LENNOX Service Literature

UNIT INFORMATION

100109

April 21, 2025

CBK45UHPT

CBK45UHPT (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 6.

⚠ 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.

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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 CBK45UHPT 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 non-communicating thermostats 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 32 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

Wiring Diagrams

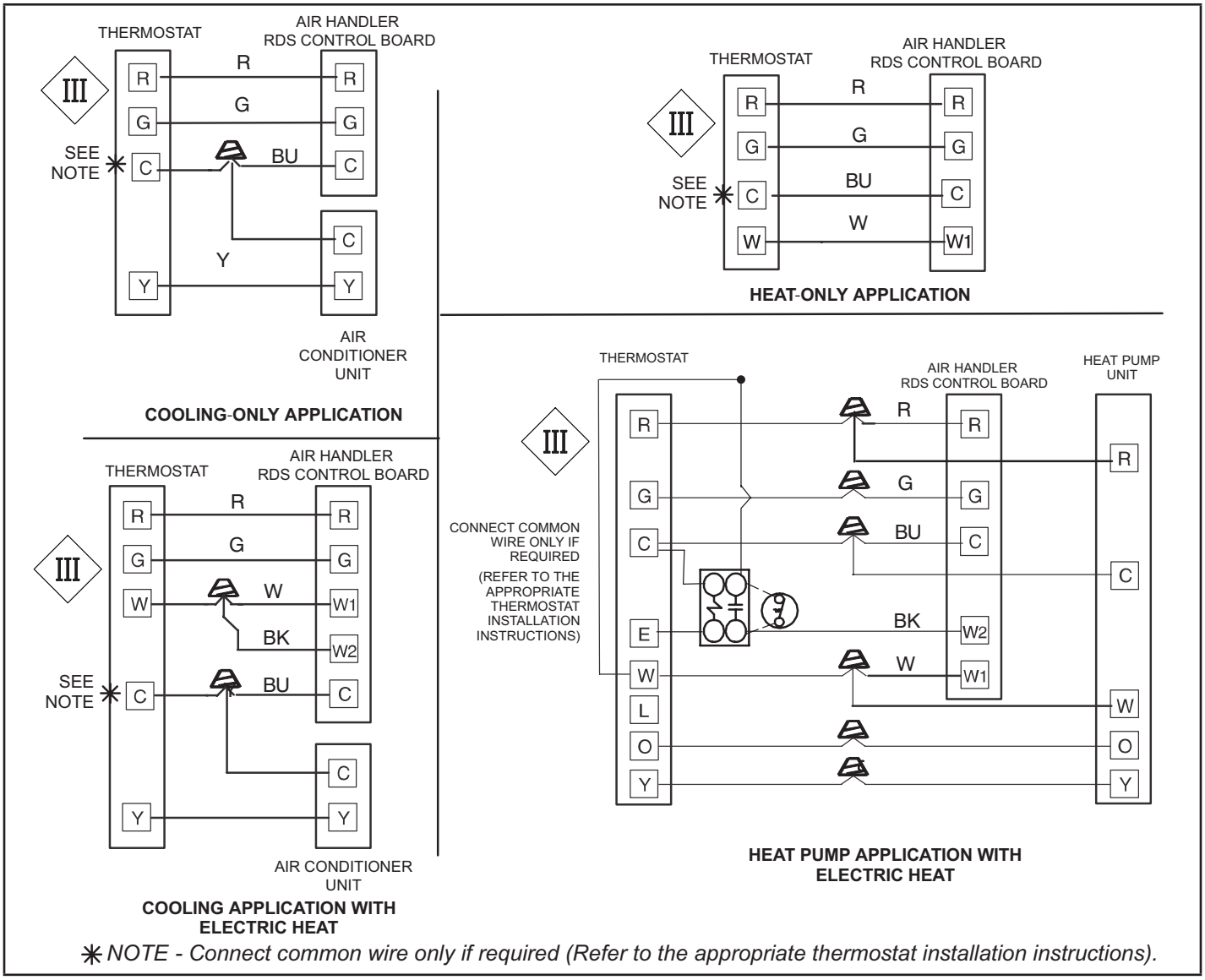


FIGURE 1. Low Voltage Connections (3-Speed PSC Motor) – Field Wiring

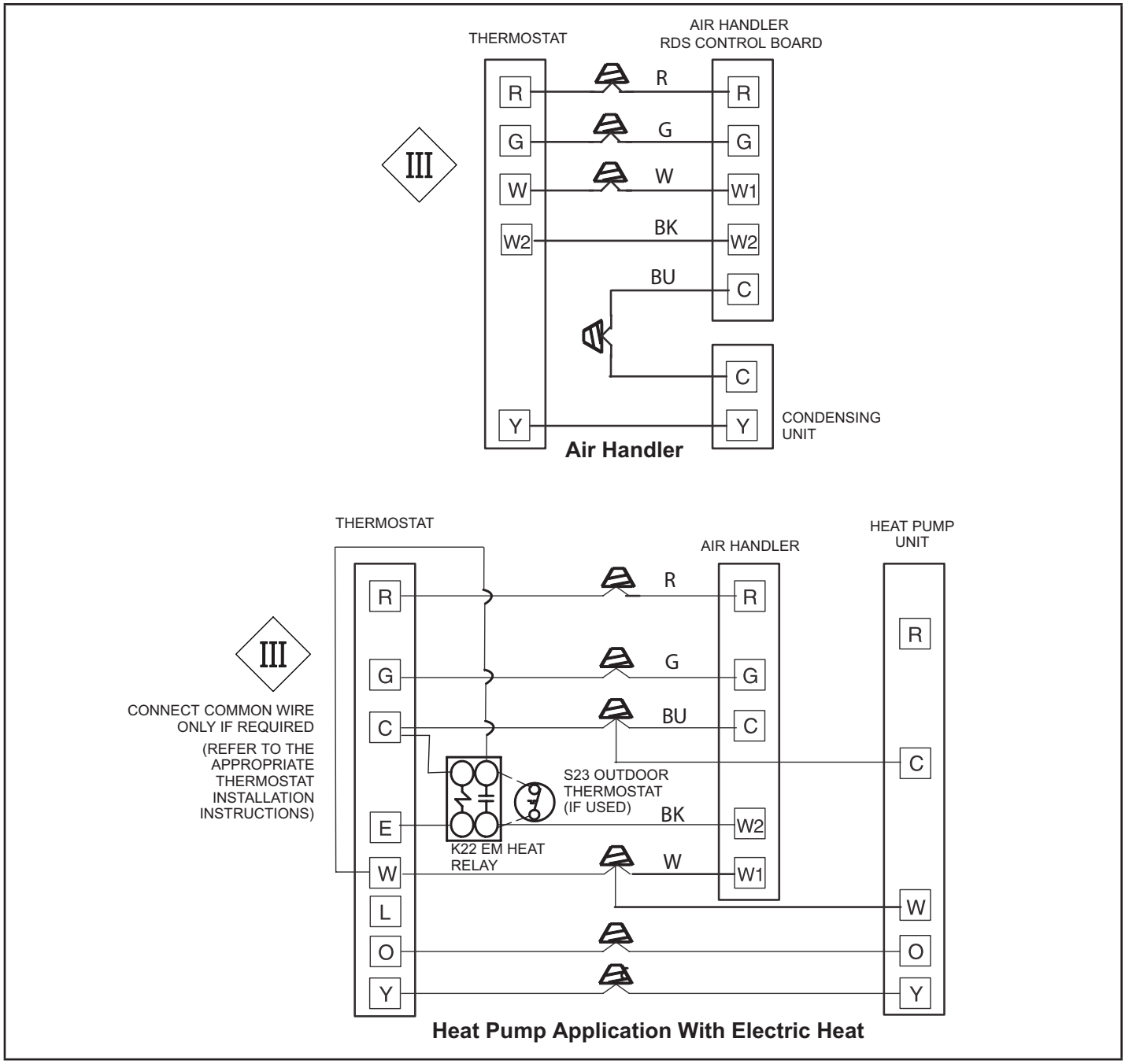
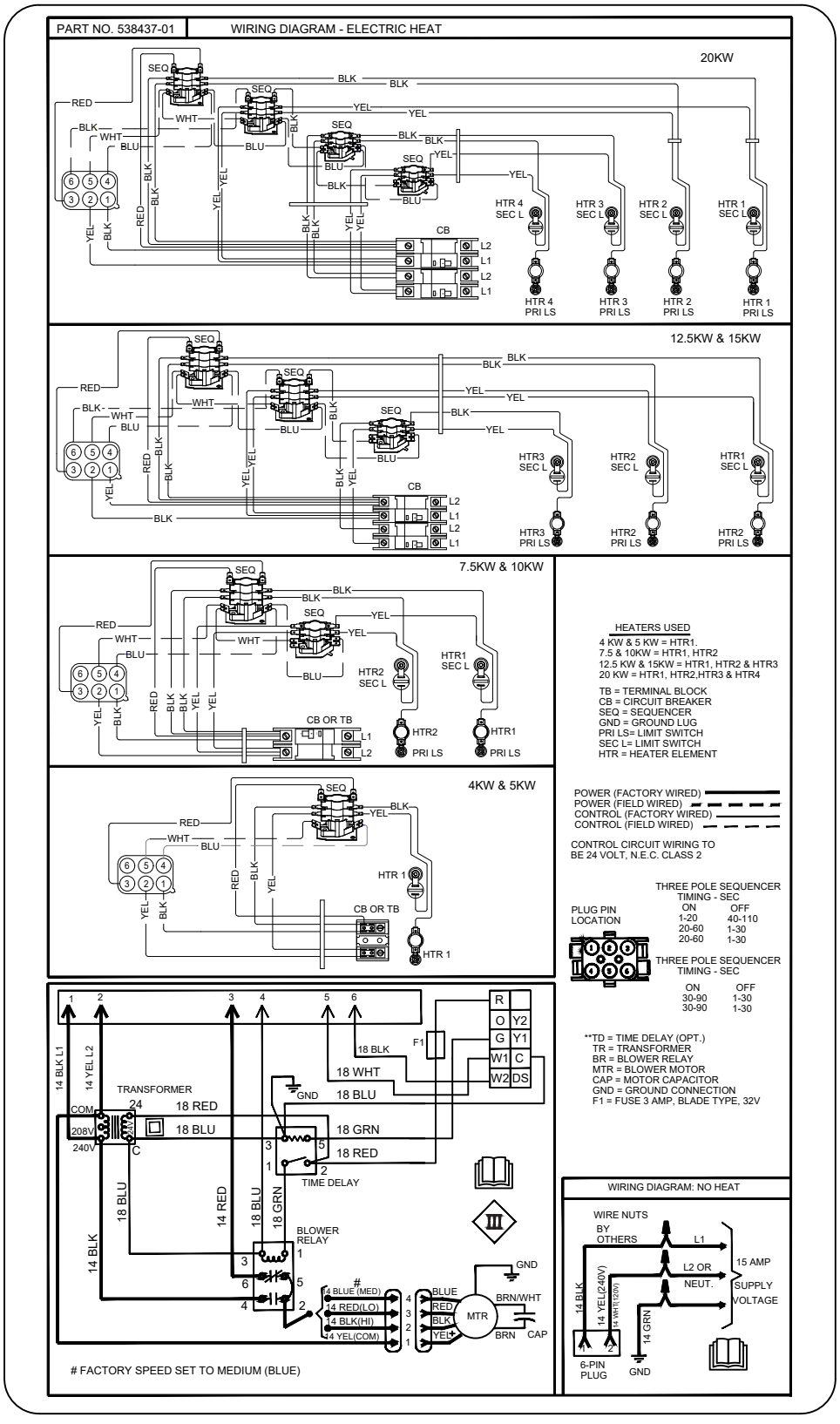


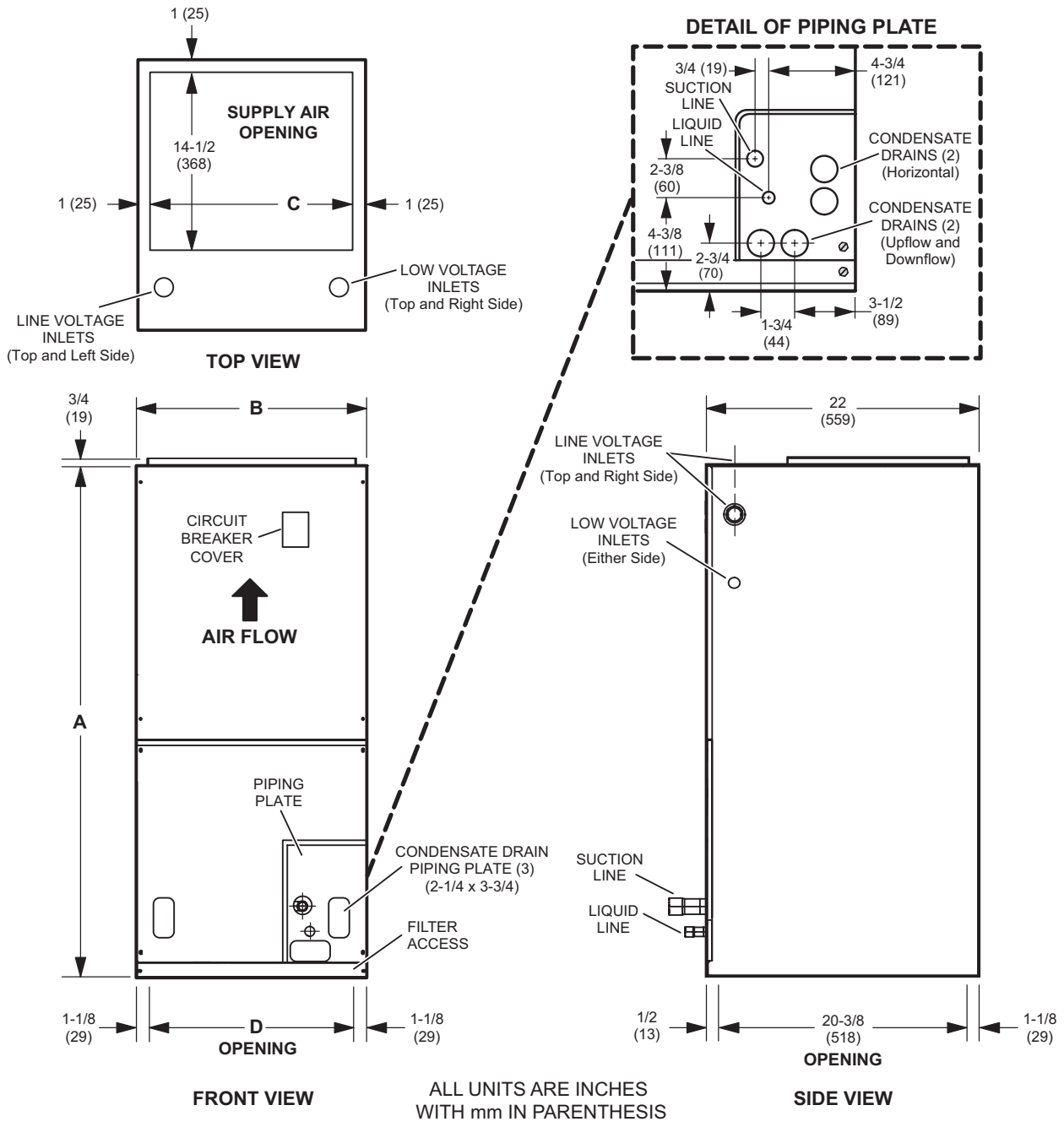
FIGURE 2. Low Voltage Field Wiring Electric Heat



ELECTRIC HEAT	
PSC LABEL WIRING DIAGRAM	
	Supersedes
01/25	Form No. 538437-01

FIGURE 3. Unit Wiring Diagram – Electric Heat and Air Handler

CBK45UHPT Unit Dimensions – Upflow



Dimensions	018		024		030		036, 042	
	in.	mm	in.	mm	in.	mm	in.	mm
A	43-1/2	1105	45-1/2	1156	47	1194	53-5/8	1362
B	18-1/2	470	18-1/2	470	18-1/2	470	21-1/2	546
C	16-1/2	419	16-1/2	419	16-1/2	419	19-1/2	495
D	16-1/4	413	16-1/4	413	16-1/4	413	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	042
Nominal Tonnage		1.5	2	2.5	3	3.5
Refrigerant Type		R-454B	R-454B	R-454B	R-454B	R-454B
Factry Installed Expansion (TXV)		**26Z70**	**26Z70**	**26Z70**	**26Z70**	**26Z71**
Connections	Liquid line (OD) sweat - in.	3/8	3/8	3/8	3/8	3/8
	Suction line (OD) sweat - in.	3/4	3/4	3/4	7/8	7/8
	Condensate drain (FPT) - in.	(2) 3/4	(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	5.66
	Tube diameter - in.	3/8	3/8	3/8	3/8	3/8
	Rows	3	3	3	3	3
	Fins - in.	15	15	15	15	15
Blower	HP	1/5	1/3	1/2	1/3	1/2
	Wheel nominal diameter x width - in.	9 x 6	9 x 6	10 x 8	10 x 8	10 x 8
	Air volume range - cfm	420 - 920	590 - 1105	770 - 1310	805 - 1560	1155 - 1815
[1] **Filters**	Size - in.	15 x 20 x 1	15 x 20 x 1	15 x 20 x 1	18 x 20 x 1	18 x 20 x 1
Shipping Data - lbs.		129	136	143	169	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	208/230-1-60
[2] Maximum overcurrent protection (MOCP) amps (unit)		15	15	15	15	15
[3] Minimum circuit ampacity (MCA) (unit)		5.0	5.0	5.0	5.0	5.0
Blower Motor Full Load Amps		1.1	1.6	2.2	2.0	2.5

OPTIONAL ACCESSORIES - ORDER SEPARATELY

Description	018, 024, 030	036, 042, 048, 060
M30 Smart Wi-Fi Thermostat	**15Z69**	**15Z69**
Remote Outdoor Temperature Sensor	**X2658**	**X2658**
Downflow Conversion Kit	**Y9658**	**Y9659**
Electric Heat	See Electric Heat Data Tables on page 9	
Horizontal Support Frame Kit	**56J18**	**56J18**
Side Return Unit Stand (Upflow Only)	**45K32**	**45K32**
Single-Point Power Source Control Box (for Electric Heat)	**21H39**	**21H39**
Wall Hanging Bracket Kit (Upflow Only)	**45K30**	**45K30**
High Performance Economizer (Commercial Only)	**10U53**	**10U53**

Model Number Identification

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

- **Unit Type**: CB = Air Handler
- **Refrigerant Type**: K = R-454B
- **Series**
- **Configuration**: UH = Upflow/Horizontal
- **Blower Motor**: P = Permanent Split Capacitor (PSC)
- **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
- **Voltage**: 230 = 208/230V-1 phase-60hz
- **Revision Level**: 71 = R-454B TXV installed

Air Flow – Cooling Blower Speed

The cooling blower speed is factory configured to provide correct air flow for an outdoor unit that matches the cooling capacity rating of the air handler.

If the outdoor unit is smaller than the maximum cooling capacity rating for the air handler, the cooling blower speed may need to be changed. Refer to blower performance data on page 12 .

⚠ 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

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

CHANGE BLOWER SPEED

1 - Disconnect all power supplies.

2 - Remove the air handler access panel.

3 - Locate pin number 2 on the blower relay. Two black wires are connected to this terminal pin. One connects to pin number 5 on the blower relay, one connects to an in-line splice connecting to a blue wire.

4 - Select the required blower motor speed. Connect red-LO or black-HI and plug it into the 4-pin blower relay harness connector.

***NOTE** - Reuse the factory-installed wire nut on the unused wires.*

5 - Replace all panels.

6 - Reconnect power.

***NOTE -** Refer to wiring diagram located on the unit access panel, this figure and blower performance (table 2).*

- All air data measured external to unit with 1 inch non-pleated air filter in place.
- All factory settings are medium speed.
- All data given while air handler is operating with a dry DX coil.
- All downflow applications run on high speed when utilizing electric heat.

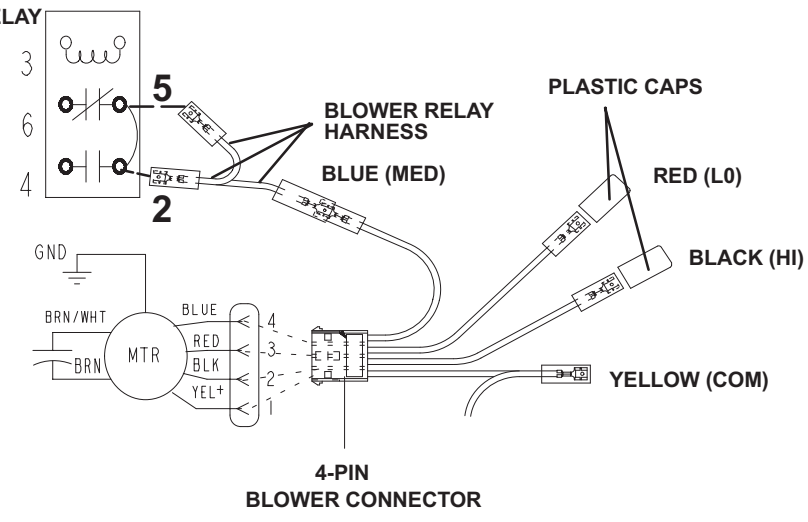


FIGURE 4. Changing Blower Speed

Blower Data

CBK45UHPT Blower Performance (3-Speed PSC) – 240V (CFM @ ESP. – in. W. C.)

Air Handler Model	Blower Speed	.10" WC	.20" WC	.30" WC	.40" WC	.50" WC
-018	LOW	538	525	503	471	418
	MED	688	670	639	603	548
	HIGH	919	881	855	788	710
-024	LOW	677	673	657	629	592
	MED	1011	979	942	803	742
	HIGH	1106	1045	999	917	857
-030	LOW	871	870	853	812	769
	MED	1078	1057	1024	987	936
	HIGH	1311	1261	1214	1154	1086
-036	LOW	1020	972	956	909	806
	MED	1276	1240	1191	1148	1086
	HIGH	1559	1521	1446	1395	1327
-042	LOW	1,300	1,273	1,250	1,211	1,155
	MED	1,527	1,493	1,452	1,390	1,345
	HIGH	1,816	1,756	1,693	1,605	1,528

Blower Performance (CFM vs. ESP inches H_20)

- Cooling speeds should not be reduced below factory setting.
- All units with electric heat are approved at 0.5" at maximum and medium blower speed.
- All downflow applications run on high speed when utilizing electric heat.

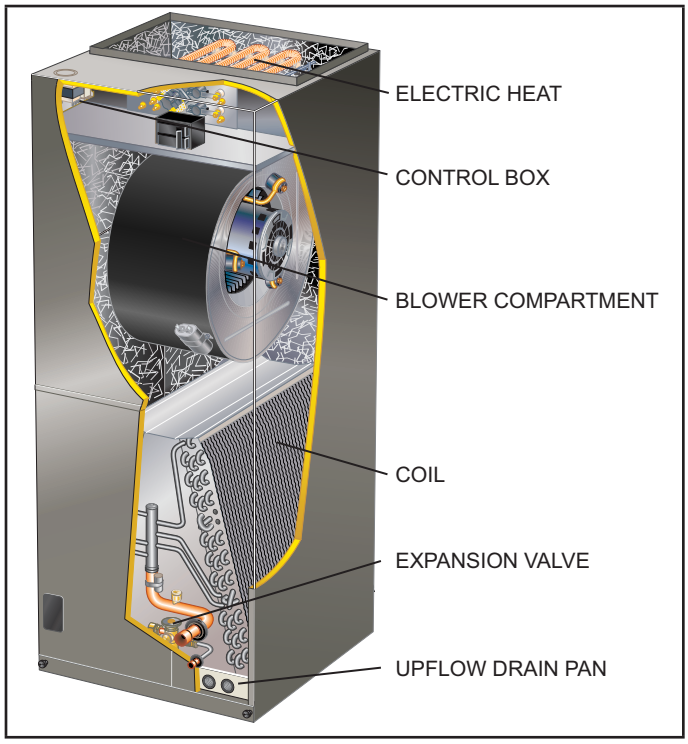


FIGURE 5. Typical Unit Parts Arrangement

Application

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 CBK45UHPT control box is located above the blower section shown in figure 5. 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 CBK45UHPT 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 6.

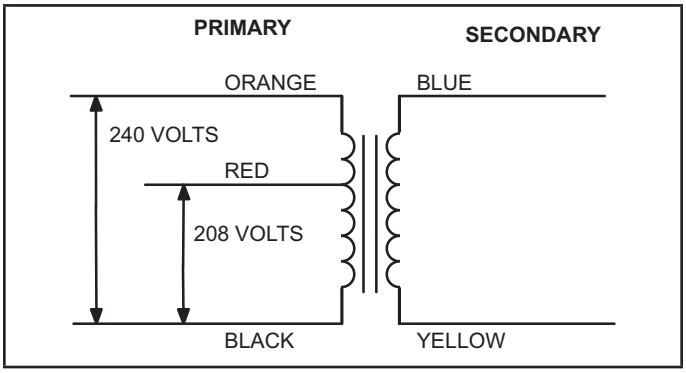


FIGURE 6. 208 / 240 Volt Transformer

BLOWER RELAY

All CBK45UHPT 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).

TIME DELAY RELAY

Blower time delay operation:

1 - When cooling demand is initiated, there is a 1 second motor-on delay.

2 - After the motor-on delay expires, motor ramps up to 100% and runs at 100% until cooling demand is satisfied.

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

4 - Motor ramps down to stop.

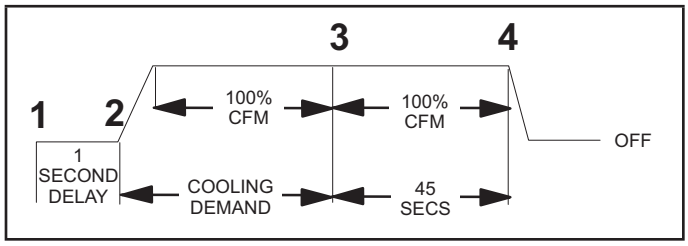


FIGURE 7. Blower Time Delay

BLOWER MOTOR (B3)

CBK45UHPT units use PSC blower motors with a run capacitor. Figure 5 shows the parts arrangement. All motors have three speed taps. Typically, the MED speed tap is energized during normal operation.

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.

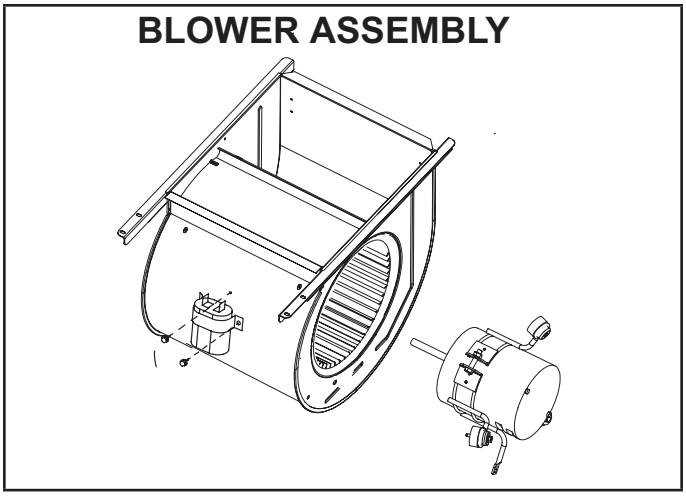


FIGURE 8. Blower Assembly

BLOWER MOTOR CAPACITOR

All CBK45UHPT series units use PSC motors with a run capacitor. The run capacitor is mounted on the blower housing. See figure 8. Capacitor ratings are shown on side of capacitor and indoor blower motor nameplate.

COIL

CBK45UHPT 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 CBK45UHPT. The drain pans are made from fiberglass filled plastic.

ECB45 Electric Heat Data

CBK45UHPT-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	1.1	19	[4] **20**
		220	3.4	11,450	1.1	20	[4] **20**
		230	3.7	12,550	1.1	21	[4] **25**
		240	4.0	13,650	1.1	22	[4] **25**
5 kW	ECB45-5 (**27A09**) Terminal Block ECB45-5CB (**27A13**) 30A Circuit Breaker	208	3.6	12,300	1.1	23	[4] **25**
		220	4.0	13,800	1.1	24	[4] **25**
		230	4.4	15,000	1.1	25	[4] **25**
		240	4.8	16,400	1.1	26	30
7.5 kW	ECB45-7.5 (**27A10**) Terminal Block ECB45-7.5CB (**27A14**) 45A Circuit Breaker	208	5.6	19,200	1.1	35	**35**
		220	6.3	21,500	1.1	37	[4] **40**
		230	6.9	23,500	1.1	39	[4] **40**
		240	7.5	25,600	1.1	40	[4] **40**
10 kW	ECB45-10 (**27A11**) Terminal Block ECB45-10CB (**27A15**) 60A Circuit Breaker	208	7.2	24,600	1.1	45	[4] **45**
		220	8.0	27,500	1.1	47	[4] **50**
		230	8.8	30,000	1.1	49	[4] **50**
		240	9.6	32,700	1.1	51	60

CBK45UHPT-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	1.6	20	[4] **20**
		220	3.4	11,450	1.6	21	[4] **25**
		230	3.7	12,550	1.6	22	[4] **25**
		240	4.0	13,650	1.6	23	[4] **25**
5 kW	ECB45-5 (**27A09**) Terminal Block ECB45-5CB (**27A13**) 30A Circuit Breaker	208	3.6	12,300	1.6	24	[4] **25**
		220	4.0	13,800	1.6	25	[4] **25**
		230	4.4	15,000	1.6	26	30
		240	4.8	16,400	1.6	27	30
7.5 kW	ECB45-7.5 (**27A10**) Terminal Block ECB45-7.5CB (**27A14**) 45A Circuit Breaker	208	5.6	19,200	1.6	36	[4] **40**
		220	6.3	21,500	1.6	38	[4] **40**
		230	6.9	23,500	1.6	39	[4] **40**
		240	7.5	25,600	1.6	41	45
10 kW	ECB45-10 (**27A11**) Terminal Block ECB45-10CB (**27A15**) 60A Circuit Breaker	208	7.2	24,600	1.6	45	[4] **45**
		220	8.0	27,500	1.6	48	[4] **50**
		230	8.8	30,000	1.6	50	[4] **50**
		240	9.6	32,700	1.6	52	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 12.

ELECTRIC HEAT DATA — CBK45UHPT-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	2.2	21	- - -	[4] **25**	- - -	- - -	- - -
		220	3.4	11,450	2.2	22	- - -	[4] **25**	- - -	- - -	- - -
		230	3.7	12,550	2.2	23	- - -	[4] **25**	- - -	- - -	- - -
		240	4.0	13,650	2.2	24	- - -	[4] **25**	- - -	- - -	- - -
5 kW	ECB45-5 (**27A09**) Terminal Block ECB45-5CB (**27A13**) 30A Circuit Breaker	208	3.6	12,300	2.2	24	- - -	[4] **25**	- - -	- - -	- - -
		220	4.0	13,800	2.2	26	- - -	30	- - -	- - -	- - -
		230	4.4	15,000	2.2	27	- - -	30	- - -	- - -	- - -
		240	4.8	16,400	2.2	28	- - -	30	- - -	- - -	- - -
7.5 kW	ECB45-7.5 (**27A10**) Terminal Block ECB45-7.5CB (**27A14**) 45A Circuit Breaker	208	5.6	19,200	2.2	37	- - -	[4] **40**	- - -	- - -	- - -
		220	6.3	21,500	2.2	39	- - -	[4] **40**	- - -	- - -	- - -
		230	6.9	23,500	2.2	40	- - -	[4] **40**	- - -	- - -	- - -
		240	7.5	25,600	2.2	42	- - -	45	- - -	- - -	- - -
10 kW	ECB45-10 (**27A11**) Terminal Block ECB45-10CB (**27A15**) 60A Circuit Breaker	208	7.2	24,600	2.2	46	- - -	[4] **50**	- - -	- - -	- - -
		220	8.0	27,500	2.2	49	- - -	[4] **50**	- - -	- - -	- - -
		230	8.8	30,000	2.2	51	- - -	60	- - -	- - -	- - -
		240	9.6	32,700	2.2	53	- - -	60	- - -	- - -	- - -
12.5 kW	ECB45-12.5CB (**27A16**) (1) 50A and (1) 25A Circuit Breaker	208	9.4	32,000	2.2	40	19	[4] **40**	[4] **20**	59	60
		220	10.5	35,800	2.2	43	20	[4] **45**	[4] **20**	62	70
		230	11.5	39,200	2.2	44	21	[4] **45**	25	65	70
		240	12.5	42,600	2.2	46	22	50	25	68	70
15 kW	ECB45-15CB (**27A17**) (1) 60A and (1) 25A Circuit Breaker	208	10.8	36,900	2.2	46	22	[4] **50**	25	68	70
		220	12.1	41,300	2.2	49	23	[4] **50**	25	72	80
		230	13.2	45,100	2.2	51	24	60	25	75	80
		240	14.4	49,100	2.2	53	25	60	25	78	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 12.

ELECTRIC HEAT DATA — CBK45UHPT-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	2.0	21	- - -	[4] **25**	- - -	- - -	- - -
		220	3.4	11,450	2.0	22	- - -	[4] **25**	- - -	- - -	- - -
		230	3.7	12,550	2.0	22	- - -	[4] **25**	- - -	- - -	- - -
		240	4.0	13,650	2.0	23	- - -	[4] **25**	- - -	- - -	- - -
5 kW	ECB45-5 (**27A09**) Terminal Block ECB45-5CB (**27A13**) 30A Circuit Breaker	208	3.6	12,300	2.0	24	- - -	[4] **25**	- - -	- - -	- - -
		220	4.0	13,800	2.0	25	- - -	[4] **25**	- - -	- - -	- - -
		230	4.4	15,000	2.0	26	- - -	30	- - -	- - -	- - -
		240	4.8	16,400	2.0	28	- - -	30	- - -	- - -	- - -
7.5 kW	ECB45-7.5 (**27A10**) Terminal Block ECB45-7.5CB (**27A14**) 45A Circuit Breaker	208	5.6	19,200	2.0	36	- - -	[4] **40**	- - -	- - -	- - -
		220	6.3	21,500	2.0	38	- - -	[4] **40**	- - -	- - -	- - -
		230	6.9	23,500	2.0	40	- - -	[4] **40**	- - -	- - -	- - -
		240	7.5	25,600	2.0	42	- - -	45	- - -	- - -	- - -
10 kW	ECB45-10 (**27A11**) Terminal Block ECB45-10CB (**27A15**) 60A Circuit Breaker	208	7.2	24,600	2.0	46	- - -	[4] **50**	- - -	- - -	- - -
		220	8.0	27,500	2.0	48	- - -	[4] **50**	- - -	- - -	- - -
		230	8.8	30,000	2.0	50	- - -	[4] **50**	- - -	- - -	- - -
		240	9.6	32,700	2.0	53	- - -	60	- - -	- - -	- - -
12.5 kW	ECB45-12.5CB (**27A16**) (1) 50A and (1) 25A Circuit Breaker	208	9.4	32,000	2.0	40	19	[4] **40**	[4] **20**	59	60
		220	10.5	35,800	2.0	42	20	[4] **45**	[4] **20**	62	70
		230	11.5	39,200	2.0	44	21	[4] **45**	25	65	70
		240	12.5	42,600	2.0	46	22	50	25	68	70
15 kW	ECB45-15CB (**27A17**) (1) 60A and (1) 25A Circuit Breaker	208	10.8	36,900	2.0	46	22	[4] **50**	25	68	70
		220	12.1	41,300	2.0	48	23	[4] **50**	25	71	80
		230	13.2	45,100	2.0	50	24	[4] **50**	25	74	80
		240	14.4	49,100	2.0	53	25	60	25	78	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 12.

ELECTRIC HEAT DATA — CBK45UHPT-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	2.5	21	- - -	[4] **25**	- - -	- - -	- - -
		220	3.4	11,450	2.5	22	- - -	[4] **25**	- - -	- - -	- - -
		230	3.7	12,550	2.5	23	- - -	[4] **25**	- - -	- - -	- - -
		240	4.0	13,650	2.5	24	- - -	[4] **25**	- - -	- - -	- - -
5 kW	ECB45-5 (**27A09**) Terminal Block ECB45-5CB (**27A13**) 30A Circuit Breaker	208	3.6	12,300	2.5	25	- - -	[4] **25**	- - -	- - -	- - -
		220	4.0	13,800	2.5	26	- - -	30	- - -	- - -	- - -
		230	4.4	15,000	2.5	27	- - -	30	- - -	- - -	- - -
		240	4.8	16,400	2.5	28	- - -	30	- - -	- - -	- - -
7.5 kW	ECB45-7.5 (**27A10**) Terminal Block ECB45-7.5CB (**27A14**) 45A Circuit Breaker	208	5.6	19,200	2.5	37	- - -	[4] **40**	- - -	- - -	- - -
		220	6.3	21,500	2.5	39	- - -	[4] **40**	- - -	- - -	- - -
		230	6.9	23,500	2.5	41	- - -	45	- - -	- - -	- - -
		240	7.5	25,600	2.5	42	- - -	45	- - -	- - -	- - -
10 kW	ECB45-10 (**27A11**) Terminal Block ECB45-10CB (**27A15**) 60A Circuit Breaker	208	7.2	24,600	2.5	46	- - -	[4] **50**	- - -	- - -	- - -
		220	8.0	27,500	2.5	49	- - -	[4] **50**	- - -	- - -	- - -
		230	8.8	30,000	2.5	51	- - -	60	- - -	- - -	- - -
		240	9.6	32,700	2.5	53	- - -	60	- - -	- - -	- - -
12.5 kW	ECB45-12.5CB (**27A16**) (1) 50A and (1) 25A Circuit Breaker	208	9.4	32,000	2.5	41	19	[4] **45**	[4] **20**	60	60
		220	10.5	35,800	2.5	43	20	[4] **45**	[4] **20**	63	70
		230	11.5	39,200	2.5	45	21	[4] **45**	25	66	70
		240	12.5	42,600	2.5	47	22	50	25	68	70
15 kW	ECB45-15CB (**27A17**) (1) 60A and (1) 25A Circuit Breaker	208	10.8	36,900	2.5	46	22	[4] **50**	25	68	70
		220	12.1	41,300	2.5	49	23	[4] **50**	25	72	80
		230	13.2	45,100	2.5	51	24	60	25	75	80
		240	14.4	49,100	2.5	53	25	60	25	78	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 12.

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 bracket (see figure 9). 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 9).

***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.*

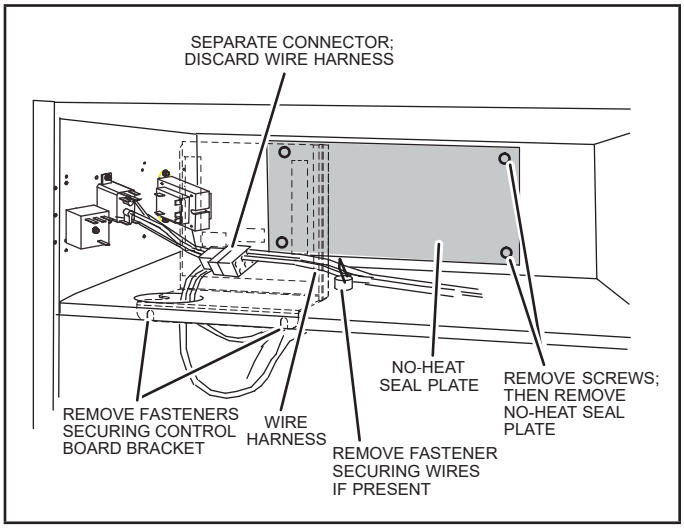


FIGURE 9. Prepare to Install Heat Element

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 10).

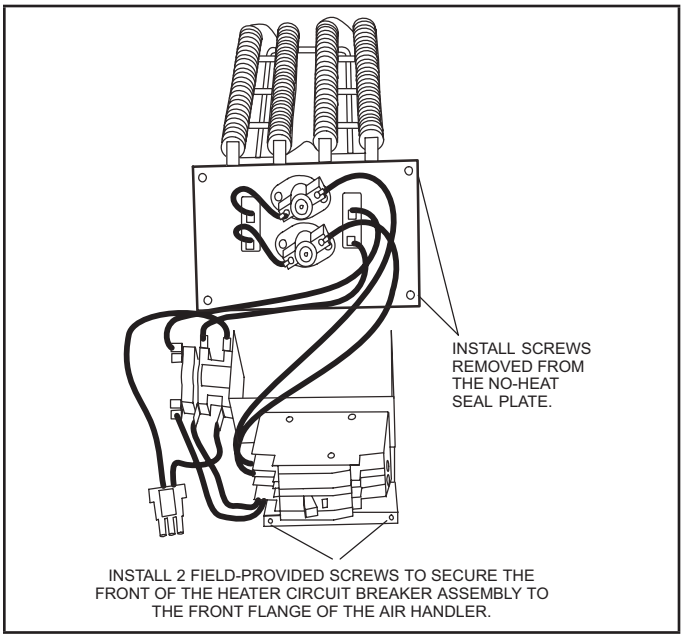


FIGURE 10. Installing the Heat Element Assembly

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 8). 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.

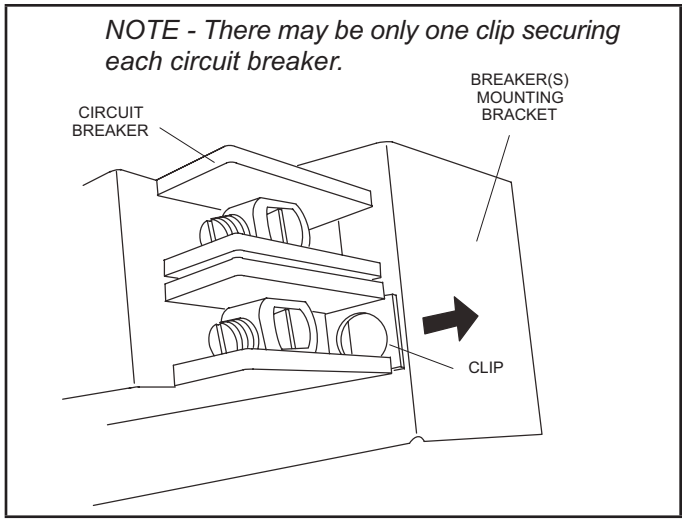


FIGURE 11. Circuit Breaker Clip

2 - Install the circuit breaker cover plate.

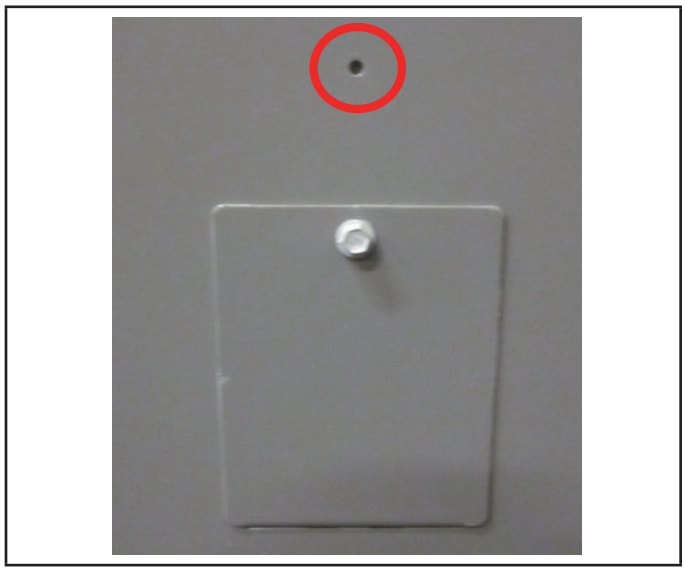


FIGURE 12. Circuit Breaker Cover Plate

***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 12. 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 13 for typical low voltage field wiring for air handler/condensing unit and heat pump applications. Figure 10 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 13 shows **L1**, **L2** and ground **(GND)** connections for a 2-breaker configuration.

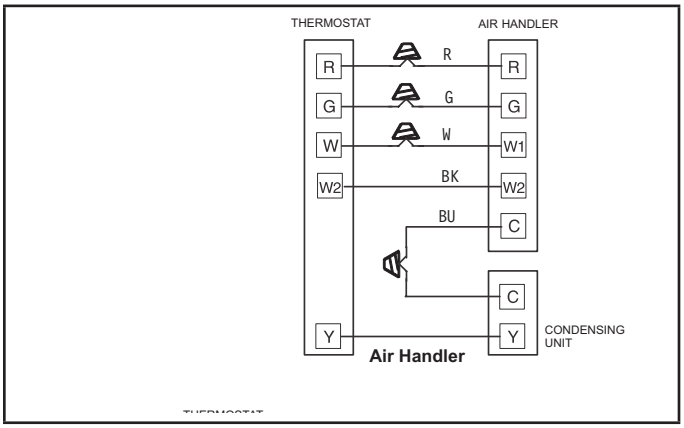


FIGURE 13. Field Power Supply Wiring

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 figures 1 and 2.

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 14).

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

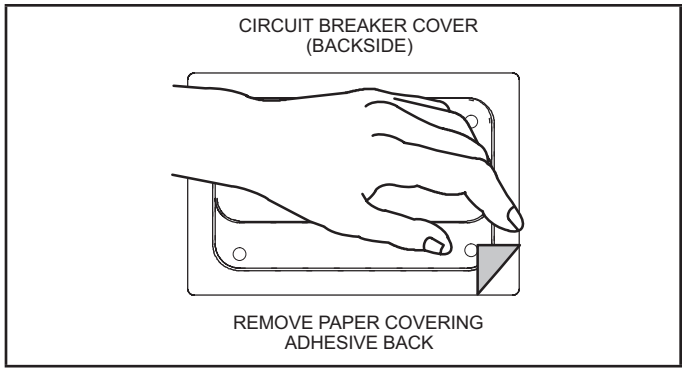


FIGURE 14. Remove Paper Cover

⚠ 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.

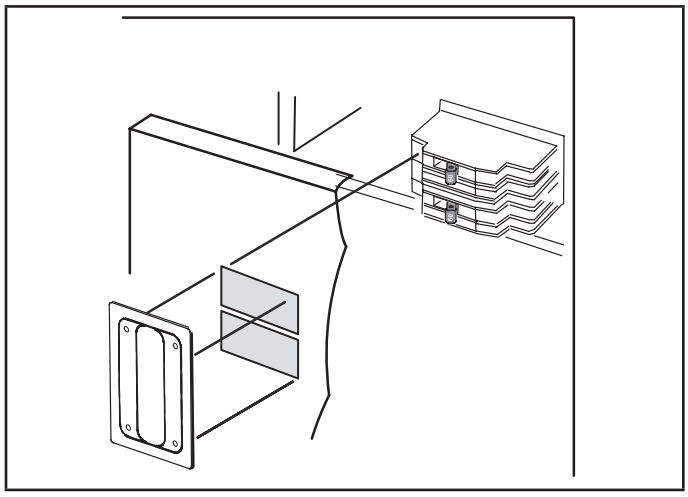


FIGURE 15. Typical Circuit Breaker Cover Installation

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.

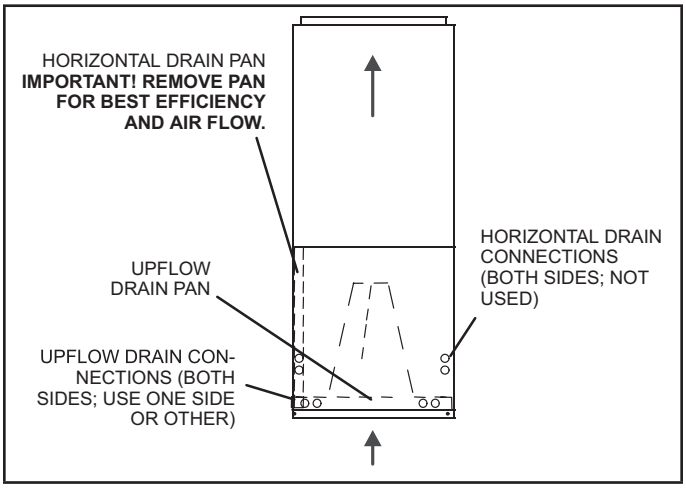


FIGURE 16. Upflow Configuration

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.

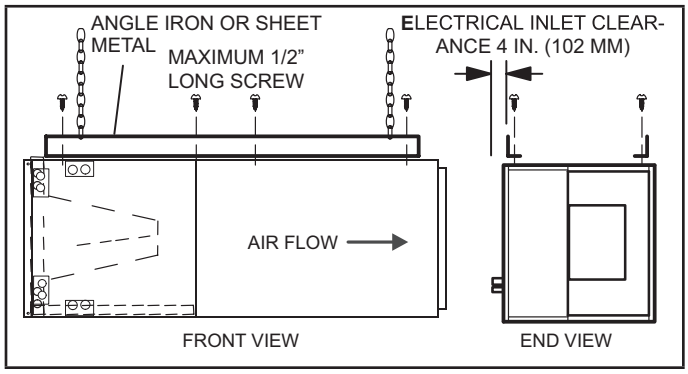


FIGURE 17. Suspend Horizontal Unit

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.

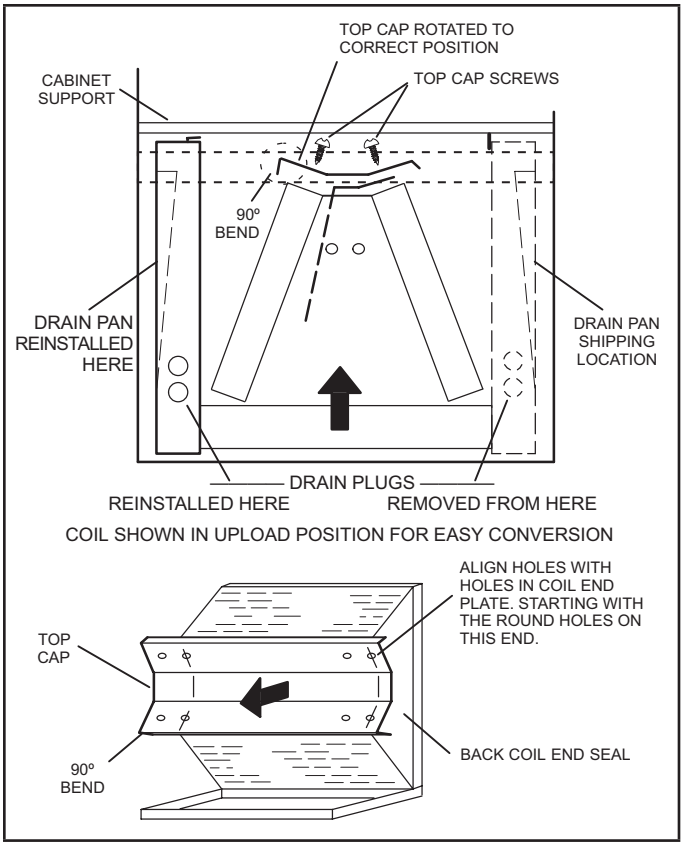


FIGURE 18. Field Modification for Left-Hand Discharge

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 18.

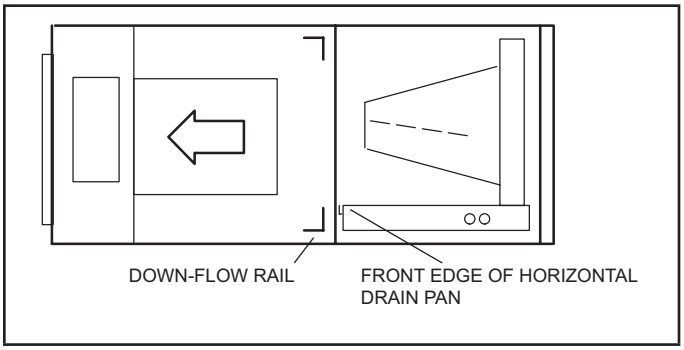


FIGURE 19. Left-Hand Discharge Configuration

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 19.

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 17. 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.

4 - The horizontal configuration is shown in figure 19.

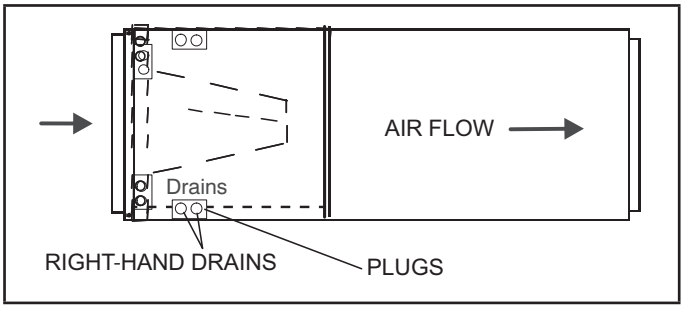


FIGURE 20. Right-Hand Discharge Configuration

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 17. Use sheet metal screws to connect the return and supply air plenums as required.

DOWNFLOW APPLICATION

Use the following procedures to configure the unit for downflow operations:

⚠ IMPORTANT

If electric heat section with circuit breakers (ECB45) is installed in a CBK45UHPT unit in a downflow application, the circuit breakers must be rotated 180° to the UP position. See ECB45 installation instructions for more details.

Table 1 outlines the sizes of the various drip shields.

NOTE - (-060 Model Only) *Remove access panels and horizontal drip shield from the corrugated padding between the blower and coil assembly.*

1 - Remove the coil assembly from the unit.

2 - For best efficiency and air flow, remove the horizontal drain pan from the units in downflow positions as illustrated in figure 21.

3 - Rotate cabinet 180º from the upright position. See figure 21. You may need to first remove the blower assembly to lighten the cabinet for lifting.

4 - Foam tape that is provided creates a seal between the drip shield and the coil so that water does not leak into the air stream. The foam tape pieces are precut. Apply the tape to the drip shields as illustrated in figure 22 and specified as follows:

- Apply two pieces of foam tape provided down both ends of each shield. The tape should measure 4-3/4" X 2" (120 X 25 mm). Ensure that the tape covers both sides of the shield equally.
- Apply the longer piece of 1 inch wide foam tape between the end pieces of tape.

5 - From the underside of the coil, install the downflow drip shield firmly in place as illustrated in figure 23.

TABLE 1. Downflow Drip Shields (Tape Required)

Units	Length	Width
-018/024	Not Required	Not Required
-030	15-7/8"	4-11/16"
-036, -042	17-7/8"	4-11/16"

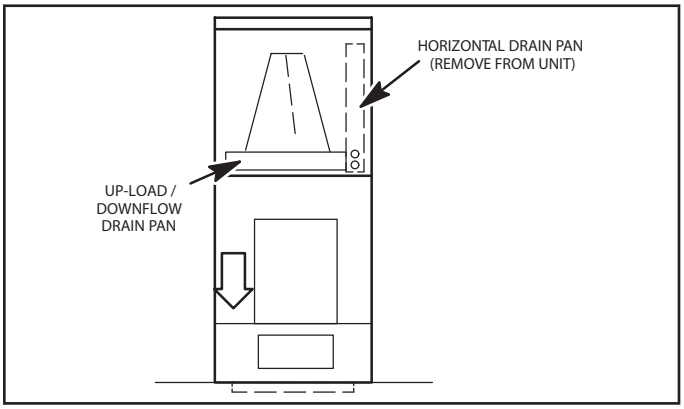


FIGURE 21. Downflow Discharge Position

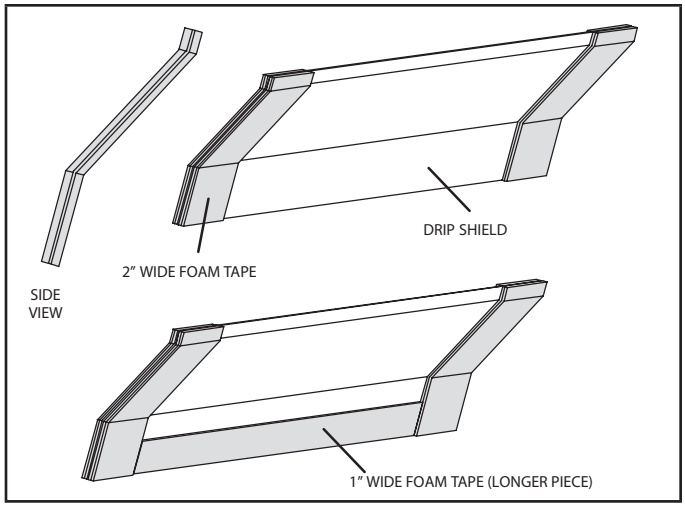


FIGURE 22. Applying Foam Tape to Drip Shield

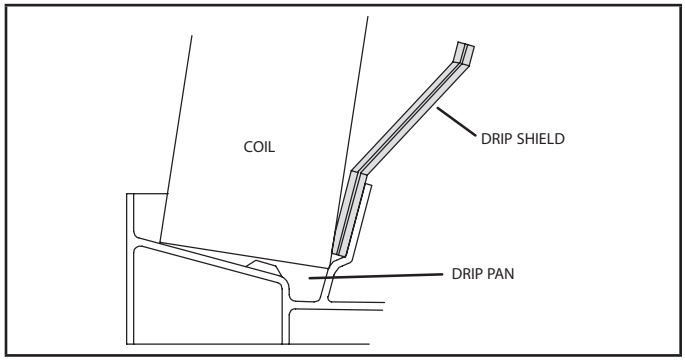


FIGURE 23. Downflow Drip Shields

6 - Replace the coil assembly and blower if you have removed it. Replace the coil access panel.

7 - Set the unit so that it is level. Using sheet metal screws, connect the return and supply air plenums as required.

***NOTE** - For downflow application, metal or Class I supply and return air plenums must be used.*

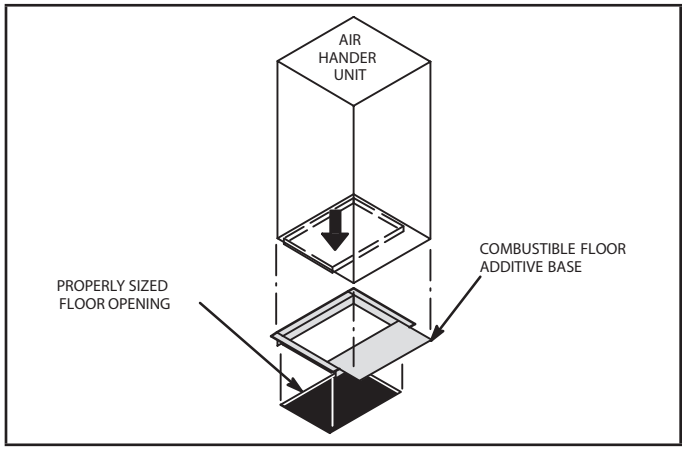


FIGURE 24. Downflow Combustible Flooring Base

8 - For downflow installation on combustible flooring, an additive base must be used as illustrated in figure 9. See CBK45UHPT Engineering Handbook for downflow combustible flooring base kits available for this air handler.

9 - Cut an opening appropriately sized for combustible base. Base dimensions are illustrated in figure 25. 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.

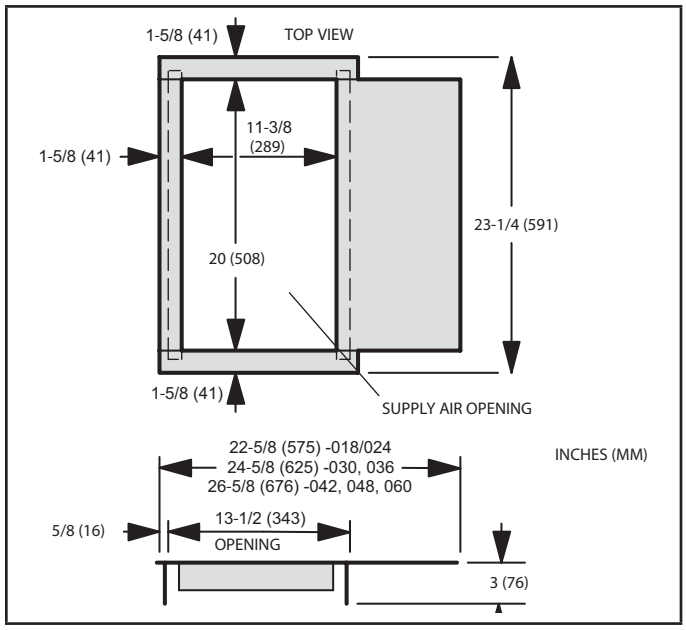


FIGURE 25. Downflow Combustible Base Dimensions

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 26). Do not remove sensor from bracket, and do not disconnect or reroute sensor wire from the control panel area.

FIGURE 26

2 - Follow instructions for right-hand discharge as outlined in previous section on page 22

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 27. Note: sensor should be facing toward the inside of the unit.

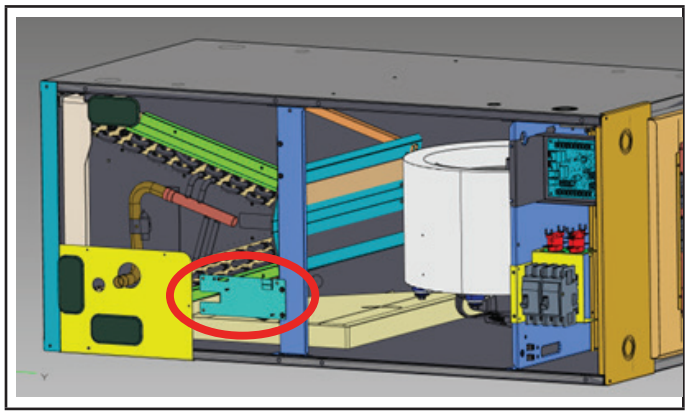


FIGURE 27

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 28).

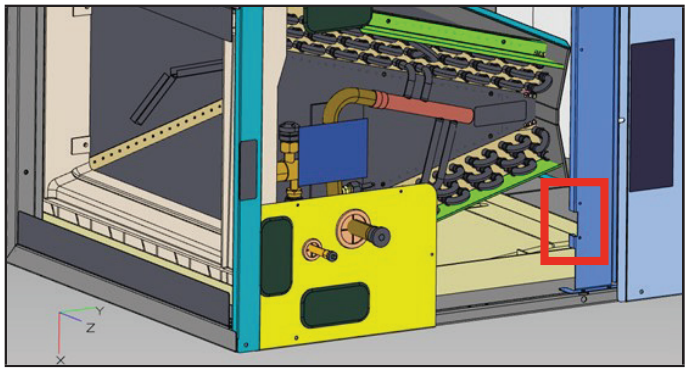


FIGURE 28

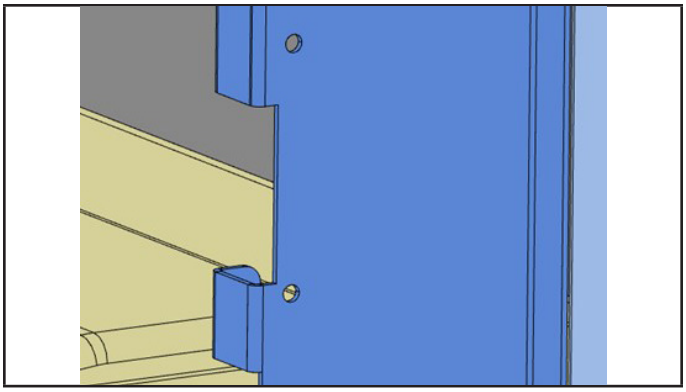


FIGURE 25 (Detail)

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 21 and 22. 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 29.

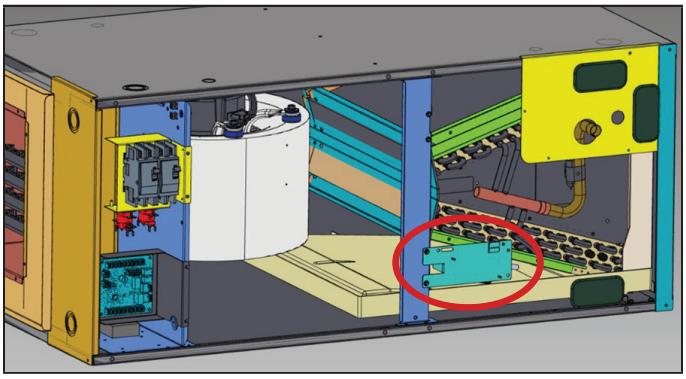


FIGURE 29

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 30.

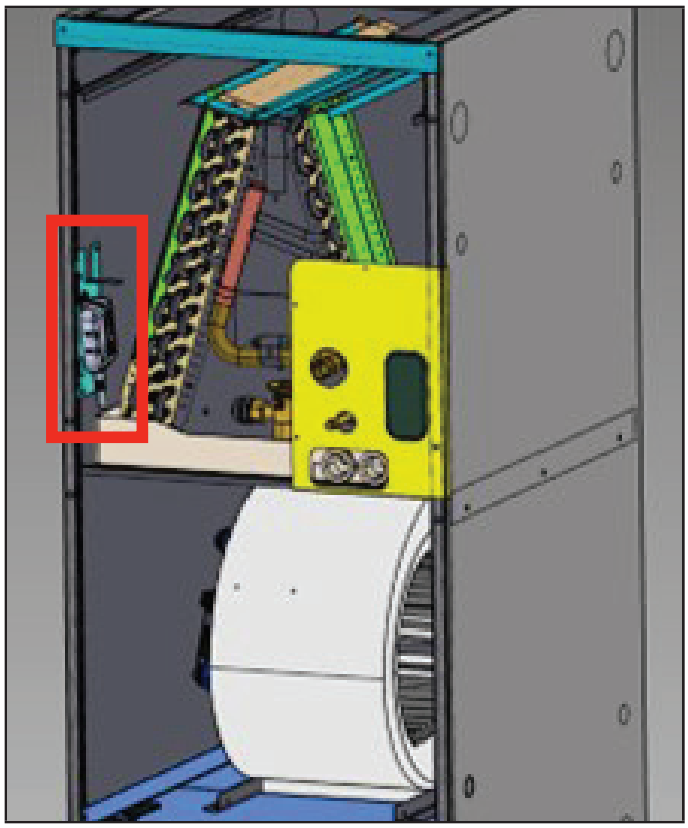


FIGURE 30

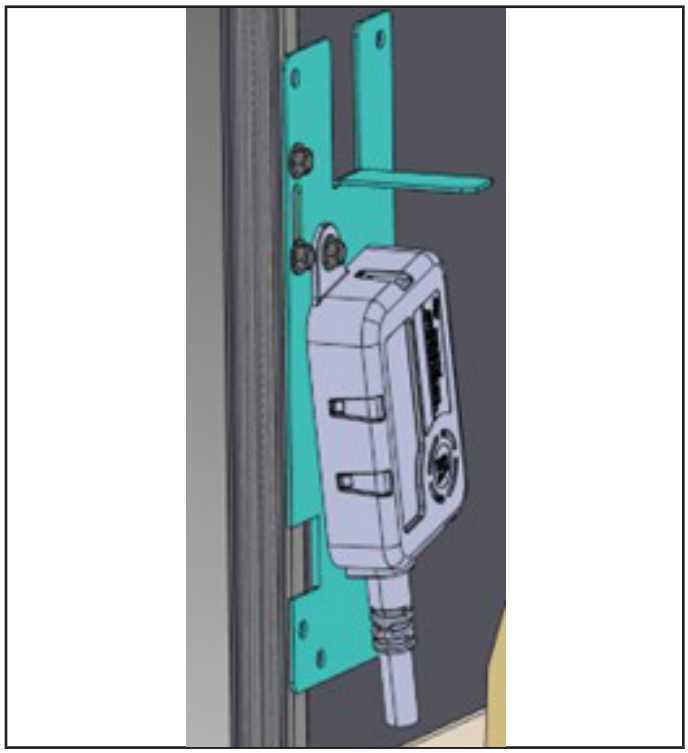


FIGURE 30 (Detail)

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 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 2. CBK45UHPT 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	3/8" (10mm)	7/8" (22mm)	
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.

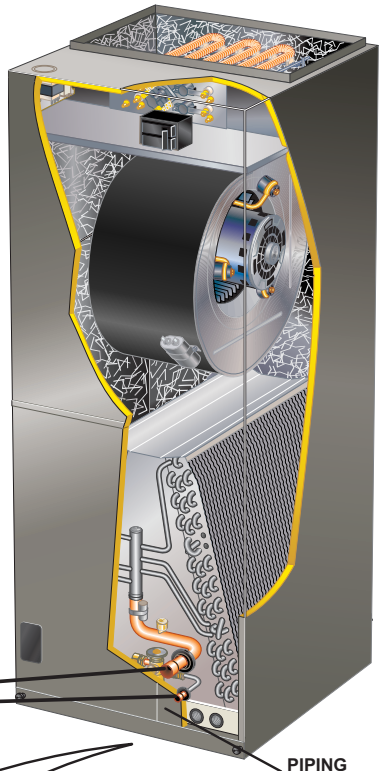
When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

- 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

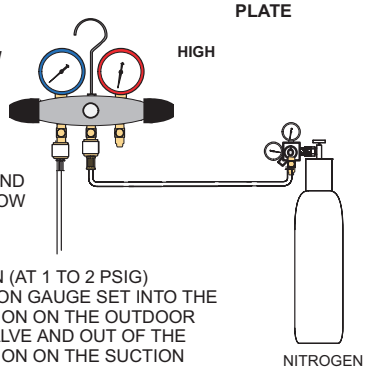
B REMOVE RUBBER PLUG FROM BOTH LIQUID AND SUCTION LINES

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.

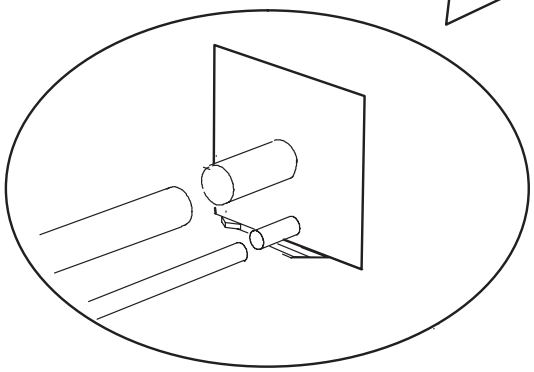
D CONNECT PIPES

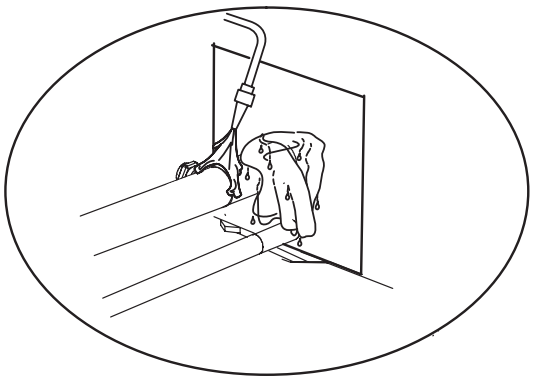
NOTE - *REFRIGERANT LINE SETS SHOULD BE ROUTED TO ALLOW FILTER ACCESSIBILITY.*



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 31. 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.

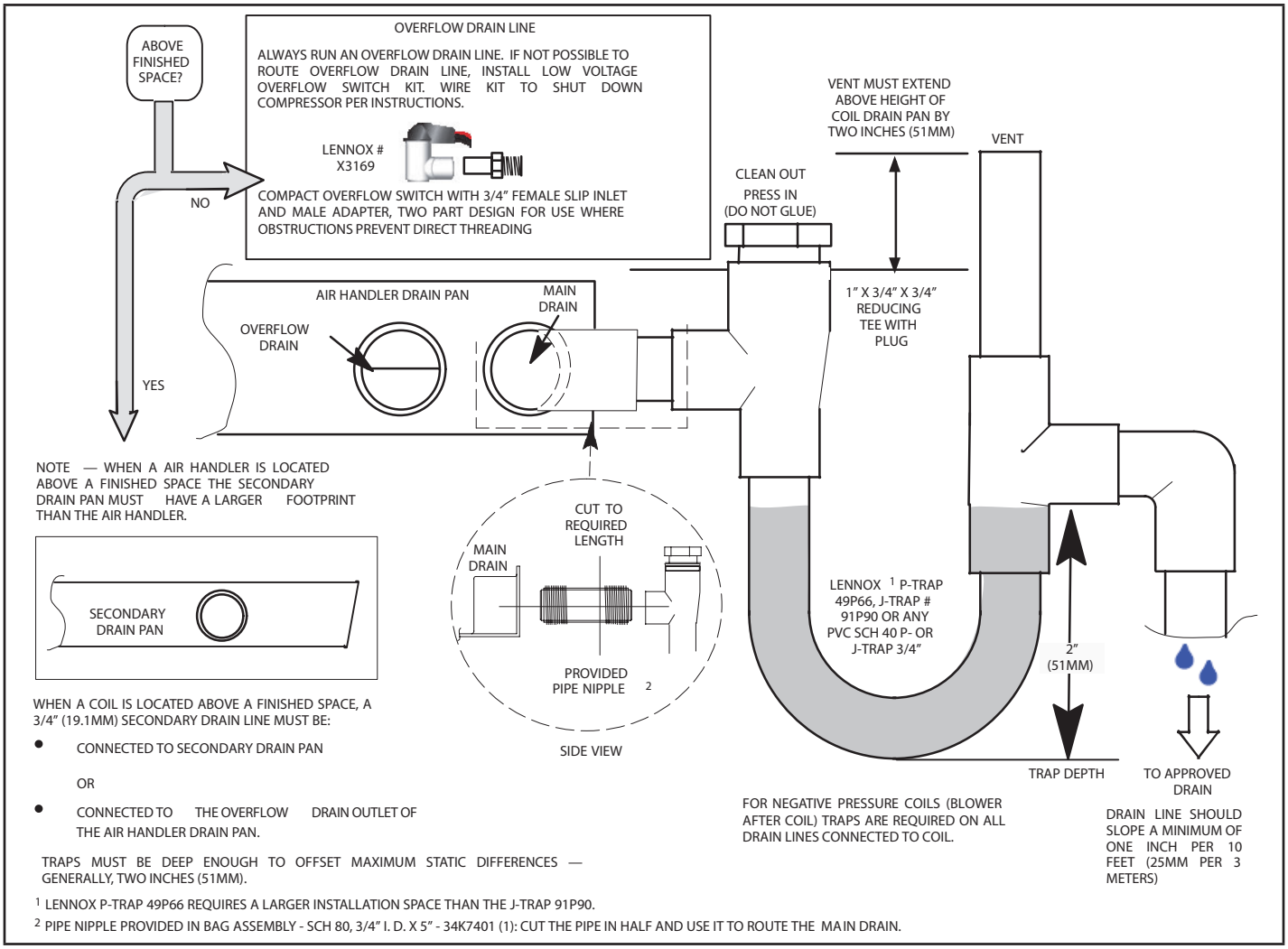


FIGURE 32. Typical Main and Overflow Drain Installations

⚠ 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.

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 32). 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).

NOTE – Do not use soft solder.

6 - Allow refrigerant pipes to cool to room temperature.

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.

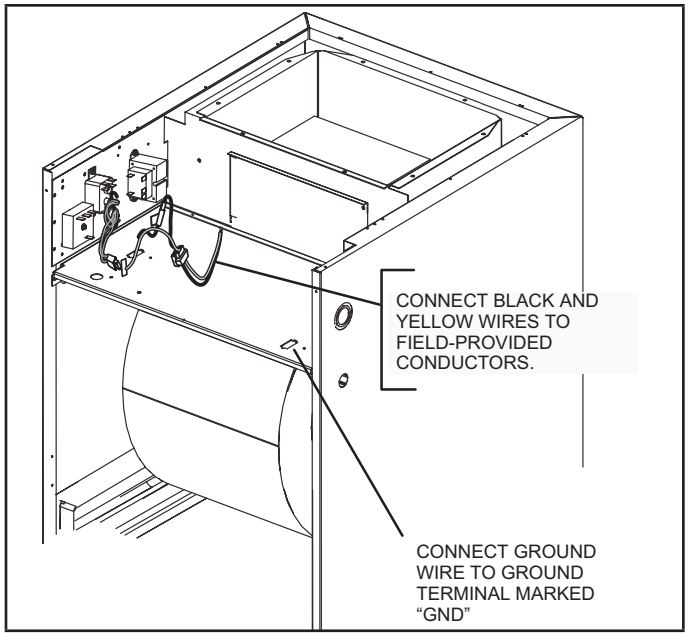


FIGURE 33. Making Electrical Connections

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.

⚠ WARNING

Electrically ground air handler. Connect ground wire to ground terminal marked "GND".

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

208 / 240 VOLT TRANSFORMER

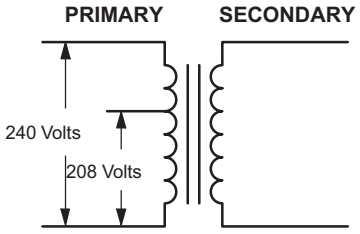


FIGURE 34. Converting Unit from 240VAC to 208VAC

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 3 for replacement filter sizes.

TABLE 3. Filter Dimensions

CBK45UHPT	Filter Size – In. (mm)
-018/024, -030, -036	15 x 20 x 1 (381 x 508 x 25)
-042	18 x 20 x 1 (457 x 508 x 25)

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 4 to review the diagnostic codes.

TABLE 4. 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 8 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 5. 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.
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 6 lists the functions of the Test button during each mode of operation.

TABLE 6. 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 7 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 4. LED Diagnostic Codes” on page 34.

TABLE 7. 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 35 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 8. 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 8 for troubleshooting steps.

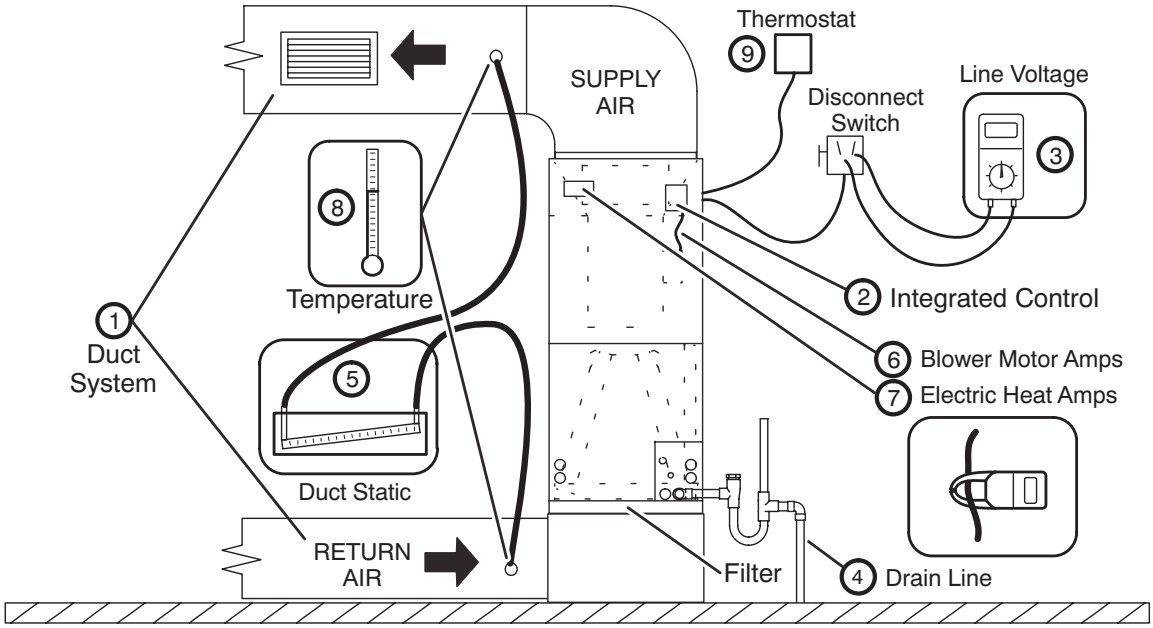
TABLE 9. Red LED Diagnostic Codes / Troubleshooting

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.

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

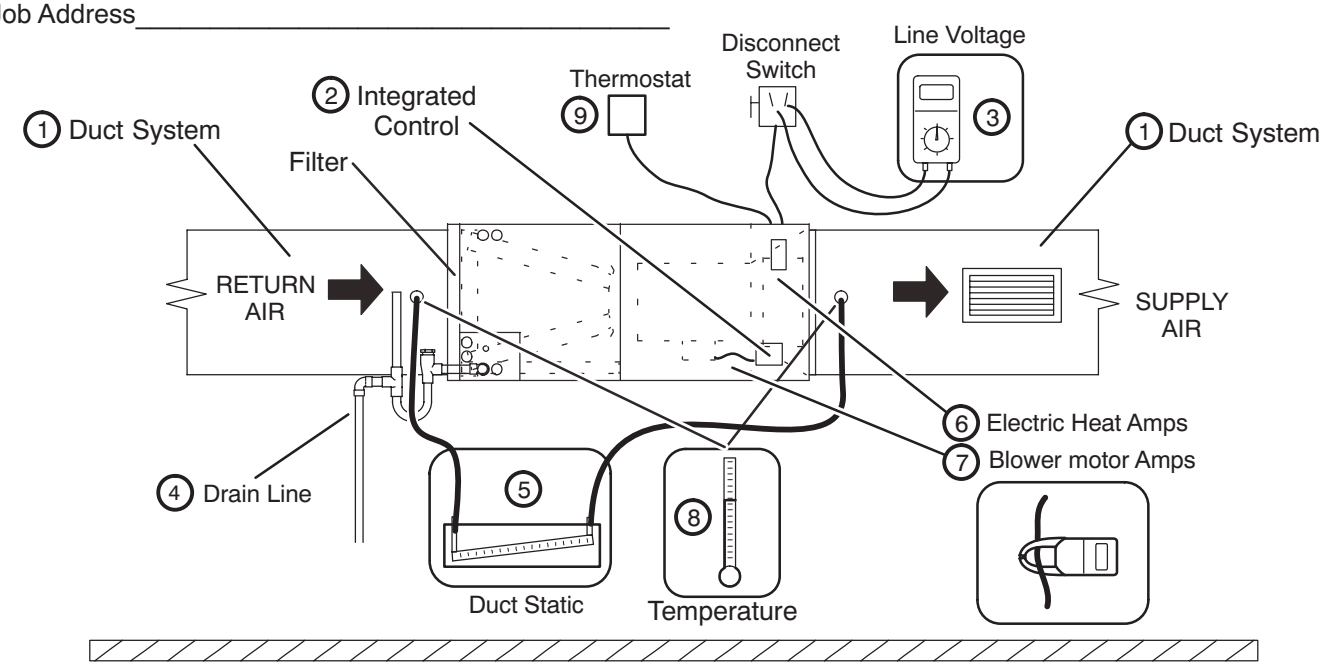
Technician's Name:_____Date Start–Up & Performance Check Completed_____

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)