	73	105	112	131	151	162	184
	Tap 3	69	90	122	149	170	197	207	229
	Tap 4	105	130	147	172	219	242	262	278
Second Stage "COOL" Speed	Tap 1	64	81	119	142	161	184	194	219
	Tap 2	111	131	151	174	221	255	268	293
	Tap 3	168	199	222	248	287	304	359	396
	Tap 4	249	293	331	340	386	410	443	475

BLOWER DATA

CBK45UHVT-042 BLOWER PERFORMANCE

0 through 0.80 in. w.g. External Static Pressure Range

"ADJUST" Jumper Setting	Jumper Speed Positions											
	"HEAT" Speed				First Stage "COOL" Speed				Second Stage "COOL" Speed			
	1	2	3	4	1	2	3	4	1	2	3	4
	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm
+	1130	1370	1575	1810	780	945	1110	1275	1130	1370	1575	1810
NORM	1020	1255	1440	1650	710	860	1000	1160	1020	1255	1440	1650
-	920	1135	1300	1490	670	780	910	1040	920	1135	1300	1490

NOTES - All air data measured external to unit with dry coil and 1 inch non-pleated air filter in place. Electric heaters have no appreciable air resistance.
First stage cooling air volume is 70% of COOL speed setting. Continuous blower speed is approximately 50% of COOL speed setting.
Lennox® LZSV Variable Zoning System applications - minimum blower speed is 450 cfm.

CBK45UHVT-042 BLOWER MOTOR WATTS

AT "+" (Plus) SETTING ("Adjust" Jumper at "+" Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	148	175	198	227	258	275	312	364
	Tap 2	239	268	295	323	351	375	409	437
	Tap 3	338	375	411	437	470	507	537	563
	Tap 4	504	531	578	614	657	687	716	763
First Stage "COOL" Speed	Tap 1	67	91	115	143	165	185	202	223
	Tap 2	101	127	145	175	213	241	251	277
	Tap 3	140	164	196	215	250	265	299	345
	Tap 4	190	229	245	285	303	324	363	398
Second Stage "COOL" Speed	Tap 1	148	175	198	227	258	275	312	364
	Tap 2	239	268	295	323	351	375	409	437
	Tap 3	338	375	411	437	470	507	537	563
	Tap 4	504	531	578	614	657	687	716	763

AT "NORM" SETTING ("Adjust" Jumper at NORM Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	116	146	168	196	221	250	286	305
	Tap 2	188	215	243	266	295	319	348	383
	Tap 3	270	300	327	353	384	417	450	474
	Tap 4	375	416	459	500	517	556	588	618
First Stage "COOL" Speed	Tap 1	57	78	107	134	151	171	192	225
	Tap 2	85	111	135	158	197	213	226	246
	Tap 3	118	138	163	186	219	254	291	305
	Tap 4	170	198	217	247	267	295	328	380
Second Stage "COOL" Speed	Tap 1	116	146	168	196	221	250	286	305
	Tap 2	188	215	243	266	295	319	348	383
	Tap 3	270	300	327	353	384	417	450	474
	Tap 4	375	416	459	500	517	556	588	618

AT " - " (Minus) SETTING ("Adjust" Jumper at " - " Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	96	119	138	162	191	227	247	266
	Tap 2	153	171	200	226	249	286	303	348
	Tap 3	204	237	259	286	319	336	371	401
	Tap 4	282	312	353	384	417	441	468	503
First Stage "COOL" Speed	Tap 1	56	74	98	121	131	169	178	200
	Tap 2	79	93	115	140	165	188	199	218
	Tap 3	98	117	138	170	196	228	250	260
	Tap 4	126	148	175	194	222	254	300	322
Second Stage "COOL" Speed	Tap 1	96	119	138	162	191	227	247	266
	Tap 2	153	171	200	226	249	286	303	348
	Tap 3	204	237	259	286	319	336	371	401
	Tap 4	282	312	353	384	417	441	468	503

BLOWER DATA

CBK45UHVT-048 BLOWER PERFORMANCE

0 through 0.80 in. w.g. External Static Pressure Range

"ADJUST" Jumper Setting	Jumper Speed Positions											
	"HEAT" Speed				First Stage "COOL" Speed				Second Stage "COOL" Speed			
	1	2	3	4	1	2	3	4	1	2	3	4
	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm
+	1375	1600	1820	2185	960	1125	1285	1620	1375	1600	1820	2185
NORM	1260	1455	1655	2085	885	1035	1185	1475	1260	1455	1655	2085
-	1125	1310	1490	1885	790	925	1060	1330	1125	1310	1490	1885

NOTES - All air data measured external to unit with dry coil and 1 inch non-pleated air filter in place. Electric heaters have no appreciable air resistance.
First stage cooling air volume is 70% of COOL speed setting. Continuous blower speed is approximately 50% of COOL speed setting.
Lennox® LZSV Variable Zoning System applications - minimum blower speed is 450 cfm.

CBK45UHVT-048 BLOWER MOTOR WATTS

AT "+" (Plus) SETTING ("Adjust" Jumper at "+" Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	221	244	277	308	345	372	406	449
	Tap 2	325	363	403	448	478	517	549	578
	Tap 3	465	502	550	592	637	671	711	755
	Tap 4	922	985	1000	1006	996	991	996	989
First Stage "COOL" Speed	Tap 1	94	129	152	179	206	247	265	288
	Tap 2	135	168	190	220	247	275	313	367
	Tap 3	176	213	241	270	292	344	366	405
	Tap 4	330	368	405	439	478	515	542	576
Second Stage "COOL" Speed	Tap 1	221	244	277	308	345	372	406	449
	Tap 2	325	363	403	448	478	517	549	578
	Tap 3	465	502	550	592	637	671	711	755
	Tap 4	922	985	1000	1006	996	991	996	989

AT "NORM" SETTING ("Adjust" Jumper at NORM Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	180	208	240	275	296	333	362	410
	Tap 2	252	287	311	346	380	407	456	484
	Tap 3	347	392	434	457	507	534	579	615
	Tap 4	696	749	797	841	881	927	972	999
First Stage "COOL" Speed	Tap 1	77	102	128	153	185	210	231	247
	Tap 2	111	133	164	188	219	251	279	304
	Tap 3	144	175	206	233	262	285	325	352
	Tap 4	251	283	317	364	382	419	447	482
Second Stage "COOL" Speed	Tap 1	180	208	240	275	296	333	362	410
	Tap 2	252	287	311	346	380	407	456	484
	Tap 3	347	392	434	457	507	534	579	615
	Tap 4	696	749	797	841	881	927	972	999

AT " - " (Minus) SETTING ("Adjust" Jumper at " - " Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	133	164	192	221	253	280	318	352
	Tap 2	203	224	270	291	317	371	403	430
	Tap 3	273	309	343	376	413	441	471	522
	Tap 4	518	573	610	667	694	732	776	821
First Stage "COOL" Speed	Tap 1	61	87	116	141	168	186	204	222
	Tap 2	85	109	135	166	197	222	249	270
	Tap 3	115	142	168	199	220	253	287	330
	Tap 4	194	227	253	288	320	359	388	415
Second Stage "COOL" Speed	Tap 1	133	164	192	221	253	280	318	352
	Tap 2	203	224	270	291	317	371	403	430
	Tap 3	273	309	343	376	413	441	471	522
	Tap 4	518	573	610	667	694	732	776	821

BLOWER DATA

CBK45UHVT-060 BLOWER PERFORMANCE

0 through 0.80 in. w.g. External Static Pressure Range

"ADJUST" Jumper Setting	Jumper Speed Positions											
	"HEAT" Speed				First Stage "COOL" Speed				Second Stage "COOL" Speed			
	1	2	3	4	1	2	3	4	1	2	3	4
	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm
+	1600	1835	2030	2190	1110	1285	1380	1615	1600	1835	2030	2190
NORM	1465	1675	1855	2085	1000	1160	1250	1470	1465	1675	1855	2085
-	1320	1500	1675	1890	895	1035	1115	1320	1320	1500	1675	1890

NOTES - All air data measured external to unit with dry coil and 1 inch non-pleated air filter in place. Electric heaters have no appreciable air resistance.
First stage cooling air volume is 70% of COOL speed setting. Continuous blower speed is approximately 50% of COOL speed setting.
Lennox® LZSV Variable Zoning System applications - minimum blower speed is 450 cfm.

CBK45UHVT-060 BLOWER MOTOR WATTS

AT "+" (Plus) SETTING ("Adjust" Jumper at "+" Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	330	360	403	444	488	521	563	600
	Tap 2	469	505	564	616	649	685	735	776
	Tap 3	631	671	734	782	832	894	931	974
	Tap 4	903	957	1016	1015	1013	1002	1002	998
First Stage "COOL" Speed	Tap 1	146	166	194	223	267	300	340	379
	Tap 2	195	221	252	278	319	358	383	427
	Tap 3	225	260	286	319	357	399	427	466
	Tap 4	339	382	417	447	494	532	567	611
Second Stage "COOL" Speed	Tap 1	330	360	403	444	488	521	563	600
	Tap 2	469	505	564	616	649	685	735	776
	Tap 3	631	671	734	782	832	894	931	974
	Tap 4	903	957	1016	1015	1013	1002	1002	998

AT "NORM" SETTING ("Adjust" Jumper at NORM Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	251	288	320	355	391	440	463	514
	Tap 2	348	397	433	482	515	565	607	650
	Tap 3	472	524	578	614	664	704	749	810
	Tap 4	696	740	792	856	886	939	984	983
First Stage "COOL" Speed	Tap 1	110	105	164	196	233	263	297	320
	Tap 2	152	182	205	244	271	300	347	387
	Tap 3	177	205	238	271	311	341	375	424
	Tap 4	254	298	331	367	408	444	473	527
Second Stage "COOL" Speed	Tap 1	251	288	320	355	391	440	463	514
	Tap 2	348	397	433	482	515	565	607	650
	Tap 3	472	524	578	614	664	704	749	810
	Tap 4	696	740	792	856	886	939	984	983

AT " - " (Minus) SETTING ("Adjust" Jumper at " - " Setting)

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.							
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	189	228	263	294	328	358	403	430
	Tap 2	268	304	343	380	427	461	483	549
	Tap 3	355	401	431	487	523	569	611	642
	Tap 4	506	549	607	646	689	720	775	834
First Stage "COOL" Speed	Tap 1	88	119	139	173	198	244	260	275
	Tap 2	117	145	169	200	225	272	309	338
	Tap 3	130	161	187	217	253	286	325	368
	Tap 4	192	237	265	295	324	364	405	440
Second Stage "COOL" Speed	Tap 1	189	228	263	294	328	358	403	430
	Tap 2	268	304	343	380	427	461	483	549
	Tap 3	355	401	431	487	523	569	611	642
	Tap 4	506	549	607	646	689	720	775	834

TABLE 2. CBK45UHVT Thermostat and Single-Stage Outdoor Unit Operating Sequence

Operating Sequence		System Demand								System Response		
System Condition	Step	Thermostat Demand						Relative Humidity		Compressor	Air Handler CFM (COOL)	Comments
		Y1	Y2	O	G	W1	W2	Status	D			
NO CALL FOR DEHUMIDIFICATION												
Normal Operation	1	On		On	On			Acceptable	24 VAC	High	100%	Compressor and indoor air handler follow thermostat demand
BASIC MODE (only active on a Y1 thermostat demand)												
Normal Operation	1	On		On	On			Acceptable	24 VAC	High	100%	Thermostat energizes Y1 and de-energizes D on a call for dehumidification
Dehumidification Call	2	On		On	On			Demand	0 VAC	High	60%/65 70%*	
PRECISION MODE (operates independent of a Y1 thermostat demand)												
Normal Operation	1	On		On	On			Acceptable	24 VAC	High	100%	Dehumidification mode begins when humidity is greater than set point
Dehumidification Call	2	On		On	On			Demand	0 VAC	High	60%/65% 70%*	
Dehumidification Call ONLY	1	On		On	On			Demand	0 VAC	High	60%/65% 70%*	Thermostat will try to maintain room humidity setpoint by allowing the room space to maintain a cooler room thermostat setpoint**
	Jumpers at indoor unit with a single stage outdoor unit With Condensing unit - Y1 to Y2 and R to O With Heat Pump - Y1 to Y2											

* During dehumidification, cooling air handler speed is as follows: 70% of COOL cfm for 018, 024, 030; 65% for 036; 60% for 042, 048 and 060 units.
** Thermostat will maintain the room temperature up to 2°F (1.2°C) cooler than the room thermostat setting in precision mode.

TABLE 3. CBK45UHVT Thermostat and Two-Stage Outdoor Unit Operating Sequence

Operating Sequence		System Demand								System Response		
System Condition	Step	Thermostat Demand						Relative Humidity		Compressor	Air Handler CFM (COOL)	Comments
		Y1	Y2	O	G	W1	W2	Status	D			
NO CALL FOR DEHUMIDIFICATION												
Normal Operation - Y1	1	On		On	On			Acceptable	24 VAC	Low	70%	Compressor and indoor air handler follow thermostat demand
Normal Operation - Y2	2	On	On	On	On			Acceptable	24 VAC	High	100%	
Room Thermostat Calls for First-Stage Cooling												
BASIC MODE (only active on a Y1 thermostat demand)												
Normal Operation	1	On		On	On			Acceptable	24 VAC	Low	70%	Thermostat energizes Y2 and de-energizes D on a call for dehumidification
Dehumidification Call	2	On	On	On	On			Demand	24 VAC	High	60%/65% 70%*	
PRECISION MODE (operates independent of a Y1 thermostat demand)												
Normal Operation	1	On		On	On			Acceptable	24 VAC	Low	70%	Dehumidification mode begins when humidity is greater than set point
Dehumidification Call	2	On	On	On	On			Demand	0 VAC	High	60%/65% 70%*	
Dehumidification Call ONLY	1	On	On	On	On			Demand	0 VAC	High	60%/65% 70%*	Thermostat will try to maintain room humidity setpoint by allowing the room space to maintain a cooler room thermostat setpoint**
Room Thermostat Calls for First- and Second-Stage Cooling												
BASIC MODE (only active on a Y1 thermostat demand)												
Normal Operation	1	On	On	On	On			Acceptable	24 VAC	High	100%	Thermostat energizes Y2 and de-energizes D on a call for dehumidification
Dehumidification Call	2	On	On	On	On			Demand	0 VAC	High	60%/65% 70%*	
PRECISION MODE (operates independent of a Y1 thermostat demand)												
Normal Operation	1	On	On	On	On			Acceptable	24 VAC	High	100%	Dehumidification mode begins when humidity is greater than set point
Dehumidification Call	2	On	On	On	On			Demand	0 VAC	High	60%/65% 70%*	
Dehumidification Call ONLY	1	On	On	On	On			Demand	0 VAC	High	60%/65% 70%*	Thermostat will try to maintain room humidity setpoint by allowing the room space to maintain a cooler room thermostat setpoint**
	Jumpers at indoor unit with a two-stage outdoor unit With Condensing unit - Y2 and R to O With Heat Pump - none											

* During dehumidification, cooling air handler speed is as follows: 70% of COOL cfm for 018, 024, 030; 65% for 036; 60% for 042, 048 and 060 units.
** Thermostat will maintain the room temperature up to 2°F (1.2°C) cooler than the room thermostat setting in precision mode.

HEAT JUMPER

The **HEAT** jumper is used to determine CFM during electric heat operation only. These jumper selections are activated only when W1 is energized.

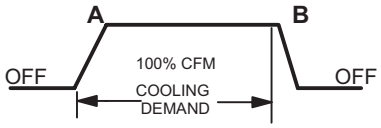
DELAY JUMPER

The **DELAY** jumper is used to set the specific motor fan operation during cooling mode. Depending on the application, one of four options may be chosen by moving the jumper to the appropriate set of pins.

#1 Pins Jumpered

A- Motor runs at 100% until demand is satisfied.

B- Once demand is met, motor ramps down to stop.

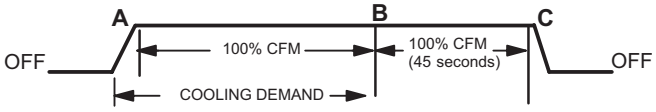


#2 Pins Jumpered

A- Motor runs at 100% until demand is satisfied.

B- Once demand is met, motor runs at 100% for 45 seconds.

C- Motor ramps down to stop.

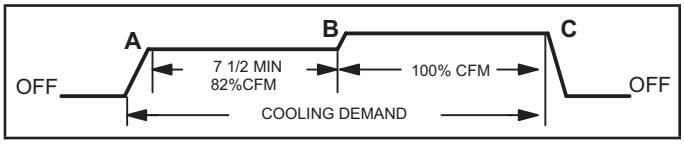


#3 Pins Jumpered

A- Motor runs at 82% for approximately 7-1/2 minutes. If demand has not been satisfied after 7-1/2 minutes.

B- Motor runs at 100% until demand is satisfied.

C- Once demand is met, motor ramps down to stop.



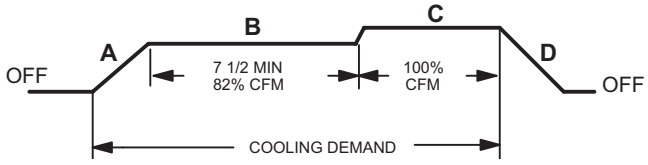
#4 Pins Jumpered

A- Motor ramps up to 82%.

B- Motor then runs at 82% for approximately 7-1/2 minutes. If demand has not been satisfied after 7-1/2 minutes,

C- Motor runs at 100% until demand is satisfied.

D- Once demand is met, motor ramps down to stop.



Application

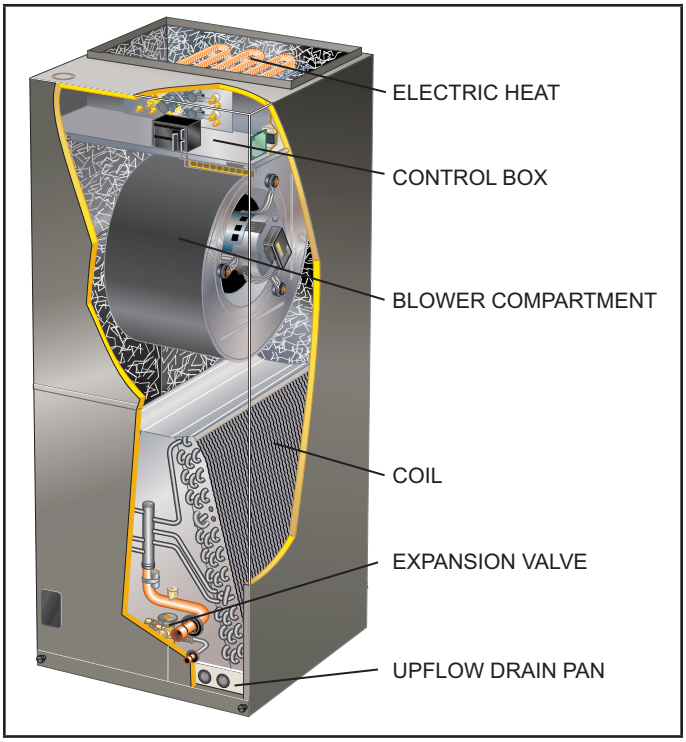


FIGURE 2. Typical Unit Parts Arrangement

All major blower coil components must be matched according to Lennox recommendations for the unit to be covered under warranty. Refer to the Product Specification bulletin for approved system matchups. A misapplied system will cause erratic operation and can result in early unit failure.

The units come with factory installed check and expansion valve for all applications. The TXV valve has been installed internally for a cleaner installation and is accessible if required.

Unit Components

CONTROL BOX

The CBK45UHVT control box is located above the blower section shown in figure 2. Line voltage and electric heat connections are made in the control box. Optional electric heat fits through an opening located in the center of the control box. When electric heat is not used, cover plates cover the opening. The electric heat control arrangement is detailed in the electric heat section of this manual.

TRANSFORMER

All CBK45UHVT series units use a single line voltage to 24VAC transformer mounted in the control box. The transformer supplies power to the control circuits in the indoor and outdoor unit. Transformers are rated at 40VA. 208/240VAC single phase transformers use two primary voltage taps as shown in figure 3.

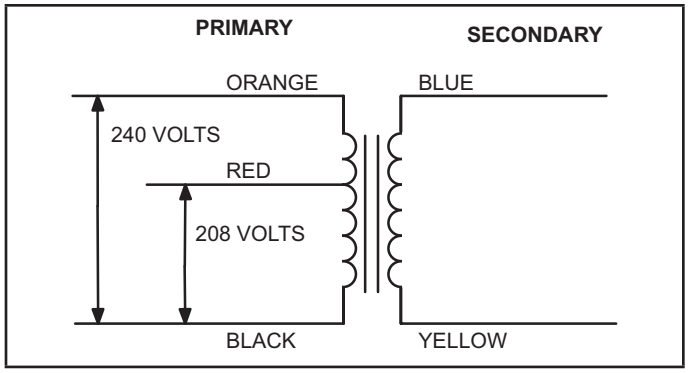


FIGURE 3. 208 / 240 Volt Transformer

BLOWER RELAY

All CBK45UHVT units use a double-pole single-throw (DPST) switch relay to energize the blower motor. The relay coil is energized by blower demand from indoor thermostat. When the coil is energized, a set of normally open (N.O.) contacts closes to energize the blower motor on cooling speed. When de-energized, a set of normally closed (N.C.) contacts allows the electric heat relay to energize the blower on heating speed (refer to unit wiring diagram).

BLOWER MOTOR (B3)

CBK45UHVT units use programmable variable speed blower motors. Figure 4 shows the parts arrangement.

All units are factory wired for heat pump and cooling applications with or without electric heat. The unit wiring diagrams will provide factory set blower speeds.

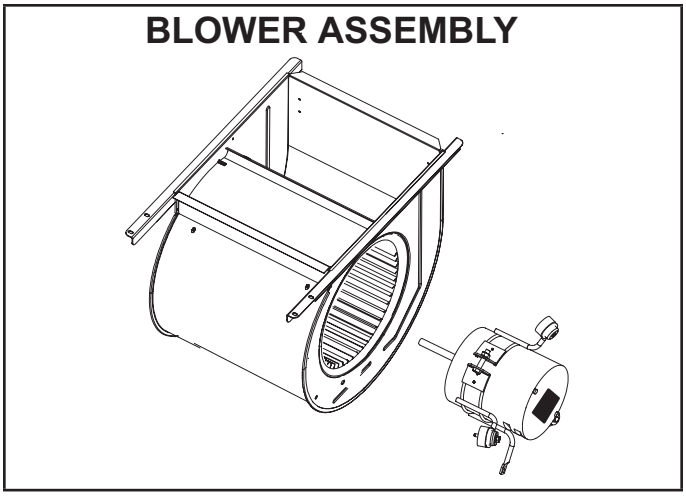


FIGURE 4. Blower Assembly

COIL

CBK45UHVT units have dual slab coils arranged in an A configuration. Each coil has two or three rows of aluminum tubes fitted with ripple-edged aluminum fins. An expansion valve feeds multiple parallel circuits through the coils. The coil is designed to easily slide out of the unit cabinet.

PLASTIC DRAIN PANS

Drain pans are provided and installed on the CBK45UHVT. The drain pans are made from fiberglass filled plastic.

ECB45 Electric Heat

ELECTRIC HEAT DATA — CBK45UHVT-018 | SINGLE PHASE

	Electric Heat Model Number	Input			Blower Motor Full Load Amps	[2] Minimum Circuit Ampacity	[3] Maximum Overcurrent Protection
		Volt	kW	[1] Btuh			
4 kW	ECB45-4 (**27A08**) Terminal Block ECB45-4CB (**27A12**) 30A Circuit Breaker	208	3.0	10,250	3.9	23	[4] **25**
		220	3.4	11,450	3.9	24	[4] **25**
		230	3.7	12,550	3.9	25	[4] **25**
		240	4.0	13,650	3.9	26	30
5 kW	ECB45-5 (**27A09**) Terminal Block ECB45-5CB (**27A13**) 30A Circuit Breaker	208	3.6	12,300	3.9	27	30
		220	4.0	13,800	3.9	28	30
		230	4.4	15,000	3.9	29	30
		240	4.8	16,400	3.9	30	30
7.5 kW	ECB45-7.5 (**27A10**) Terminal Block ECB45-7.5CB (**27A14**) 45A Circuit Breaker	208	5.6	19,200	3.9	39	[4] **40**
		220	6.3	21,500	3.9	41	45
		230	6.9	23,500	3.9	42	45
		240	7.5	25,600	3.9	44	45
10 kW	ECB45-10 (**27A11**) Terminal Block ECB45-10CB (**27A15**) 60A Circuit Breaker	208	7.2	24,600	3.9	48	[4] **50**
		220	8.0	27,500	3.9	51	60
		230	8.8	30,000	3.9	53	60
		240	9.6	32,700	3.9	55	60

ELECTRIC HEAT DATA — CBK45UHVT-024 | SINGLE PHASE

	Electric Heat Model Number	Input			Blower Motor Full Load Amps	[2] Minimum Circuit Ampacity	[3] Maximum Overcurrent Protection
		Volt	kW	[1] Btuh			
4 kW	ECB45-4 (**27A08**) Terminal Block ECB45-4CB (**27A12**) 30A Circuit Breaker	208	3.0	10,250	3.9	23	[4] **25**
		220	3.4	11,450	3.9	24	[4] **25**
		230	3.7	12,550	3.9	25	[4] **25**
		240	4.0	13,650	3.9	26	30
5 kW	ECB45-5 (**27A09**) Terminal Block ECB45-5CB (**27A13**) 30A Circuit Breaker	208	3.6	12,300	3.9	27	30
		220	4.0	13,800	3.9	28	30
		230	4.4	15,000	3.9	29	30
		240	4.8	16,400	3.9	30	30
7.5 kW	ECB45-7.5 (**27A10**) Terminal Block ECB45-7.5CB (**27A14**) 45A Circuit Breaker	208	5.6	19,200	3.9	39	[4] **40**
		220	6.3	21,500	3.9	41	45
		230	6.9	23,500	3.9	42	45
		240	7.5	25,600	3.9	44	45
10 kW	ECB45-10 (**27A11**) Terminal Block ECB45-10CB (**27A15**) 60A Circuit Breaker	208	7.2	24,600	3.9	48	[4] **50**
		220	8.0	27,500	3.9	51	60
		230	8.8	30,000	3.9	53	60
		240	9.6	32,700	3.9	55	60

NOTE - Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.

[1] Electric heater capacity only - does not include additional blower motor heat capacity.

[2] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F.

[3] HACR type breaker or fuse.

[4] **Bold indicates that the circuit breaker on "CB" circuit breaker models must be replaced with size shown. See table on page 8.**

ELECTRIC HEAT DATA — CBK45UHVT-030 | SINGLE PHASE

Electric Heat Model Number		Input			Blower Motor Full Load Amps	[2] Minimum Circuit Ampacity		[3] Maximum Overcurrent Protection		Single Point Power Source	
		Volt	kW	[1] Btuh		Ckt 1	Ckt 2	Ckt 1	Ckt 2	[2] Minimum Circuit Ampacity	[3] Maximum Overcurrent Protection
4 kW	ECB45-4 (**27A08**) Terminal Block ECB45-4CB (**27A12**) 30A Circuit Breaker	208	3.0	10,250	3.9	23	- - -	[4] **25**	- - -	- - -	- - -
		220	3.4	11,450	3.9	24	- - -	[4] **25**	- - -	- - -	- - -
		230	3.7	12,550	3.9	25	- - -	[4] **25**	- - -	- - -	- - -
		240	4.0	13,650	3.9	26	- - -	30	- - -	- - -	- - -
5 kW	ECB45-5 (**27A09**) Terminal Block ECB45-5CB (**27A13**) 30A Circuit Breaker	208	3.6	12,300	3.9	27	- - -	30	- - -	- - -	- - -
		220	4.0	13,800	3.9	28	- - -	30	- - -	- - -	- - -
		230	4.4	15,000	3.9	29	- - -	30	- - -	- - -	- - -
		240	4.8	16,400	3.9	30	- - -	30	- - -	- - -	- - -
7.5 kW	ECB45-7.5 (**27A10**) Terminal Block ECB45-7.5CB (**27A14**) 45A Circuit Breaker	208	5.6	19,200	3.9	39	- - -	[4] **40**	- - -	- - -	- - -
		220	6.3	21,500	3.9	41	- - -	45	- - -	- - -	- - -
		230	6.9	23,500	3.9	42	- - -	45	- - -	- - -	- - -
		240	7.5	25,600	3.9	44	- - -	45	- - -	- - -	- - -
10 kW	ECB45-10 (**27A11**) Terminal Block ECB45-10CB (**27A15**) 60A Circuit Breaker	208	7.2	24,600	3.9	48	- - -	[4] **50**	- - -	- - -	- - -
		220	8.0	27,500	3.9	51	- - -	60	- - -	- - -	- - -
		230	8.8	30,000	3.9	53	- - -	60	- - -	- - -	- - -
		240	9.6	32,700	3.9	55	- - -	60	- - -	- - -	- - -
12.5 kW	ECB45-12.5CB (**27A16**) (1) 50A and (1) 25A Circuit Breaker	208	9.4	32,000	3.9	42	19	[4] **45**	[4] **20**	61	70
		220	10.5	35,800	3.9	45	20	[4] **45**	[4] **20**	65	70
		230	11.5	39,200	3.9	46	21	50	25	67	70
		240	12.5	42,600	3.9	48	22	50	25	70	70
15 kW	ECB45-15CB (**27A17**) (1) 60A and (1) 25A Circuit Breaker	208	10.8	36,900	3.9	48	22	[4] **50**	25	70	70
		220	12.1	41,300	3.9	51	23	60	25	74	80
		230	13.2	45,100	3.9	53	24	60	25	77	80
		240	14.4	49,100	3.9	55	25	60	25	80	80

NOTE - Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.

[1] Electric heater capacity only - does not include additional blower motor heat capacity.

[2] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F.

[3] HACR type breaker or fuse.

[4] Bold indicates that the circuit breaker on "CB" circuit breaker models must be replaced with size shown. See table on page 8.

ELECTRIC HEAT DATA — CBK45UHVT-036 | SINGLE PHASE

Electric Heat Model Number		Input			Blower Motor Full Load Amps	[2] Minimum Circuit Ampacity		[3] Maximum Overcurrent Protection		Single Point Power Source	
		Volt	kW	[1] Btuh		Ckt 1	Ckt 2	Ckt 1	Ckt 2	[2] Minimum Circuit Ampacity	[3] Maximum Overcurrent Protection
4 kW	ECB45-4 (**27A08**) Terminal Block ECB45-4CB (**27A12**) 30A Circuit Breaker	208	3.0	10,250	3.9	23	- - -	[4] **25**	- - -	- - -	- - -
		220	3.4	11,450	3.9	24	- - -	[4] **25**	- - -	- - -	- - -
		230	3.7	12,550	3.9	25	- - -	[4] **25**	- - -	- - -	- - -
		240	4.0	13,650	3.9	26	- - -	30	- - -	- - -	- - -
5 kW	ECB45-5 (**27A09**) Terminal Block ECB45-5CB (**27A13**) 30A Circuit Breaker	208	3.6	12,300	3.9	27	- - -	30	- - -	- - -	- - -
		220	4.0	13,800	3.9	28	- - -	30	- - -	- - -	- - -
		230	4.4	15,000	3.9	29	- - -	30	- - -	- - -	- - -
		240	4.8	16,400	3.9	30	- - -	30	- - -	- - -	- - -
7.5 kW	ECB45-7.5 (**27A10**) Terminal Block ECB45-7.5CB (**27A14**) 45A Circuit Breaker	208	5.6	19,200	3.9	39	- - -	[4] **40**	- - -	- - -	- - -
		220	6.3	21,500	3.9	41	- - -	45	- - -	- - -	- - -
		230	6.9	23,500	3.9	42	- - -	45	- - -	- - -	- - -
		240	7.5	25,600	3.9	44	- - -	45	- - -	- - -	- - -
10 kW	ECB45-10 (**27A11**) Terminal Block ECB45-10CB (**27A15**) 60A Circuit Breaker	208	7.2	24,600	3.9	48	- - -	[4] **50**	- - -	- - -	- - -
		220	8.0	27,500	3.9	51	- - -	60	- - -	- - -	- - -
		230	8.8	30,000	3.9	53	- - -	60	- - -	- - -	- - -
		240	9.6	32,700	3.9	55	- - -	60	- - -	- - -	- - -
12.5 kW	ECB45-12.5CB (**27A16**) (1) 50A and (1) 25A Circuit Breaker	208	9.4	32,000	3.9	42	19	[4] **45**	[4] **20**	61	70
		220	10.5	35,800	3.9	45	20	[4] **45**	[4] **20**	65	70
		230	11.5	39,200	3.9	46	21	50	25	67	70
		240	12.5	42,600	3.9	48	22	50	25	70	70
15 kW	ECB45-15CB (**27A17**) (1) 60A and (1) 25A Circuit Breaker	208	10.8	36,900	3.9	48	22	[4] **50**	25	70	70
		220	12.1	41,300	3.9	51	23	60	25	74	80
		230	13.2	45,100	3.9	53	24	60	25	77	80
		240	14.4	49,100	3.9	55	25	60	25	80	80

NOTE - Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.

[1] Electric heater capacity only - does not include additional blower motor heat capacity.

[2] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F.

[3] HACR type breaker or fuse.

[4] Bold indicates that the circuit breaker on "CB" circuit breaker models must be replaced with size shown. See table on page 8.

ELECTRIC HEAT DATA — CBK45UHVT-042 | SINGLE PHASE

Electric Heat Model Number		Input			Blower Motor Full Load Amps	[2] Minimum Circuit Ampacity		[3] Maximum Overcurrent Protection		Single Point Power Source	
		Volt	kW	[1] Btuh		Ckt 1	Ckt 2	Ckt 1	Ckt 2	[2] Minimum Circuit Ampacity	[3] Maximum Overcurrent Protection
4 kW	ECB45-4 (**27A08**) Terminal Block ECB45-4CB (**27A12**) 30A Circuit Breaker	208	3.0	10,250	7.4	27	- - -	30	- - -	- - -	- - -
		220	3.4	11,450	7.4	28	- - -	30	- - -	- - -	- - -
		230	3.7	12,550	7.4	29	- - -	30	- - -	- - -	- - -
		240	4.0	13,650	7.4	30	- - -	30	- - -	- - -	- - -
5 kW	ECB45-5 (**27A09**) Terminal Block ECB45-5CB (**27A13**) 30A Circuit Breaker	208	3.6	12,300	7.4	31	- - -	[4] **35**	- - -	- - -	- - -
		220	4.0	13,800	7.4	32	- - -	[4] **35**	- - -	- - -	- - -
		230	4.4	15,000	7.4	33	- - -	[4] **35**	- - -	- - -	- - -
		240	4.8	16,400	7.4	34	- - -	[4] **35**	- - -	- - -	- - -
7.5 kW	ECB45-7.5 (**27A10**) Terminal Block ECB45-7.5CB (**27A14**) 45A Circuit Breaker	208	5.6	19,200	7.4	43	- - -	45	- - -	- - -	- - -
		220	6.3	21,500	7.4	45	- - -	45	- - -	- - -	- - -
		230	6.9	23,500	7.4	47	- - -	[4] **50**	- - -	- - -	- - -
		240	7.5	25,600	7.4	48	- - -	[4] **50**	- - -	- - -	- - -
10 kW	ECB45-10 (**27A11**) Terminal Block ECB45-10CB (**27A15**) 60A Circuit Breaker	208	7.2	24,600	7.4	53	- - -	60	- - -	- - -	- - -
		220	8.0	27,500	7.4	55	- - -	60	- - -	- - -	- - -
		230	8.8	30,000	7.4	57	- - -	60	- - -	- - -	- - -
		240	9.6	32,700	7.4	59	- - -	60	- - -	- - -	- - -
12.5 kW	ECB45-12.5CB (**27A16**) (1) 50A and (1) 25A Circuit Breaker	208	9.4	32,000	7.4	47	19	50	[4] **20**	66	70
		220	10.5	35,800	7.4	49	20	50	[4] **20**	69	70
		230	11.5	39,200	7.4	51	21	[4] **60**	25	72	80
		240	12.5	42,600	7.4	53	22	[4] **60**	25	74	80
15 kW	ECB45-15CB (**27A17**) (1) 60A and (1) 25A Circuit Breaker	208	10.8	36,900	7.4	53	22	60	25	74	80
		220	12.1	41,300	7.4	55	23	60	25	78	80
		230	13.2	45,100	7.4	57	24	60	25	81	90
		240	14.4	49,100	7.4	59	25	60	25	84	90

NOTE - Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.

[1] Electric heater capacity only - does not include additional blower motor heat capacity.

[2] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F.

[3] HACR type breaker or fuse.

[4] Bold indicates that the circuit breaker on "CB" circuit breaker models must be replaced with size shown. See table on page 8.

ELECTRIC HEAT DATA — CBK45UHVT-048 | CBK45UHVT-060 | SINGLE PHASE

Electric Heat Model Number		Input			Blower Motor Full Load Amps	[2] Minimum Circuit Ampacity		[3] Maximum Overcurrent Protection		Single Point Power Source	
		Volt	kW	[1] Btuh		Ckt 1	Ckt 2	Ckt 1	Ckt 2	[2] Minimum Circuit Ampacity	[3] Maximum Overcurrent Protection
4 kW	ECB45-4 (**27A08**) Terminal Block ECB45-4CB (**27A12**) 30A Circuit Breaker	208	3.0	10,250	7.4	27	- - -	30	- - -	- - -	- - -
		220	3.4	11,450	7.4	28	- - -	30	- - -	- - -	- - -
		230	3.7	12,550	7.4	29	- - -	30	- - -	- - -	- - -
		240	4.0	13,650	7.4	30	- - -	30	- - -	- - -	- - -
5 kW	ECB45-5 (**27A09**) Terminal Block ECB45-5CB (**27A13**) 30A Circuit Breaker	208	3.6	12,300	7.4	31	- - -	[4] **35**	- - -	- - -	- - -
		220	4.0	13,800	7.4	32	- - -	[4] **35**	- - -	- - -	- - -
		230	4.4	15,000	7.4	33	- - -	[4] **35**	- - -	- - -	- - -
		240	4.8	16,400	7.4	34	- - -	[4] **35**	- - -	- - -	- - -
7.5 kW	ECB45-7.5 (**27A10**) Terminal Block ECB45-7.5CB (**27A14**) 45A Circuit Breaker	208	5.6	19,200	7.4	43	- - -	45	- - -	- - -	- - -
		220	6.3	21,500	7.4	45	- - -	45	- - -	- - -	- - -
		230	6.9	23,500	7.4	47	- - -	[4] **50**	- - -	- - -	- - -
		240	7.5	25,600	7.4	48	- - -	[4] **50**	- - -	- - -	- - -
10 kW	ECB45-10 (**27A11**) Terminal Block ECB45-10CB (**27A15**) 60A Circuit Breaker	208	7.2	24,600	7.4	53	- - -	60	- - -	- - -	- - -
		220	8.0	27,500	7.4	55	- - -	60	- - -	- - -	- - -
		230	8.8	30,000	7.4	57	- - -	60	- - -	- - -	- - -
		240	9.6	32,700	7.4	59	- - -	60	- - -	- - -	- - -
12.5 kW	ECB45-12.5CB (**27A16**) (1) 50A and (1) 25A Circuit Breaker	208	9.4	32,000	7.4	47	19	50	[4] **20**	66	70
		220	10.5	35,800	7.4	49	20	50	[4] **20**	69	70
		230	11.5	39,200	7.4	51	21	[4] **60**	25	72	80
		240	12.5	42,600	7.4	53	22	[4] **60**	25	74	80
15 kW	ECB45-15CB (**27A17**) (1) 60A and (1) 25A Circuit Breaker	208	10.8	36,900	7.4	53	22	60	25	74	80
		220	12.1	41,300	7.4	55	23	60	25	78	80
		230	13.2	45,100	7.4	57	24	60	25	81	90
		240	14.4	49,100	7.4	59	25	60	25	84	90
20 kW	ECB45-20CB (**27A18**) (1) 60A and (1) 50A Circuit Breaker	208	14.4	49,200	7.4	53	43	60	[4] **45**	96	100
		220	16.1	55,000	7.4	55	46	60	50	101	110
		230	17.6	60,100	7.4	57	48	60	50	105	110
		240	19.2	65,500	7.4	59	50	60	50	109	110

NOTE - Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.

[1] Electric heater capacity only - does not include additional blower motor heat capacity.

[2] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F.

[3] HACR type breaker or fuse.

[4] Bold indicates that the circuit breaker on "CB" circuit breaker models must be replaced with size shown. See table on page 8.

Heat Section Installation

⚠ WARNING

Before installing or servicing unit, be sure ALL power to the unit is OFF. More than one disconnect switch may be present. *Electrical shock can cause personal injury or death!*

Before installing the unit, check information on the unit rating plate to ensure that the unit meets the job specification, proper electrical power is available, and that proper duct clearances are maintained.

***NOTE** – If installing heat sections at the same time as the air handler unit, install the electric heat section in the air handler unit before setting the air handler unit and attaching the plenum.*

1 - Shut off all power to the air handler unit. More than one disconnect may be required.

2 - Remove air handler access panel and keep the six screws to reattach access panel after installing heat elements.

3 - Disconnect any existing field supply wires and pull them out of the air handler. Disconnect and remove wiring harness, fastener and control board (see figure 5). If not removed, these items will prevent the heat section's base from resting properly in the compartment.

4 - Remove the no-heat seal plate in the air handler frame (see figure 5).

***NOTE** – If a small heater is installed in the unit, the installer will need to remove the no-heat plate and break it apart at the perforations and reinstall the two pieces so the smaller heater can be installed into the unit.*

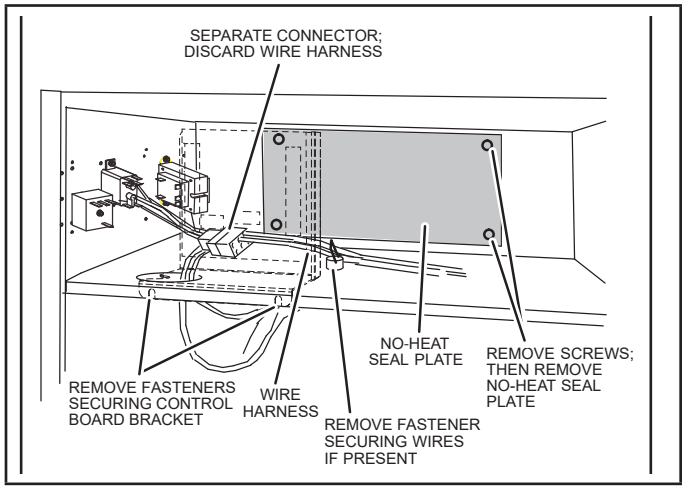


FIGURE 5. Prepare to Install Heat Element

5 - Slide the electric heat section into the air handler. Be careful that the heating elements do not rub against the sheet metal opening when they slide into the air handler. The mounting holes should then line up with holes in the air handler control box.

6 - Secure the electric heater assembly into place with the screws that were removed from the heat element panel. Install two field-provided #8 SDST screws in the front of the electric heater assembly (see figure 6).

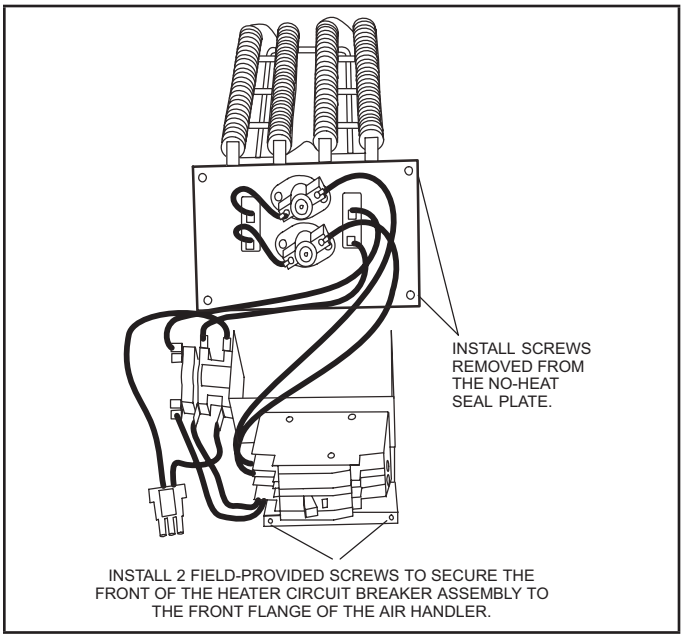


FIGURE 6. Installing the Heat Element Assembly

7 - The air handler's access panels have a cover plate that is fastened with a screw and will need to be positioned to fit either one breaker or two, but do not install the access panel until all electrical connections have been completed.

⚠ WARNING

Foil face insulation must be cut to eliminate the possibility for any frayed foil to come in contact with any main or low voltage connections. Insulation must be kept a minimum of 1/2" away from any electrical connection.

CHANGING CIRCUIT BREAKER ORIENTATION

The air handler comes from the factory ready for horizontal right hand discharge installation. Always rotate the breaker so up is the ON position in all orientations. The circuit breaker orientation change is required by UL60335-2-40.

1 - Locate the one clip located on the right side (see arrow) of each breaker (see figure 7). The clip secures the circuit breaker to the mounting bracket. Pull the clip to release the breaker from the mounting bracket and rotate the breaker to the proper postition.

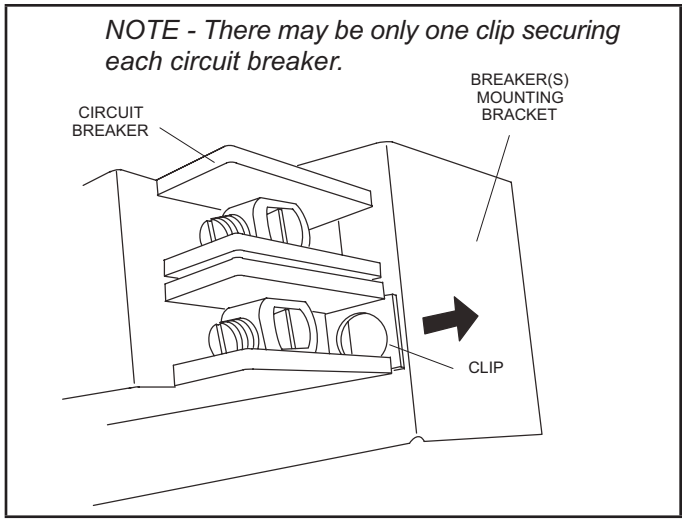


FIGURE 7. Circuit Breaker Clip

2 - Install the circuit breaker cover plate.

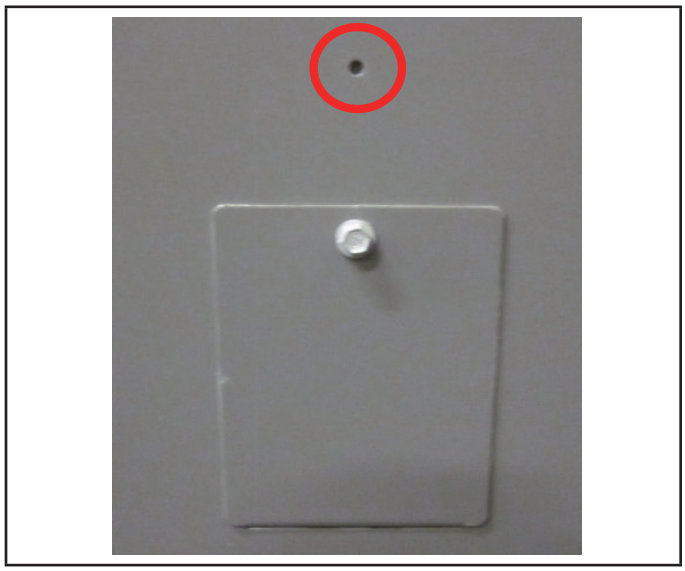


FIGURE 8. Circuit Breaker Cover Plate

***NOTE** – If electric heat kit has only one circuit breaker, the breaker cover plate needs to be moved up and installed over the opening without the circuit breaker. Fasten the breaker cover plate to the access panel using the circled hole in figure 8. If the electric heat kit has two circuit breakers, the breaker cover plate is not required.*

Electrical Connections

⚠ WARNING

Electric shock hazard! - Disconnect all power supplies before servicing.

Replace all parts and panels before operating.

Failure to do so can result in death or electrical shock.

⚠ IMPORTANT

USE COPPER CONDUCTORS ONLY

***NOTE** – Refer to the nameplate on the air handler unit for minimum circuit ampacity and maximum overcurrent protection size.*

The air handler units are provided with openings to be used with 1-1/2 inch trade size (1-31/32 inch diameter) conduit.

If you want a single point power supply, refer to the nameplate on the single point power supply accessory for minimum circuit ampacity and maximum overcurrent protection size. Select the proper supply circuit conductors in accordance with tables 310-16 and 310-17 in the National Electric Code, ANSI/NFPA No. 70 or tables 1 through 4 in the Canadian Electric Code, Part I, CSA Standard C22.1.

Refer to figure 34 for typical low voltage field wiring for air handler/condensing unit and heat pump applications. Figure 33 is a diagram of the air handler connections and the heater high-voltage wiring.

1 - Make wiring connections as follows: **Heaters equipped with circuit breakers** – Connect field power supply wiring to circuit breaker(s). Figure 9 shows **L1**, **L2** and ground **(GND)** connections for a 2-breaker configuration.

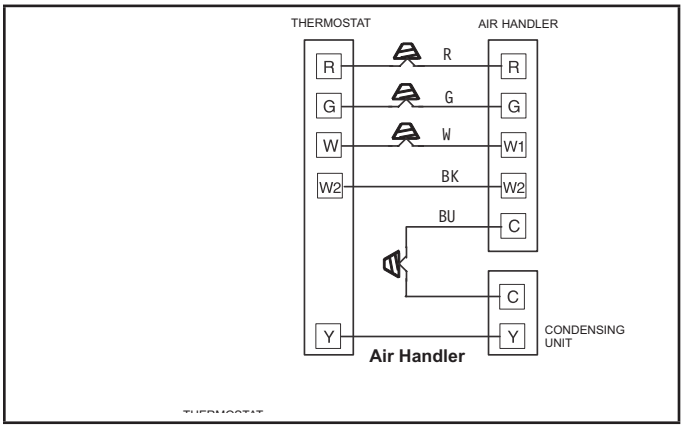


FIGURE 9. Field Power Supply Wiring

2 - Remove the interface harness from the air handler unit and connect the 6-pin connector on the heater assembly to the mating connector on the air handler unit.

3 - For applications using a two-stage room thermostat and/or an outdoor thermostat, connect wiring as shown in figure 34.

Circuit Breaker Cover Installation

1 - Remove any installed patch plates still present.

2 - Remove paper backing from the adhesive around the perimeter of the back side of the circuit breaker cover (figure 10).

3 - Position the breaker cover over the air handler circuit breaker opening.

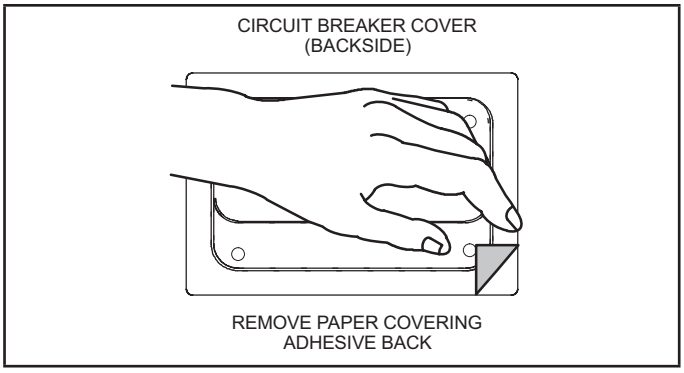


FIGURE 10. Remove Paper Cover

⚠ IMPORTANT

Confirm air tight seal between breaker cover and air handler access panel. Apply a thin silicone bead to the adhesive back seat to ensure air tight seal.

Failure to seal circuit breaker cover will allow warm moist air to be pulled into control panel which can create condensation to form on the circuit breaker and other electrical components within the control panel.

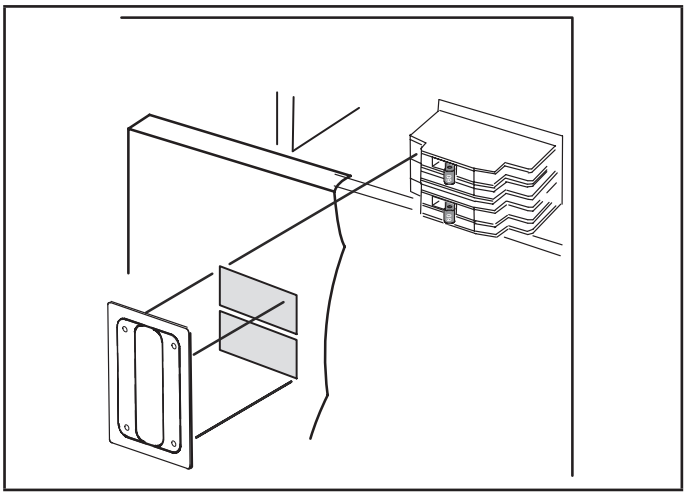


FIGURE 11. Typical Circuit Breaker Cover Installation

Air Handler Speed Connections

When using the electric heat sections with air handler units, you must adjust the air handler speed according to the size of electric heat and air handler unit. **Air handler speed tap for electric heat in upflow and horizontal position is medium. For downflow it is high speed.** See specific air handler installation instructions for air handler speed adjustment procedure and location.

1 - Set the thermostat above room temperature.

2 - Check the heat pump and the heat section for normal operation.

3 - Set the thermostat to desired setting.

4 - Affix the wiring diagram sticker to air handler scroll, aligned with circuit breaker unit wiring diagram sticker.

Configuration Modification

UPFLOW APPLICATION

1 - The air handler must be supported on the bottom only and set on solid floor or field-supplied support frame. Securely attach the air handler to the floor or support frame.

2 - If installing a unit in an upflow application, remove the horizontal drain pan. **IMPORTANT - The horizontal drain pan is not required in upflow air discharge installations; its removal provides the best efficiency and air flow.**

3 - Place the unit in the desired location and slope unit as previously mentioned. Connect return and supply air plenums as required using sheet metal screws.

4 - Install units that have no return air plenum on a stand that is at least 14" from the floor. This will allow proper air return.

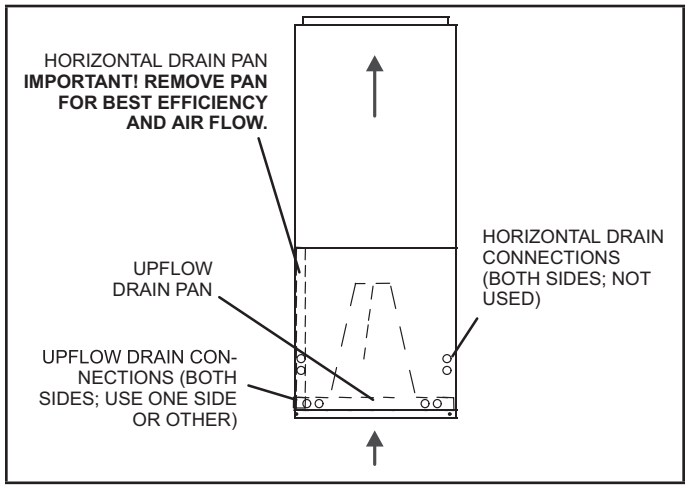


FIGURE 12. Upflow Configuration

HORIZONTAL APPLICATION

⚠ IMPORTANT

When removing the coil, there is possible danger of equipment damage and personal injury. Be careful when removing the coil assembly from a unit installed in right- or left-hand applications. The coil may tip into the drain pan once it is clear of the cabinet. Support the coil when removing it.

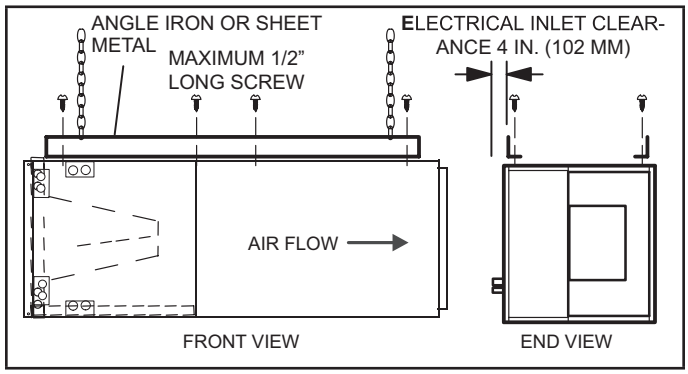


FIGURE 13. Suspend Horizontal Unit

NOTE *– When the unit is installed in horizontal applications, a secondary drain pan is recommended. Refer to local codes.*

NOTE – This unit may be installed in left- or right-hand air discharge horizontal applications. Adequate support must be provided to ensure cabinet integrity. Ensure that there is adequate room to remove service and access panels if installing in the horizontal position.

LEFT-HAND DISCHARGE

For horizontal left-hand air discharge, the following field modifications are required.

1 - Remove access panels and the corrugated padding between the blower and coil assembly. Discard the corrugated padding.

2 - Pull the coil assembly from unit. Pull off the horizontal drain pan.

3 - Remove the drain plugs from back drain holes on horizontal drain pan and reinstall them on front holes.

⚠ IMPORTANT

After removal of drain pan plug(s), check drain hole(s) to verify that drain opening is fully open and free of any debris. Also check to make sure that no debris has fallen into the drain pan during installation that may plug up the drain opening.

4 - Rotate drain pan 180º front-to-back and install it on the opposite side of the coil.

5 - Remove screws from top cap.

6 - Remove plastic plug from left hole on coil front end seal and reinstall plug in back hole.

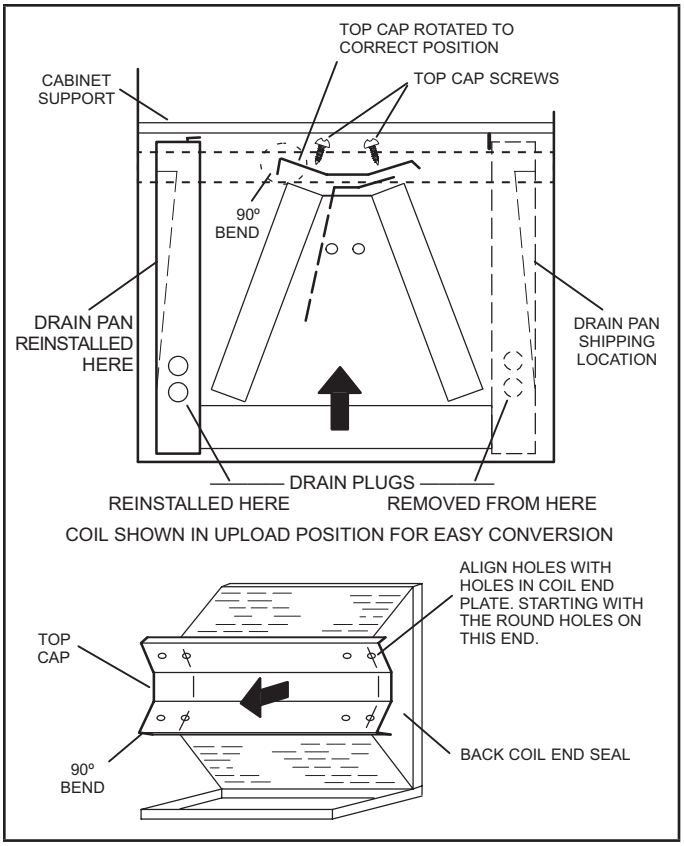


FIGURE 14. Field Modification for Left-Hand Discharge

7 - Rotate top cap 180º front-to-back and align with unused screw holes. Holes must align with front and back coil end plates. The top cap has a 45º bend on one side and a 90º bend on the other. **The 90º bend must be on the same side as the horizontal drain pan** as illustrated in figure 14.

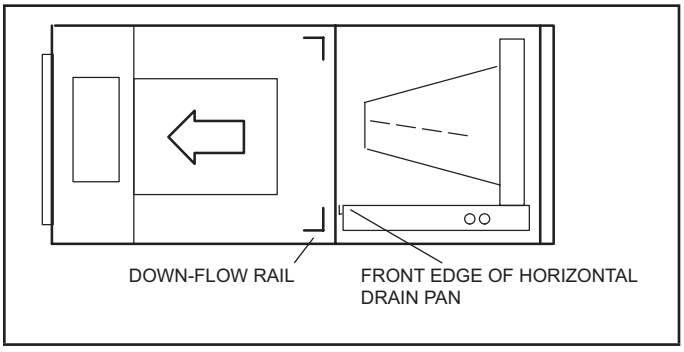


FIGURE 15. Left-Hand Discharge Configuration

NOTE – *Be very careful when reinstalling the screws into the coil end plate engaging holes. Misaligned screws may damage the coil.*

8 - From the upflow position, flip cabinet 90º to the left and set into place. Replace blower assembly. Secure coil in place by bending down the tab on the cabinet support rail as illustrated.

9 - Install the horizontal shield (-060 model) on the front edge of the horizontal drain pan as illustrated in figure 15.

NOTE – *For horizontal applications in high humidity areas, remove the downflow rail closest to the drain pan. To remove rail, remove screw from rail at back of unit and at cabinet support rail. Remove downflow rail then replace screws. Also, seal around the exiting drain pipe, liquid and suction lines to prevent infiltration of humid air.*

10 - Knock out drain seal plate from access door. Secure plate to cabinet front flange with screw provided.

11 - Flip access door and replace it on the unit.

12 - Set unit so that it is sloped 1/4" toward the drain pan end of the unit. Connect return and supply air plenums as required using sheet metal screws.

13 - If suspending the unit, it must be supported along the entire length of the cabinet. If using chain or strap, use a piece of angle iron or sheet metal attached to the unit (either above or below) so that the full length of the cabinet is supported. Use securing screws no longer than 1/2" to avoid damage to coil or filter, as illustrated in figure 13. Connect return and supply air plenums as required using sheet metal screws.

RIGHT-HAND DISCHARGE

1 - Determine which plugs are required for drain line connections.

2 - With access door removed, remove drain line plugs to install drain lines.

3 - Set unit so that it is sloped toward the upflow drain pan end of the unit and level from front to back of unit (see figure 7).

4 - The horizontal configuration is shown in figure 16.

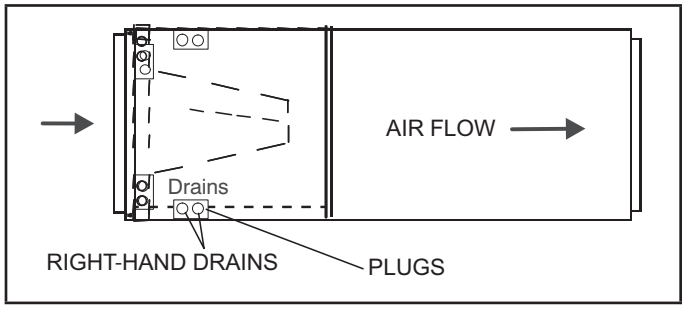


FIGURE 16. Right-Hand Discharge Configuration

5 - If the unit is suspended, the entire length of the cabinet must be supported. If you use a chain or strap, use a piece of angle iron or sheet metal attached to the unit (either above or below) to support the length of the cabinet. Use securing screws no longer than 1/2 inch to avoid damaging the coil or filter. See figure 13. Use sheet metal screws to connect the return and supply air plenums as required.

DOWNFLOW APPLICATION

NOTE *– If downflow application is required, separately order kit number Y9658 (-018 through -030) or Y9659 (-036 through -060) and install per kit's instructions. Also use metal or class I supply and return air plenums.*

Use the installation instruction provided with the downflow kit.

⚠ IMPORTANT

If electric heat section with circuit breakers (ECB45) is installed in a CBK45UHVT unit in a downflow application, the circuit breakers must be rotated 180° to the UP position. See ECB45 installation instructions for more details.

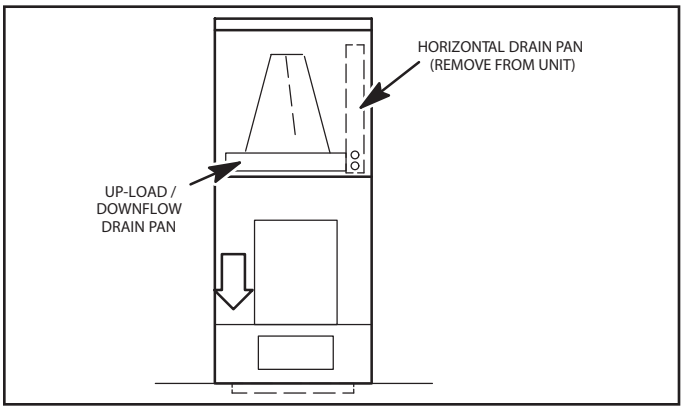


FIGURE 17. Downflow Discharge Position

Combustible Flooring Base

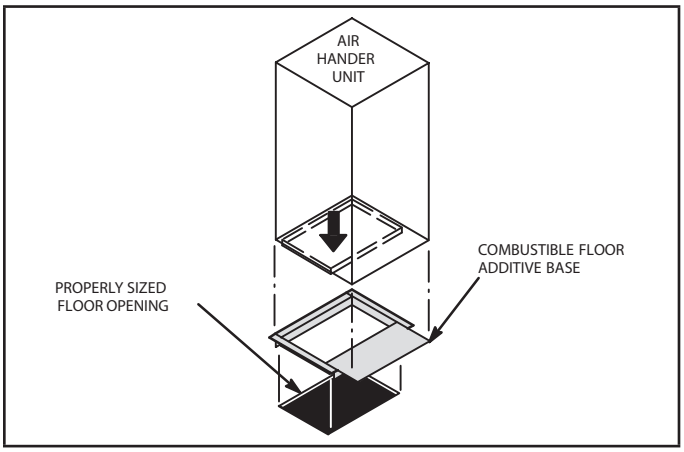


FIGURE 18. Downflow Combustible Flooring Base

1 - For downflow installation on combustible flooring, an additive base must be used as illustrated in figure 18. See CBK45UHVT Engineering Handbook for downflow combustible flooring base kits available for this air handler.

2 - Cut an opening appropriately sized for combustible base. Base dimensions are illustrated in figure 10. After opening has been cut, set the additive base into opening. Connect outlet air plenum to the additive base. Set the unit on the additive base so flanges of the unit drop into the base opening and seal against the insulation strips. The unit is now locked in place. Install return air plenum and secure with sheet metal screws.

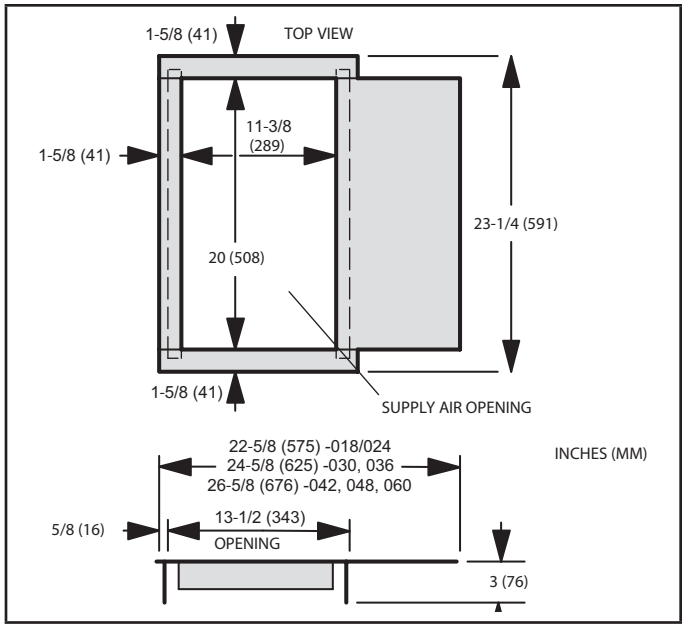


FIGURE 19. Downflow Combustible Base Dimensions

Reconfigure Blower Wiring (Variable Speed Models Only)

1 - Remove blower housing from air handler unit.
2 - Unplug wire harness from 16-pin box.
3 - Remove fasteners from 16-pin box and rotate box 180° so wires face downward.
4 - Reinstall box using same hardware.
5 - Seal box seam with caulk or metal tape.
6 - Reconnect wire harness.

FIGURE 20. 16-Pin Box Rotated 180°

FIGURE 21. Seal Seams on all 3 Sides of Box

7 - Loosen the motor band.
8 - Rotate motor to position the wiring plug at 5 o'clock.
9 - Tighten the motor band.
10 - Reinstall blower in unit and reconnect all harnesses.

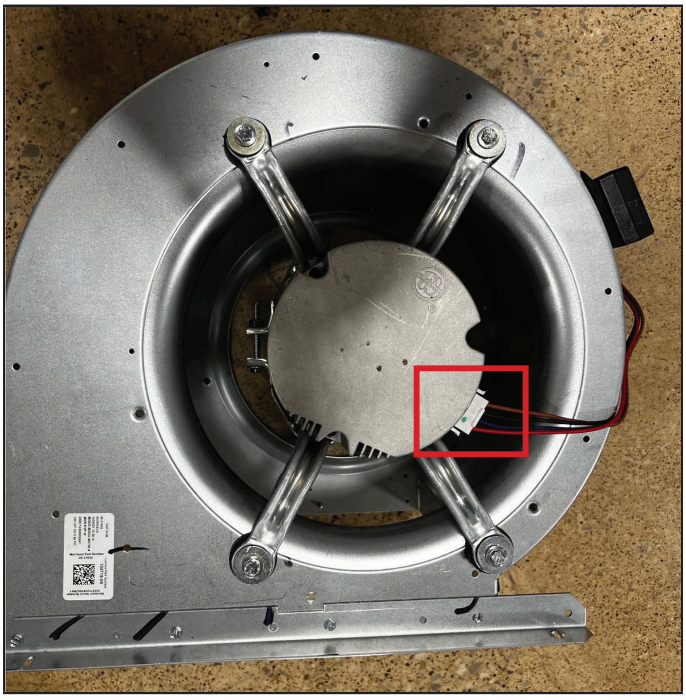


FIGURE 22. Motor Rotated to Position the Wiring Plug at 5 O'Clock

Sensor / Bracket Installation

Vertical Configuration

Leak detection sensor and bracket are factory-installed for vertical installation. No sensor relocation is required if installing in vertical configuration.

***NOTE** – The leak detection sensor needs to be relocated for horizontal right, horizontal left, and downflow configurations.*

Horizontal Right Configuration

1 - Remove sensor bracket assembly from vertical position (shown in FIGURE 23). Do not remove sensor from bracket, and do not disconnect or reroute sensor wire from the control panel area.

FIGURE 23

2 - Follow instructions for right-hand discharge as outlined in previous section on page 29

3 - With air handler unit panels removed, install sensor bracket assembly to the unit by lining up holes in the center support bracket as shown in FIGURE 24. Note: sensor should be facing toward the inside of the unit.

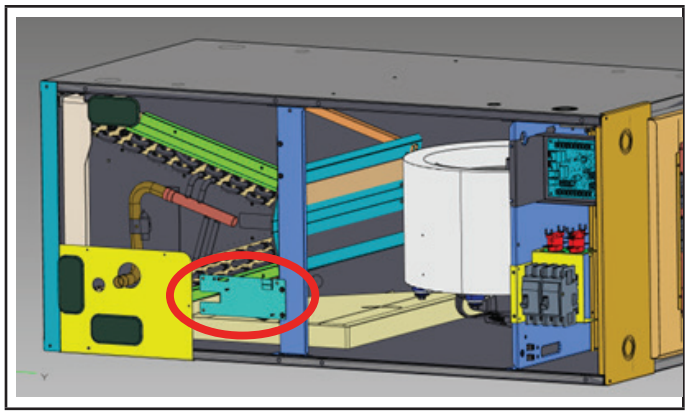


FIGURE 24

4 - Ensure sensor wire routes to the right hand side, as viewed from the front of the unit. The wire must route through the slotted opening in the center support bracket (see FIGURE 25).

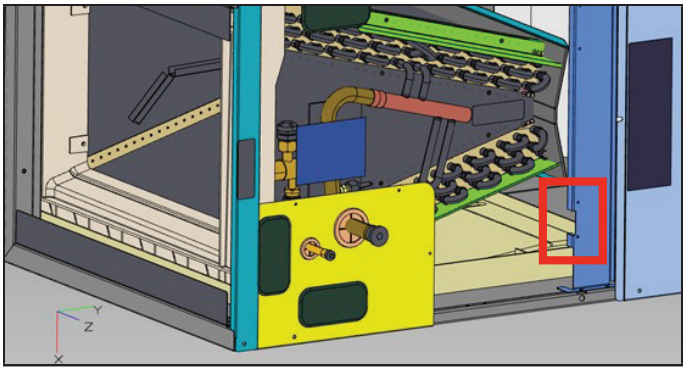


FIGURE 25

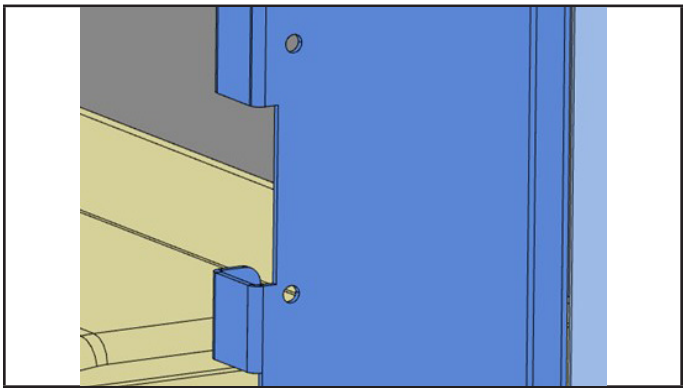


FIGURE 25 (Detail)

5 - Loop any excess wire through the plastic “M” wire clip located on the inside of the center support bracket.

Horizontal Left Configuration

1 - Remove sensor bracket assembly from vertical position. Do not remove sensor from bracket, and do not disconnect or reroute sensor wire from the control panel area. Set the sensor bracket assembly aside.

2 - Follow instructions for left-hand discharge as outlined in previous section on pages 28 and 29. Instructions are also located on sticker on top of coil assembly.

3 - After coil assembly and center support bracket are reinstalled into unit, with air handler unit panels removed, install sensor bracket assembly to the center support bracket by lining up the holes as shown in FIGURE 26.

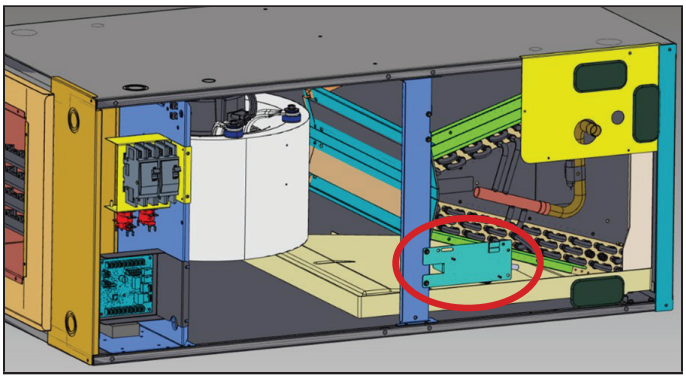


FIGURE 26

4 - Loop any excess wire through the plastic “M” wire clip located on the inside of the center support bracket.

Downflow Configuration

1 - Remove sensor bracket assembly from vertical position. Do not remove sensor from bracket, and do not disconnect or reroute sensor wire from the control panel area. Set the sensor bracket assembly aside.

2 - Follow the downflow conversion installation instructions located in the downflow installation kit (ordered separately).

***NOTE** – Refer to the downflow kit installation instructions for more details on unit configuration.*

3 - With air handler access panels removed, install sensor bracket assembly to the side of the cabinet by lining up holes as shown in FIGURE 27.

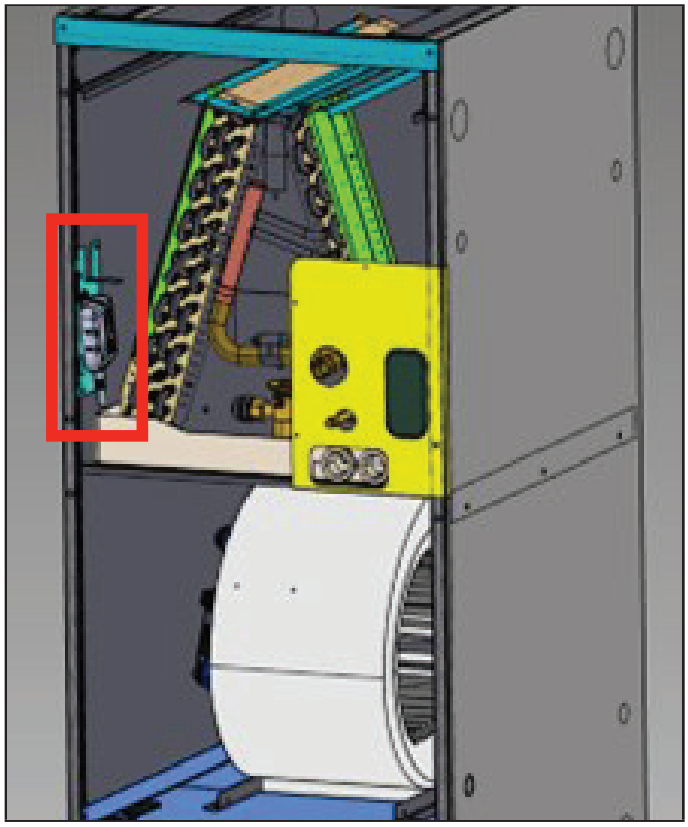


FIGURE 27

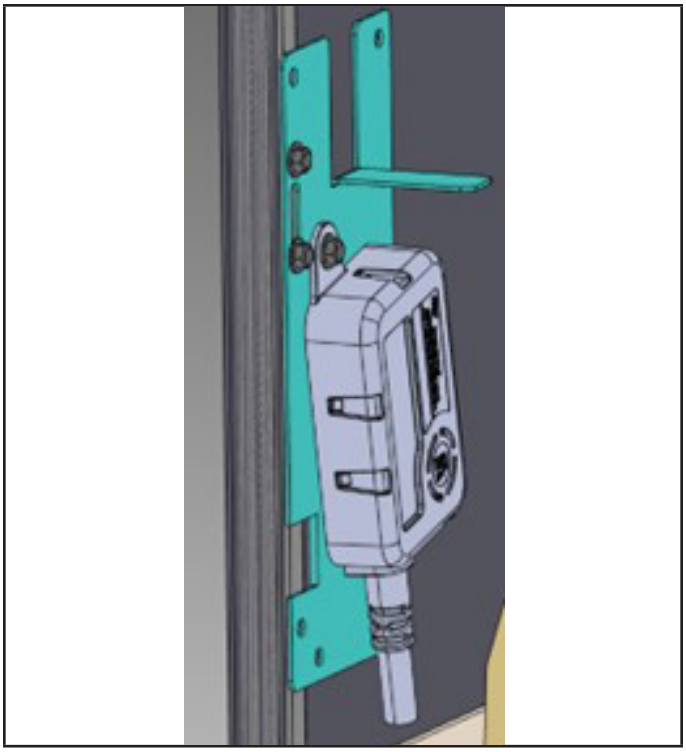


FIGURE 30 (Detail)

4 - Loop and bundle any excess sensor wire with a wire tie.

Brazing Connections

⚠ WARNING

Polyol ester (POE) and Polyvinyl ether (PVE) oils used with R454B refrigerants absorb moisture very quickly. It is very important that the refrigerant system be kept closed as much as possible. DO NOT remove line set caps or service valve stub caps until you are ready to make connections.

⚠ WARNING

Danger of fire. Bleeding the refrigerant charge from only the high side may result in pressurization of the low side shell and suction tubing. Application of a brazing torch to a pressurized system may result in ignition of the refrigerant and oil mixture. Check the high and low pressures before applying heat.

⚠ IMPORTANT

To prevent the build-up of high levels of nitrogen when purging, it must be done in a well-ventilated area. Purge low-pressure nitrogen (1 to 2 psig) through the refrigerant piping during brazing. This will help to prevent oxidation and the introduction of moisture into the system.

⚠ WARNING

Danger of explosion!

Can cause equipment damage, injury, or death.

When using a high pressure gas such as nitrogen to pressurize a refrigeration or air conditioning system, use a regulator that can control the pressure down to 1 or 2 psig (6.9 to 13.8 kPa).

⚠ CAUTION

Brazing alloys and flux contain materials which are hazardous to your health.

Avoid breathing vapors or fumes from brazing operations. Perform operations only in well ventilated areas.

Wear gloves and protective goggles or face shield to protect against burns.

Wash hands with soap and water after handling brazing alloys and flux.

⚠ WARNING

When using a high pressure gas such as nitrogen to pressurize a refrigeration or air conditioning system, use a regulator that can control the pressure down to 1 or 2 psig (6.9 to 13.8 kPa).

TABLE 4. CBK45UHVT Refrigerant Connections and Line Set Requirements

Model	Liquid Line	Vapor Line	L15 Line Sets
-018/ 024	3/8" (10mm)	3/4" (19mm)	L15 line set sizes are dependant on unit match-up. See Product Specifications (EHB) for outdoor unit to determine correct line set sizes
-030 -036	3/8" (10mm)	3/4" (19mm)	
-042 -048	3/8" (10mm)	7/8" (22mm)	
-060	3/8" (10mm)	7/8" (22mm)	Field fabricated
NOTE - Some applications may require a field-provided 7/8" to 1-1/8" adapter.			

Refrigerant system installations shall be installed and tested per ASHRAE Standard 15.2, Section 10.0 (latest edition).

***NOTE** - When installing refrigerant lines longer than 50 feet, see the Lennox Refrigerant Piping Design and Fabrication Guidelines, CORP. 9351-L9, or contact Lennox Technical Support Product Applications for assistance.*

To obtain the correct information from Lennox, be sure to communicate the following information: Model and capacity.

Leak Testing, Evacuating and Charging

Every working procedure that affects safety means shall only be carried out by competent persons. This appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Examples of such working procedures are breaking into the refrigerating circuit, opening of sealed components, and opening of ventilated enclosures.

- Work shall 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.
- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i. e. non-sparking, adequately sealed or intrinsically safe.
- If any hot work is to be conducted on the refrigerating equipment or any associated parts, the appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.
- 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.
- 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. Ventilation should disperse any released refrigerant. When possible, expel refrigerant directly into the atmosphere.
- Pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards
- All field joints shall be accessible for inspection prior to being covered or enclosed
- Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance. The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS as applicable:

1. The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed.
2. The ventilation machinery and outlets are operating adequately and are not obstructed.
3. If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
4. Markings on the equipment should be visible and legible. Markings and signs that are illegible shall be corrected.
5. Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

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

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

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

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

- Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. The following leak detection methods are deemed acceptable for all refrigerant systems. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and that 12.5 % refrigerant is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/ extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.
- When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed and, since flammability is a consideration, procedures such as safely remove refrigerant following local and national regulations, purging the circuit with inert gas, evacuating (optional for A2L), purging with inert gas (optional for A2L), or opening the circuit by cutting or brazing be adhered to. The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to be able to perform the required work. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and working area is well ventilated.

⚠ IMPORTANT

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment.

Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.

- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

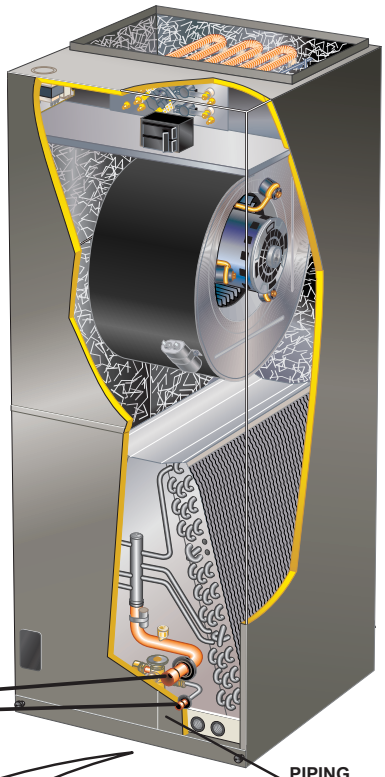
When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

- When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i. e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
- The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

PLEASE READ IMPORTANT ISSUES CONCERNING BRAZING OPERATIONS ON PREVIOUS PAGES BEFORE PROCEEDING.

NOTE - *REFER TO OUTDOOR UNIT INSTALLATION INSTRUCTIONS FOR REFRIGERANT PIPING SIZE REQUIREMENTS.*

NOTE - *Use silver alloy brazing rods with five or six percent minimum silver alloy for copper-to-copper brazing, 45 percent alloy for copper-to-brass and copper-to-steel brazing.*



A REMOVE ACCESS PANEL

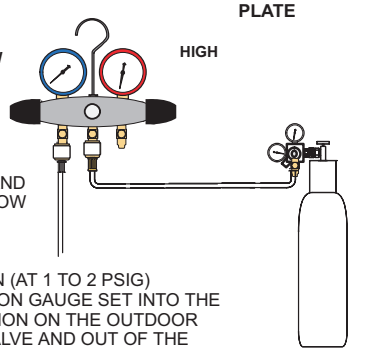
B REMOVE RUBBER PLUG FROM BOTH LIQUID AND SUCTION LINES

NOTE - *CBK45 SERIES UNITS USE NITROGEN OR DRY AIR AS A HOLDING CHARGE. IF THERE IS NO PRESSURE WHEN THE RUBBER PLUGS ARE REMOVED, CHECK THE COIL FOR LEAKS BEFORE INSTALLING.*

C EITHER REMOVE OR PUSH PIPE WRAPPING BACK THROUGH HOLE IN PIPING PLATE BEFORE LINE SET CONNECTION AND BRAZING.

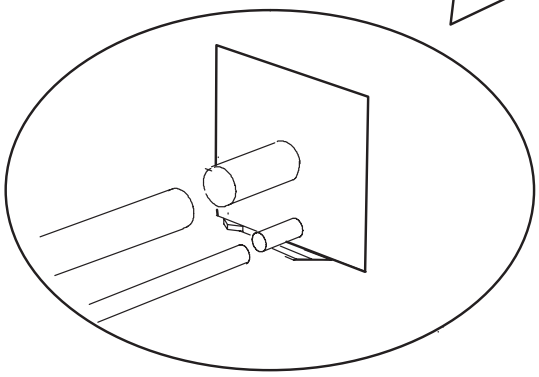
D CONNECT PIPES

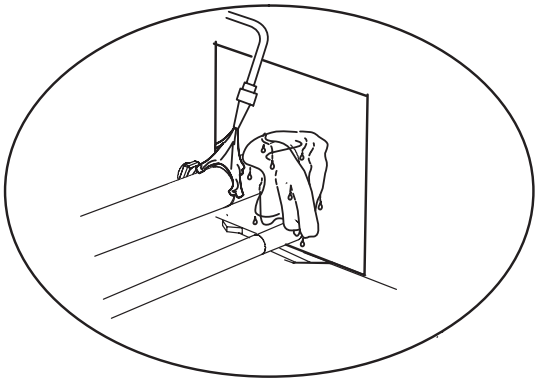
NOTE - *REFRIGERANT LINE SETS SHOULD BE ROUTED TO ALLOW FILTER ACCESSIBILITY.*



E CONNECT GAUGES AND START NITROGEN FLOW

FLOW REGULATED NITROGEN (AT 1 TO 2 PSIG) THROUGH THE REFRIGERATION GAUGE SET INTO THE VALVE STEM PORT CONNECTION ON THE OUTDOOR UNIT LIQUID LINE SERVICE VALVE AND OUT OF THE VALVE STEM PORT CONNECTION ON THE SUCTION SERVICE VALVE.





F PLACE A WET RAG AGAINST PIPING PLATE AND AROUND THE SUCTION LINE CONNECTION.

G BRAZE CONNECTION. ALLOW PIPE TO COOL BEFORE REMOVING WET RAG FROM CTXV SENSING BULB AND PIPING PANEL AREA.

H REPEAT PREVIOUS PROCEDURE FOR LIQUID LINE.

REFER TO INSTRUCTIONS PROVIDED WITH OUTDOOR UNIT FOR LEAK TESTING, EVACUATING AND CHARGING PROCEDURES.

REFRIGERANT SYSTEM INSTALLATIONS SHALL BE INSTALLED AND TESTED PER ASHRAE STANDARD 15.2, SECTION 10.0 (LATEST EDITION).

FIGURE 28. Brazing Connections

Installing the Condensate Drain

⚠ IMPORTANT

On units of this type, where the blower “draws” rather than “blows” air through the coil, traps must be installed in the condensate drain lines (primary and auxiliary, if used). Traps prevent the blower from drawing air through the drain lines into the air supply.

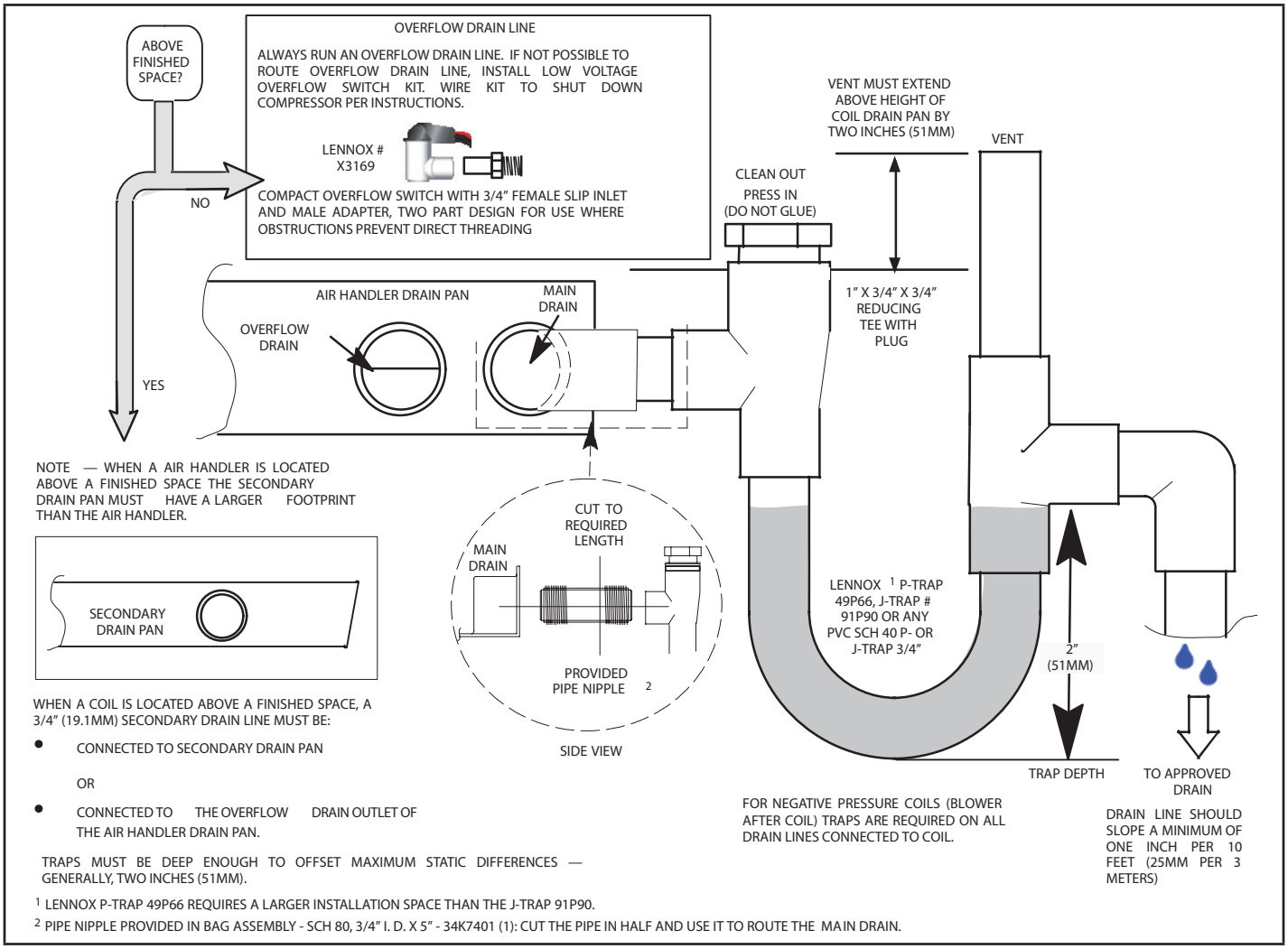


FIGURE 29. Typical Main and Overflow Drain Installations

⚠ IMPORTANT

After removal of drain pan plug(s), check drain hole(s) to verify that drain opening is fully open and free of any debris. Also check to make sure that no debris has fallen into the drain pan during installation that may plug up the drain opening.

SLOPING THE UNIT

Make sure the unit is sloped (similar to the slope shown in figure 30) so that the drain pan will empty completely without water standing in the pan.

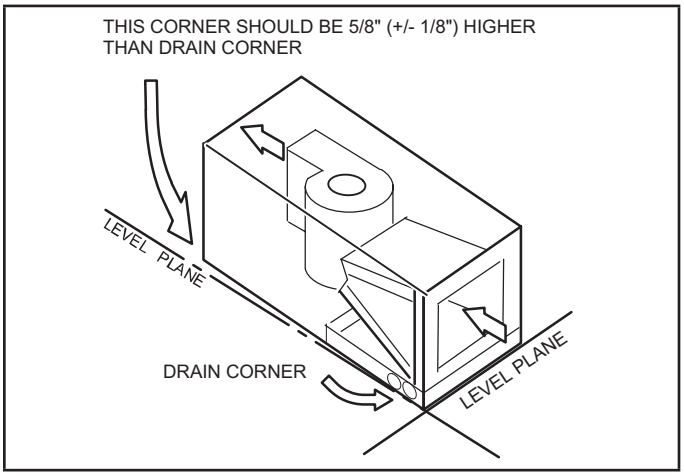


FIGURE 30. Sloping the Unit for Proper Drainage

1 - Remove the appropriate drain knockouts. If necessary, remove the indoor coil assembly from the cabinet.

2 - Connect primary drain line connection to the primary drain pan connection. The primary drain connection is flush with the bottom of the inside of the pan. Secondary connection is raised above the bottom of the inside of the pan.

***NOTE** – When making drain fitting connections to the drain pan, hand tighten the fitting and use a thread sealant. Over-tightening the fittings can split connections on the drain pan.*

3 - If the auxiliary drain line is to be used, remove the plug and route the drain line so that water draining from the outlet will be easily noticed by the homeowner. The auxiliary drain line does not require venting or a trap. Refer to local codes.

4 - After removal of drain pan plugs, check the drain port to see if holes have been drilled. If not drilled, use a 19/32" bit to drill out the primary drain hole; use a 3/8" drill bit for the secondary drain hole. Remove all drill shavings.

5 - Make sure drain ports and drain pan are free of all debris.

6 - Plug and check any unused drain pan openings for tightness. Torque plugs to 30 in. lb. to prevent water leaks or seepage from the drain pan.

7 - Install a 2" trap in the primary drain lines as close to the unit as practical (see figure 29). Make sure the top of the trap is below the connection to the drain pan to allow complete drainage of the pan.

NOTE – Horizontal runs must have an anti-siphon air vent (standpipe) installed ahead of the horizontal run. An extremely long horizontal run may require an oversized drain line to eliminate air trapping.

NOTE – Do not operate air handler without a drain trap. The condensate drain is on the negative pressure side of the blower; therefore, air being pulled through the condensate line will prevent positive drainage without a proper trap.

8 - Route the drain line to the outside or to an appropriate drain. Drain lines must be installed so they do not block service access to the front of the air handler. A 24" clearance is required for filter, coil, or blower removal and service access.

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

Insulate the drain lines where sweating could cause water damage.

TEST CONDENSATE DRAIN

Test the drain pan and drain line after installation:

1 - Pour several quarts of water into drain pan, enough to fill drain trap and line.

2 - Check to make sure the drain pan is draining completely, no leaks are found in drain line fittings, and water is draining from the end of the primary drain line.

3 - Correct any leaks found.

BEST PRACTICES

The following best practices are recommended for the condensate removal process:

- Main and overflow drain lines should **NOT** be smaller than both drain connections at drain pan.
- Overflow drain line should run to an area where homeowner will notice drainage.
- It is recommended that the overflow drain line be vented and a trap installed. Refer to local codes.
- Condensate drain lines must be configured or provided with a cleanout to permit the clearing of blockages and for maintenance without requiring the drain line to be cut.

⚠ IMPORTANT

A field-fabricated secondary drain pan, with a drain pipe to the outside of the building, is required in all installations over a finished living space or in any area that may be damaged by overflow from the main drain pan. In some localities, local codes may require a secondary drain pan for any horizontal installation.

DUCT SYSTEM

The air handler is provided with flanges for the connection of the plenum and ducts. The air handler is equipped with flanges that can form a filter rack for the installation of the air filter, or the filter may be installed as part of the return air duct system.

Supply and return duct system must be adequately sized to meet the system's air requirements and static pressure capabilities. The duct system should be insulated with a minimum of 1” thick insulation with a vapor barrier in conditioned areas or 2” minimum in unconditioned areas.

Supply plenum should be the same size as the flanged opening provided around the blower outlet and should extend at least 3 ft. from the air handler before turning or branching off plenum into duct runs. The plenum forms an extension of the blower housing and minimizes air expansion losses from the blower.

INSTALLING DUCT SYSTEM

Connect supply air duct to the flange on top of the air handler. If an isolation connector is used, it must be nonflammable.

A return air duct system is recommended. If the unit is installed in a confined space or closet, a return connection must be run, full size, to a location outside the closet.

CONNECTING REFRIGERANT LINES

Refrigerant lines must be connected by a qualified technician in accordance with established procedures.

⚠ IMPORTANT

Braze-free fittings must conform with UL207 or ISO14903 (latest edition).

⚠ IMPORTANT

Refrigerant lines must be clean, dehydrated, refrigerant-grade copper lines. Air handler coils should be installed only with specified line sizes for approved system combinations.

Handle the refrigerant lines gently during the installation process. Sharp bends or possible kinking in the lines will cause a restriction.

Do not remove the caps from the lines or system connection points until connections are ready to be completed.

1 - Route the suction and liquid lines from the fittings on the indoor coil to the fittings on the outdoor unit. Run the lines in as direct a path as possible avoiding unnecessary turns and bends.

2 - Make sure that the suction line is insulated over the entire exposed length and that neither suction nor liquid lines are in direct contact with floors, walls, duct system, floor joists, or other piping.

3 - Connect the suction and liquid lines to the evaporator coil.

4 - To avoid damaging the rubber grommets in the cabinet while brazing, slide the rubber grommets over the refrigerant lines until they are away from the heat source.

5 - Braze using an alloy of silver or copper and phosphorus with a melting point above 1,100°F (593°C).

6 - Allow refrigerant pipes to cool to room temperature.

NOTE – Do not use soft solder.

7 - Reinstall the rubber grommets after brazing is finished.

8 - Make sure outdoor unit has been put in place according to the Installation Instructions and is connected to the refrigerant lines.

⚠ IMPORTANT

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

– Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least a quarter of the maximum allowable pressure marked on unit nameplate.

No leak shall be detected.

SEALING THE UNIT

Seal the unit so that warm air is not allowed into the cabinet. Warm air introduces moisture, which results in water blow-off problems. This is especially important when the unit is installed in an unconditioned area.

If installed in an unconditioned space, sealant should be applied around the electrical wires, refrigerant tubing, and condensate lines where they enter the cabinet.

⚠ WARNING

There must be an airtight seal between the bottom of the air handler and the return air plenum. Use fiberglass sealing strips, caulking, or equivalent sealing method between the plenum and the air handler cabinet to ensure a tight seal. Return air must not be drawn from a room where this air handler or any gas-fueled appliance (i.e., water heater), or carbon monoxide-producing device (i.e., wood fireplace) is installed.

Make sure the liquid line and suction line entry points are sealed with either the provided flexible elastomeric thermal insulation, or field provided material (e.g. Armaflex, Permagum or equivalent). Any of the previously mentioned materials may be used to seal around the main and auxiliary drains, and around open areas of electrical inlets.

Electrical Connections

⚠ WARNING

Electric Shock Hazard. Can cause injury or death. Unit must be properly grounded in accordance with national and local codes.

Line voltage is present at all components when unit is not in operation on units with single-pole contactors. Disconnect all remote electric power supplies before opening access panel. Unit may have multiple power supplies.

⚠ WARNING

Electric Shock Hazard.

Can cause injury or death.

Foil-faced insulation has conductive characteristics similar to metal. Be sure there are no electrical connections within a ½" of the insulation. If the foil-faced insulation comes in contact with electrical voltage, the foil could provide a path for current to pass through to the outer metal cabinet. While the current produced may not be enough to trip existing electrical safety devices (e.g. fuses or circuit breakers), the current can be enough to cause an electric shock hazard that could cause personal injury or death.

- All field wiring must be done in accordance with National Electrical Code, applicable requirements of UL and local codes, where applicable.
- Electrical wiring, disconnect means and over-current protection are to be supplied by the installer. Refer to the air handler rating plate for maximum over-current protection, minimum circuit ampacity, as well as operating voltage.
- The power supply must be sized and protected according to the specifications supplied on the product.

- This air handler is factory-configured for 240 volt, single phase, 60 cycles. For 208-volt applications, see “208 Volt Conversion” later in this section.
- For optional field-installed electric heat applications, refer to the instructions provided with the accessory for proper installation.

⚠ IMPORTANT

USE COPPER CONDUCTORS ONLY

1 - Disconnect all power supplies.

2 - Remove the air handler access panel.

3 - Route the field supply wires to the air handler electrical connection box.

4 - Use UL-listed wire nuts to connect the field supply conductors to the unit black and yellow leads, and the ground wire to ground terminal marked GND.

5 - 5. Replace the air handler access panel.

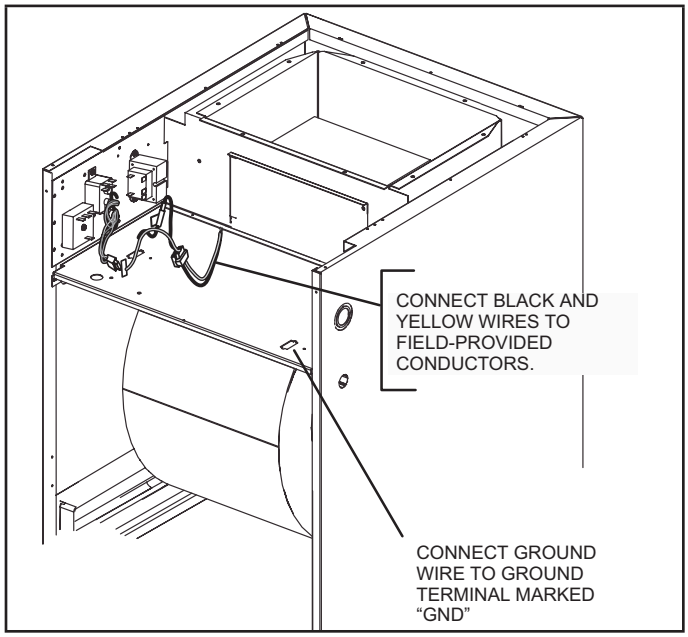


FIGURE 31. Making Electrical Connections

208 VOLT CONVERSION

1 - Disconnect all power supplies.

2 - Remove the air handler access panel.

3 - Using the wiring diagram located on the unit access panel as a reference, move the 2 connected black transformer leads from the 240 volt terminal on the transformer to the 208 volt terminal on the transformer.

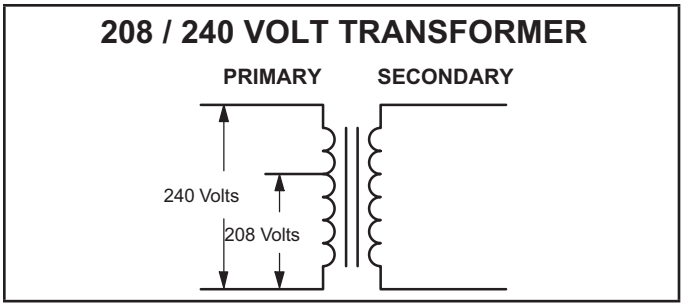


FIGURE 32. Converting Unit from 240VAC to 208VAC

⚠ WARNING

Electrically ground air handler. Connect ground wire to ground terminal marked “GND”.

Failure to do so can result in death or electrical shock.

Inspecting and Replacing Filters

⚠ IMPORTANT

Filter access door must be in place during unit operation. Excessive warm air entering the unit from unconditioned space may result in water blow-off problems.

Filters may be duct-mounted or installed in the cabinet. A filter is installed at the factory. Note that filter access door fits over access panel. Air will leak if the access panel is placed over the filter door.

Filters should be inspected monthly and must be cleaned or replaced when dirty to assure proper furnace operation.

To replace filter:

1 - Loosen the thumbscrews holding the filter panel in place.

2 - Slide the filter out of the guides on either side of cabinet.

3 - Insert new filter.

4 - Replace panel.

See table 5 for replacement filter sizes.

TABLE 5. Filter Dimensions

CBK45UHVT	Filter Size – In. (mm)
-018/024, -030, -036	15 x 20 x 1 (381 x 508 x 25)
-042, -048, -060	18 x 20 x 1 (457 x 508 x 25)

Wiring Diagrams

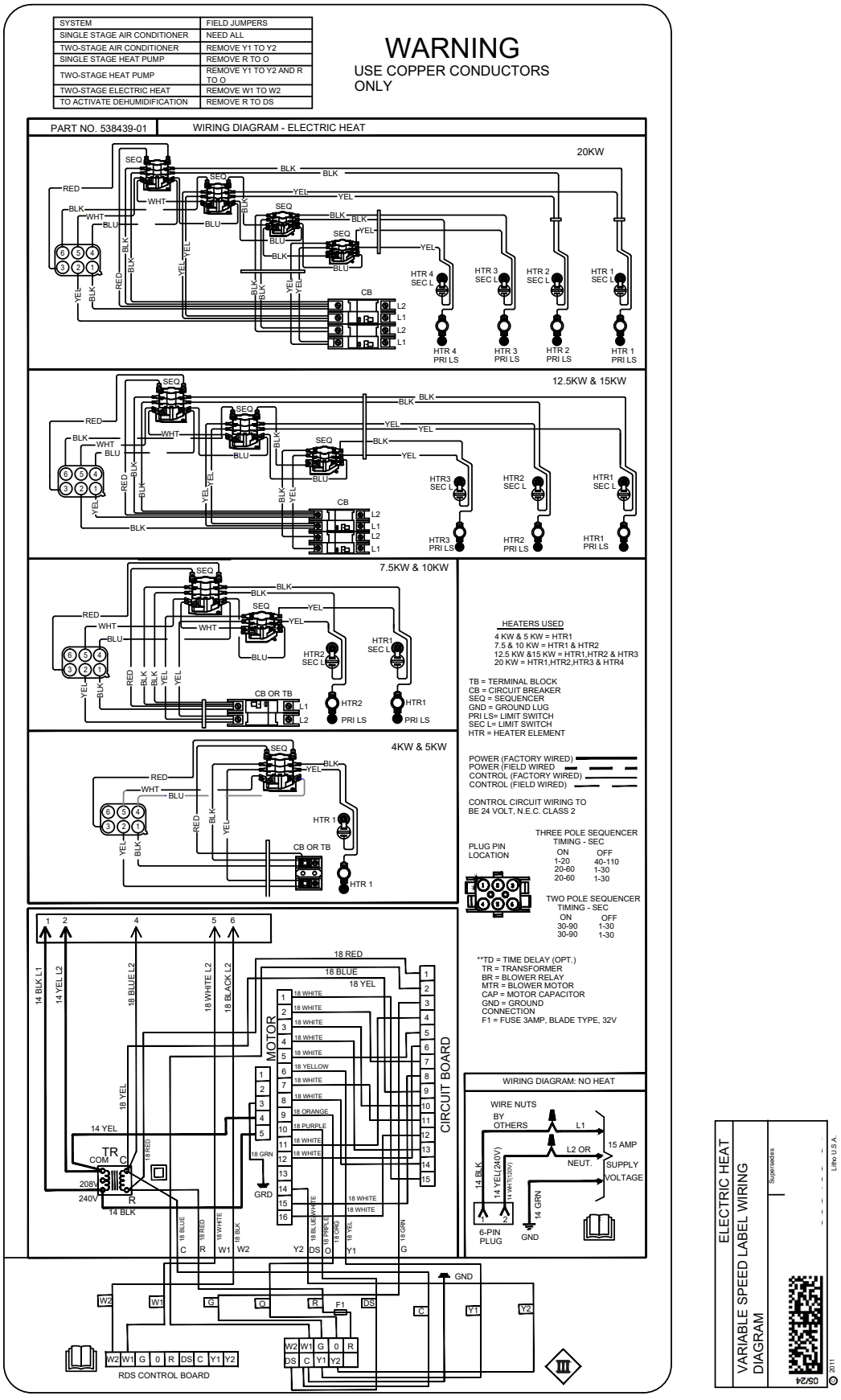


FIGURE 33. Typical Wiring Diagram – CBK45UHVT Air Handler with Electric Heat – (Variable-Speed Motor)

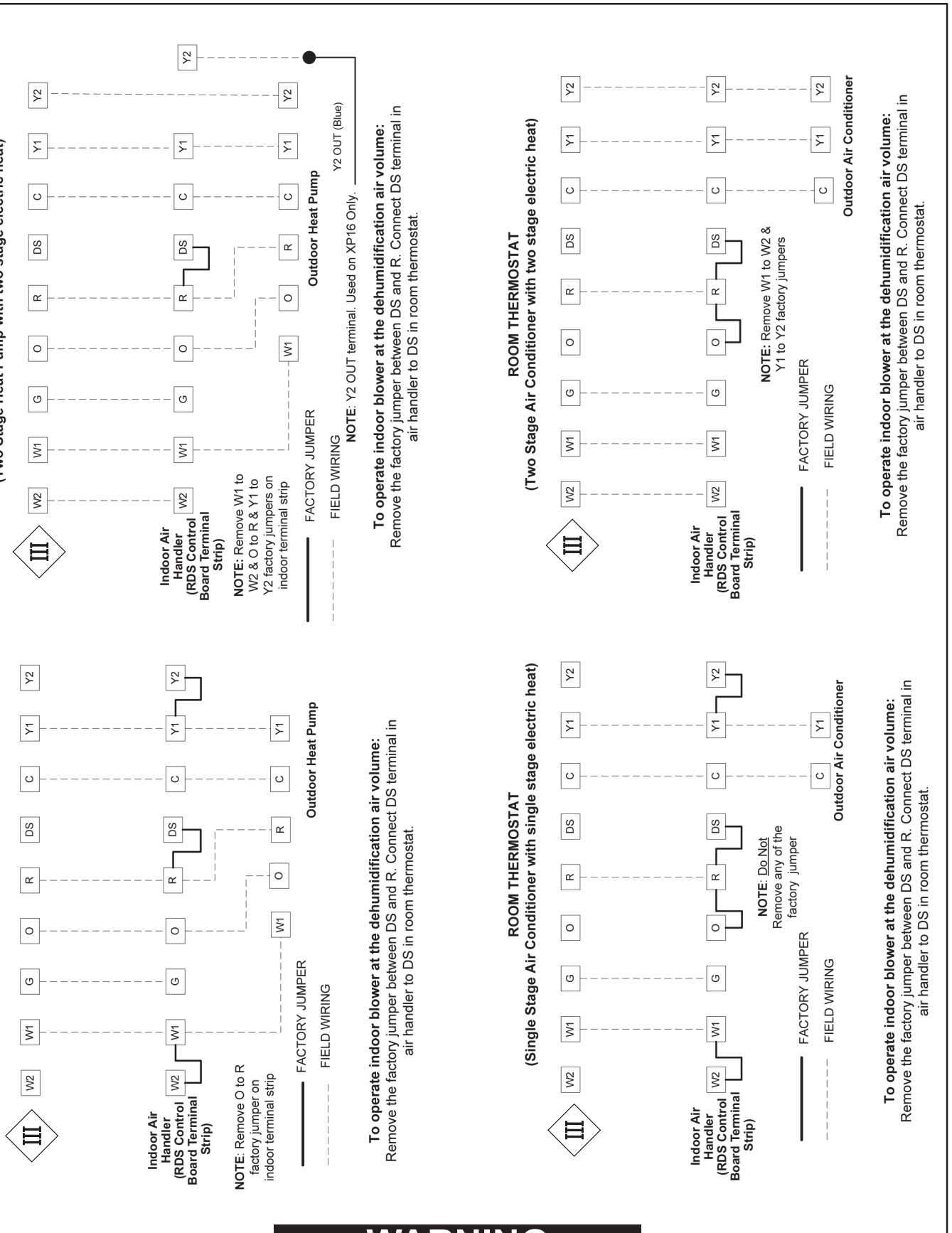


FIGURE 34. Low Voltage Connections (Variable-Speed Motor)

Professional Maintenance

NOTICE !

Failure to follow instructions will cause damage to the unit.

This unit is equipped with an aluminum coil. Aluminum coils may be damaged by exposure to solutions with a pH below 5 or above 9. The aluminum coil should be cleaned using potable water at a moderate pressure (less than 50psi). If the coil cannot be cleaned using water alone, Lennox recommends use of a coil cleaner with a pH in the range of 5 to 9. The coil must be rinsed thoroughly after cleaning.

In coastal areas, the coil should be cleaned with potable water several times per year to avoid corrosive buildup (salt).

Sensor Maintenance

It is recommended to check the state of the sensor every 6 months, at the beginning of each cooling and heating season.

- Ensure that the sensor opening is clear and free of debris.
- Check that the sensor cable is in good condition.
- DO NOT use abrasive cleaning solutions or detergents to clean sensor opening.
- DO NOT use flammable compressed air solutions to clean the sensor opening.
- DO NOT vacuum sensor inlet opening, as this could cause damage to the sensor internal components.
- Replace sensor if the opening is not clean or free of debris
- When cleaning the evaporator coil, remove sensor from the coil. Follow recommended coil cleaning guidelines as described in installation instructions.

FIGURE 35. Example of Clear, Unobstructed Sensor Inlet

Check-out Procedures

⚠ IMPORTANT

During installation, service or maintenance, make sure that copper tubing does not rub against metal edges or other copper tubing. Care should also be taken to ensure that tubing does not become kinked. Use wire ties to secure tubing to prevent movement.

Do not secure electrical wires to tubing that carries hot refrigerant gas. Heat from the tubing may melt the wiring insulation, causing a short circuit.

NOTE – *Refer to outdoor unit installation instructions for system start-up instructions and refrigerant charging instructions.*

PRE-START-UP CHECKS

- Is the air handler properly and securely installed?
- If horizontally configured, is the unit sloped up to 1/4 inch toward drain lines?
- Will the unit be accessible for servicing?
- Has an auxiliary pan been provided under the unit with separate drain for units installed above a finished ceiling or in any installation where condensate overflow could cause damage?
- Have ALL unused drain pan ports been properly plugged?
- Has the condensate line been properly sized, run, trapped, pitched, and tested?
- Is the duct system correctly sized, run, sealed, and insulated?
- Have all cabinet openings and wiring been sealed?
- Is the indoor coil factory-installed TXV properly sized for the outdoor unit being used?
- Have all unused parts and packaging been disposed of?
- Is the filter clean, in place, and of adequate size?
- Is the wiring neat, correct, and in accordance with the wiring diagram?
- Is the unit properly grounded and protected (fused)?
- Is the thermostat correctly wired and in a good location?
- Are all access panels in place and secure?

CHECK BLOWER OPERATION

- Set thermostat to FAN ON.
- The indoor blower should come on.

CHECK COOLING OPERATION

- Set thermostat to force a call for cooling (approximately 5ºF lower than the indoor ambient temperature).
- The outdoor unit should come on immediately and the indoor blower should start between 30 - 60 seconds later.

- Check the air flow from a register to confirm that the system is moving cooled air.
- Set the thermostat 5ºF higher than the indoor temperature. The indoor blower and outdoor unit should cycle off.

CHECK ELECTRIC HEAT (IF USED)

- Set thermostat to call for auxiliary heat (approximately 5°F above ambient temperature). The indoor blower and auxiliary heat should come on together. Allow a minimum of 3 minutes for all sequencers to cycle on.
- Set the thermostat so that it does not call for heat. Allow up to 5 minutes for all sequencers to cycle off.

Use of Air Handler During Construction

Lennox does not recommend the use of its air handler unit during any phase of construction. Very low return air temperatures, harmful vapors and operation of the unit with clogged or misplaced filters will damage the unit.

Air handler units may be used for heating (heat pumps) or cooling of buildings under construction, if the following conditions are met:

- A room thermostat must control the air handler. The use of fixed jumpers is not allowed.
- Air filter must be installed in the system and must be maintained during construction.
- Air filter must be replaced upon construction completion.
- The air handler evaporator coil, supply fan assembly and duct system must be thoroughly cleaned following final construction clean-up.
- All air handler operating conditions must be verified according to these installation instructions.
- Ensure that sensor opening is clear and free of debris.

Sequence of Operation

COOLING (COOLING ONLY OR HEAT PUMP)

When the thermostat calls for cooling, 24 volts is put on the blower time-delay relay coil and then the indoor blower relay energizes. The normally open contacts close, causing the indoor blower motor to operate. The circuit between **R** and **Y** is completed, closing the circuit to the contactor in the outdoor unit, starting the compressor and outdoor fan motor.

On heat pumps, circuit **R** and **O** energizes the reversing valve, switching the valve to the cooling position. (The reversing valve remains energized as long as the thermostat selector switch is in the COOL position.)

At the completion of the cooling demand, the indoor blower and outdoor unit should cycle off. Air handler should cycle off 45 seconds after the outdoor unit shuts off.

HEATING (ELECTRIC HEAT ONLY)

When the thermostat calls for heat, the circuit between **R** and **W** is completed, and the heat sequencer is energized. A time delay follows before the heating elements and the indoor blower motor come on. Units with a second heat sequencer can be connected with the first sequencer to W on the thermostat subbase, or they may also be connected to a second stage on the subbase.

HEATING (HEAT PUMP)

When the thermostat calls for heating, 24 volts is put on the blower time-delay relay coil. Then normally open contacts close, causing the indoor blower motor to operate. The circuit between **R** and **Y** is completed, closing the circuit to the contactor in the outdoor unit, starting the compressor and outdoor fan motor.

If the room temperature should continue to fall, the circuit between **R** and **W1** is completed by the second-stage heat room thermostat. Circuit **R-W1** energizes a heat sequencer. The completed circuit will energize supplemental electric heat (if applicable). Units with a second heat sequencer can be connected with the first sequencer to **W1** on the thermostat. They may also be connected to a second heating stage **W2** on the thermostat subbase.

EMERGENCY HEAT (HEATING HEAT PUMP)

If the selector switch on the thermostat is set to the emergency heat position, the heat pump will be locked out of the heating circuit, and all heating will be electric heat (if applicable). A jumper should be placed between **W2** and **E** on the thermostat subbase so that the electric heat control will transfer to the first-stage heat on the thermostat. This will allow the indoor blower to cycle on and off with the electric heat when the fan switch is in the AUTO position.

Modes of Operation

The modes of operation for the RDS Non-Communicating Blower Control Board are Initializing, Normal, Leak Detected, and Fault.

Initializing

The RDS Non-Communicating Blower Control Board is establishing connection with the refrigerant detection sensor and is completing an initial five (5) minute purge sequence.

Normal

The HVAC system is functioning normally. The RDS Non-Communicating Blower Control Board has not detected a refrigerant leak.

Leak Detected

When the RDS Non-Communicating Blower Control Board detects a refrigerant leak:

1 - The RDS Non-Communicating Blower Control Board shuts off the (R) input (24VAC power) to the thermostat, which de-energizes the outdoor unit compressor and heat sources, such as gas and/or electric strip heat. No heating or cooling demands will be met.

2 - The RDS Non-Communicating Blower Control Board activates the blower (high speed). The blower purges refrigerant from the cabinet, plenum, and ductwork.

3 - After the RDS Non-Communicating Blower Control Board determines the refrigerant levels are below the safety threshold, the blower will continue to function for an additional seven (7) minutes.

4 - After the blower sequence is complete, the HVAC system resumes normal operation.

***NOTE** – The HVAC system may not maintain a cooling or heating setpoint if a significant leak exists. Any refrigerant leaks that remain unaddressed for an extended time may cause the HVAC system to shut down on a low refrigerant pressure limit condition.*

Fault

When a fault is detected within the RDS Non-Communicating Blower Control Board, the indoor unit blower engages and remains engaged at a constant output until the fault is cleared.

Diagnostic Codes

The RDS Non-Communicating Blower Control Board is equipped with a multicolor LED within its enclosure. The LED signals the state of the RDS Non-Communicating Blower Control Board.

See Table 6 to review the diagnostic codes.

TABLE 6. LED Diagnostic Codes

State	LED Diagnostic Code	Action
Initializing	Flashing green[1]	Not Applicable
Monitoring	Solid green with blue flash[2]	Not Applicable
Mitigating (Leak Detected)	Flashing blue	Check coil tubes for leak. Repair the issue and restart the equipment.
Fault/Service	Solid blue, interrupted by issue flash code	Refer to Table 7 for troubleshooting steps.

1. A rapid flash indicates the RDSC is in the process of sensor enumeration
2. A blue flash indicates the mitigation process has previously occurred.

Red LED Diagnostic Codes

Red diagnostic codes indicate a specific RDS Non-Communicating Blower Control Board issue. Yellow diagnostic codes indicate the sensor's position (if applicable).

TABLE 7. Red LED Diagnostic Codes

Red Flash	Applies to Individual Sensor(s)	Issue	Action
1	Yes	Sensor indicates fault	Replace the sensor (Cat. # 26Z69)
2	No	Float switch Active	Check if drain line float switch is installed. If no float switch is installed, check jumper on control board.
3	Yes	Incompatible sensor type	Replace with a compatible sensor (Cat. # 26Z69)
4	Yes	Sensor communications issue	Check sensor connection. Ensure connection is clean and tight.

TABLE 7. Red LED Diagnostic Codes

Red Flash	Applies to Individual Sensor(s)	Issue	Action
5	No	R-input not available	Check for 24VAC power connection to the R terminal inputs on the RDSC. R-inputs must be energized for the RDSC to function.

Test Button Functionality

The RDS Non-Communicating Blower Control Board is equipped with a Test/Reset button. The Test button can be used to complete several functions, depending on the mode of operation of the RDS Non-Communicating Blower Control Board.

Table 8 lists the functions of the Test button during each mode of operation.

TABLE 8. Test Button Function

Mode of Operation	Press the Test Button to...
Normal	Trigger a leak detection response. Verify all equipment is wired correctly into the RDSC (after installation).
Leak Detected	Reset the RDSC to a normal mode of operation after a previous leak has been detected and purged from the HVAC system.
Fault	Reset the RDSC after troubleshooting and resolving a fault condition. If the fault is not resolved, the RDSC will enter the Fault mode again.

Test Button - Additional Functions

Table 9 lists the additional functions of the Test Button while the RDS Non-Communicating Blower Control Board is functioning within the states of Initializing, Monitoring, Leak Detection, Servicing and Fault. Refer to "Table 6. LED Diagnostic Codes".

TABLE 9. Additional Button Functions

State	Press	Action
Initializing	Short	Skips remaining pre-purge after sensors are recognized by the RDSC
Initializing	Long	Reset control
Monitoring	Short	Clear purge-counter if prior mitigation has occurred; Test mitigation
Monitoring	Long	Reset control
Mitigating	Short	If testing mitigation, end test
Servicing	Short	Reevaluate fault condition - if cleared return to monitoring, otherwise update indicator
Servicing	Long	Reset control
Fault	Short	Reevaluate fault condition - if cleared return to monitoring, otherwise update indicator
Fault	Long	Reset control

Thermostat Compatibility

Thermostats that preserve memory settings are compatible with the RDS Non-Communicating Blower Control Board. Examples include:

- Battery-powered thermostats
- Analog thermostats
- Smart thermostats
- Late-model programmable thermostats
- *Early-generation digital and programmable thermostats may not retain the operation mode and temperature setpoints after a power outage.*

The following scenarios are likely to occur when home occupants are not available to adjust the thermostat setpoints as the system is recovering from leak detection and resuming normal operation:

- Heating could be lost during a cold night
- Cooling could be lost during a hot day
- The thermostat could reset to an incorrect temperature setpoint

Compatibility Verification

Complete the following process to determine whether the thermostat is compatible with the RDS Non-Communicating Blower Control Board.

1 - Change the thermostat's current setpoint and operating mode.

2 - Power cycle the breaker to the furnace.

***NOTE** – Wait five (5) minutes before supplying power to the furnace breaker.*

3 - Note whether the thermostat maintained its setpoints and operating mode.

a. If the thermostat maintained the settings, the thermostat is compatible with the RDS Non-Communicating Blower Control Board.

b. If the thermostat did not maintain its setpoint and/or operating mode, the thermostat is not compatible with the RDS Non-Communicating Blower Control Board. Recommend replacing with a compatible thermostat.

Additional Applications

In zoned applications, all dampers will remain open when the RDS Non-Communicating Blower Control Board is in Fault or Leak Detected mode. Normal heating and cooling demands are permissible, but the blower will remain engaged until the fault condition is addressed.

Zone HVAC System

If the RDS Non-Communicating Blower Control Board is installed in a zone HVAC system, the RDS Non-Communicating Blower Control Board will open all zone dampers if a leak is detected.

***NOTE** – Proper wiring of the zone panel to the RDS Non-Communicating Blower Control Board is required for all zone dampers to open.*

After the purge sequence is complete, the zone system will resume normal operation.

External Alarm

(*For applications with external alarms wired directly to the RDS Non-Communicating Blower Control Board.*)

The RDS Non-Communicating Blower Control Board triggers the external alarm system when it enters Leak Detected mode. For alarm notifications, the RDS Non-Communicating Blower Control Board provides a dry relay contact that is rated 3A at 30 VAC/DC.

Start Up Test Procedure

The RDS Non-Communicating Blower Control Board is equipped with a Test/Reset button, see "Test Button Functionality" on page 45. After the RDS Non-Communicating Blower Control Board has been mounted and wired, restore power to the HVAC system. The system will then run through a purge sequence for five (5) minutes. After the purge sequence is complete, proceed to testing cooling demand and heating demand.

Cooling Demand

1 - Prompt a cooling demand at the thermostat.

2 - Press the Test button on the RDS Non-Communicating Blower Control Board.

The system then executes a leak detection response.

3 - Observe the following sequence:

a. The LED indicator flashes the sequence for leak detection (flashing blue).

b. The blower powers up.

c. The outdoor compressor powers down.

4 - Press the Test button to terminate the simulated Leak Detected mode upon test completion.

Heating Demand

1 - Prompt a heating demand at the thermostat.

2 - Press the Test button on the RDS Non-Communicating Blower Control Board.

The system then executes a leak detection response.

3 - Observe the following sequence:

a. The LED indicator flashes the sequence for leak detection (flashing blue).

b. The blower powers up.

c. The gas burners power down.

d. The outdoor compressor powers down.

4 - Press the Test button to terminate the simulated Leak Detected mode upon test completion.

The installation of the RDS Non-Communicating Blower Control Board is complete after both sequences are successfully completed.

Diagnostic Codes and Troubleshooting

TABLE 10. LED Diagnostic Codes

State	LED Diagnostic Code	Action Required
Initializing	Flashing green	None
Monitoring	Solid green. If a prior mitigation occurred, a blue flash interrupts the solid green LED.	None
Mitigating (Leak Detected)	Flashing blue	Check coil tubes for leak. Repair the issue and restart the equipment.
Fault/Service	Solid blue, interrupted by issue diagnostic code	Refer to Table 17 for troubleshooting steps.

TABLE 11. Red LED Diagnostic Codes / Troubleshooting

Red Flash	Applies to Individual Sensor(s)	Issue	Action Required
1	Yes	Sensor indicates fault	Replace the sensor
2	No	Float switch Active	Check if drain line float switch is installed. If no float switch is installed, check jumper on control board.
3	Yes	Incompatible sensor type	Replace the sensor
4	Yes	Sensor communications issue	Check sensor connection. Ensure connection is clean and tight.
5	No	R-input not available	Check sensor connections. Ensure connection is clean and tight.

Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely.

Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before starting decommissioning.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure, ensure that:

- mechanical handling equipment is available, if required, for handling refrigerant cylinders;
- all personal protective equipment is available and being used correctly;
- the recovery process is supervised at all times by a competent person;
- recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

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

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

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

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

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

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

k) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

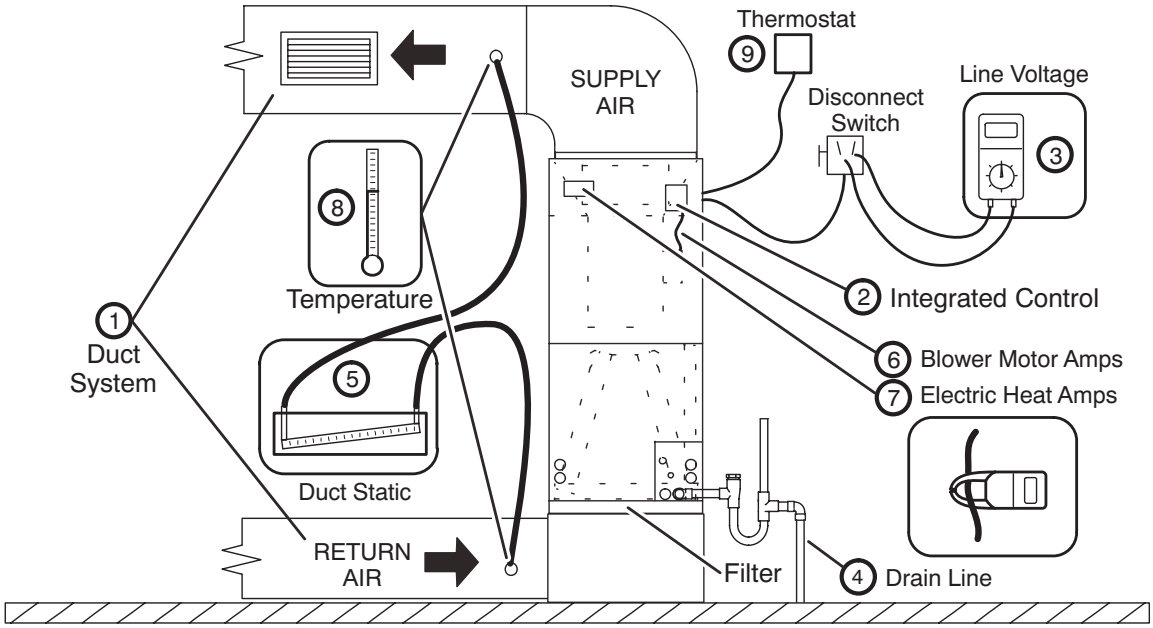
⚠ IMPORTANT

Equipment shall be labelled stating that it has been decommissioned and emptied of refrigerant. The label shall be signed and dated. Ensure that there are labels on the equipment that state the flammability of the refrigerant used.

Installing Contractor's Name_____ Installing Date_____

Installing Contractor's Phone_____ Air Handler Model #_____

Job Address_____



① DUCT SYSTEM

SUPPLY AIR DUCT

☐ Sealed

☐ Insulated (if necessary)

☐ Registers Open and Unobstructed

RETURN AIR DUCT

☐ Sealed

☐ Filter Installed and Clean

☐ Registers Open and Unobstructed

② INTEGRATED CONTROL

☐ Jumpers Configured Correctly (if applicable)

☐ Appropriate Links in Place (if applicable)

③ VOLTAGE CHECK

☐ Supply Voltage _____

☐ Low Voltage _____

☐ Electrial Connections Tight

④ DRAIN LINE

☐ Leak Free

⑤ TOTAL EXTERNAL STATIC (dry coil)

	dry coil	wet coil
Supply External Static	_____	_____
Return External Static	_____	_____
Total External Static =	_____	_____

⑥ ELECTRIC HEAT AMPS_____

⑦ INDOOR BLOWER AMPS_____

INDOOR BLOWER CFM_____

⑧ TEMPERATURE DROP (Cooling Mode)

Return Duct Temperature _____

Supply Duct Temperature – _____

Temperature Drop = _____

⑧ TEMPERATURE RISE (Heating Mode)

Return Duct Temperature _____

Supply Duct Temperature – _____

Temperature Rise = _____

⑨ THERMOSTAT

☐ Adjusted and Programmed

☐ Operation Explained to Owner

☐ Explained Operation of System to Homeowner

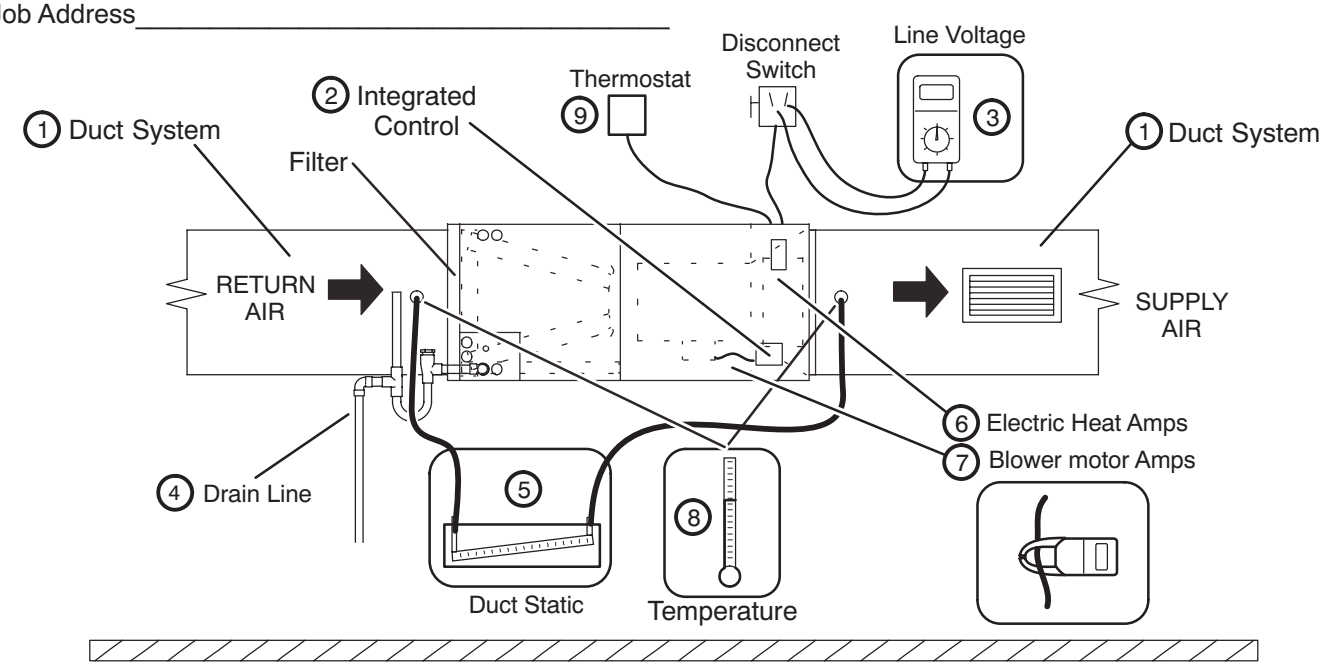
Technician's Name:_____Date Start–Up & Performance Check Completed_____

FIGURE 36. Start-up and Performance Checklist (Upflow Configuration)

Installing Contractor's Name_____ Installing Date_____

Installing Contractor's Phone_____ Air Handler Model #_____

Job Address_____



1 DUCT SYSTEM

SUPPLY AIR DUCT

☐ Sealed

☐ Insulated (if necessary)

☐ Registers Open and Unobstructed

RETURN AIR DUCT

☐ Sealed

☐ Filter Installed and Clean

☐ Registers Open and Unobstructed

2 INTEGRATED CONTROL

☐ Jumpers Configured Correctly (if applicable)

☐ Appropriate Links in Place (if applicable)

3 VOLTAGE CHECK

☐ Supply Voltage _____

☐ Low Voltage _____

☐ Electrial Connections Tight

4 DRAIN LINE

☐ Leak Free

5 TOTAL EXTERNAL STATIC (dry coil)

	dry coil	wet coil
Supply External Static	_____	_____
Return External Static	_____	_____
Total External Static =	_____	_____

6 ELECTRIC HEAT AMPS_____

7 INDOOR BLOWER AMPS_____

INDOOR BLOWER CFM_____

8 TEMPERATURE DROP (Cooling Mode)

Return Duct Temperature _____

Supply Duct Temperature – _____

Temperature Drop = _____

8 TEMPERATURE RISE (Heating Mode)

Return Duct Temperature _____

Supply Duct Temperature – _____

Temperature Rise = _____

9 THERMOSTAT

☐ Adjusted and Programmed

☐ Operation Explained to Owner

☐ Explained Operation of System to Homeowner

Technician's Name:_____Date Start–Up & Performance Check Completed_____

FIGURE 37. Start-Up and Performance Checklist (Horizontal Configuration)