CBK48MVT (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 38.

⚠ 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 CBK48MVT air handlers are equipped with a factory-installed, internally mounted check / expansion valve, which is suitable for use in R454B applications.

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

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

IMPORTANT: Special procedures are required for cleaning the all-aluminum coil in this unit. See page 64 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

⚠ IMPORTANT

RDS system requires 3 VA additional loading on low voltage transformer.

⚠ IMPORTANT

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

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

Specifications — 1.5 TO 3 TON

Size		018/024	030	036
Nominal Tonnage		1.5 to 2	2.5	3
Refrigerant Type		R-454B	R-454B	R-454B
Factory Installed Expansion Valve (TXV)		**26Z70**	**26Z70**	**26Z70**
Connections	Liquid line (OD) sweat - in.	3/8	3/8	3/8
	Suction line (OD) sweat - in.	3/4	3/4	3/4
	Condensate drain (FPT) - in.	(2) 3/4	(2) 3/4	(2) 3/4
Indoor Coil	Net face area - ft.²	4.4	5.0	5.0
	Tube diameter - in.	3/8	3/8	3/8
	Rows	3	3	3
	Fins - in.	14	14	14
Blower	HP	1/2	1/2	3/4
	Wheel nominal diameter x width - in.	10 x 8	11 x 8	11 x 8
	Air volume range - cfm	365 - 1050	510 - 1315	720 - 1580
[1] **Filters**	Size - in.	(1) 20 x 20 x 1	(1) 20 x 20 x 1	(1) 20 x 20 x 1
Shipping Data - lbs.		141	154	159
ELECTRICAL DATA				
	Line voltage data (Volts-Phase-Hz)	208/230-1-60	208/230-1-60	208/230-1-60
[2] Maximum overcurrent protection (MOCP) amps (unit)		15	15	15
[3] Minimum circuit ampacity (MCA) (unit)		5	5	8

[1] 1 Disposable frame type filter.
[2] 2 HACR type circuit breaker or fuse.
[3] 3 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F.

SPECIFICATIONS — 3.5 TO 5 TON

Size		042	048	060
Nominal Tonnage		3.5	4	5
Refrigerant Type		R-454B	R-454B	R-454B
Factory Installed Expansion Valve (TXV)		**26Z71**	**26Z71**	**26Z72**
Connections	Liquid line (OD) sweat - in.	3/8	3/8	3/8
	Suction line (OD) sweat - in.	7/8	7/8	7/8
	Condensate drain (FPT) - in.	(2) 3/4	(2) 3/4	(2) 3/4
Indoor Coil	Net face area - ft.²	7.22	7.22	8.33
	Tube diameter - in.	3/8	3/8	3/8
	Rows	3	3	3
	Fins - in.	14	14	14
Blower	HP	1	1	1
	Wheel nominal diameter x width - in.	12 x 9	12 x 9	12 x 9
	Air volume range - cfm	900 - 1760	1230 - 2200	1300 - 2210
[1] **Filters**	Size - in.	(1) 20 x 24 x 1	(1) 20 x 24 x 1	(1) 20 x 24 x 1
Shipping Data - lbs.		189	189	199
ELECTRICAL DATA				
	Line voltage data (Volts-Phase-Hz)	208/230-1-60	208/230-1-60	208/230-1-60
[2] Maximum overcurrent protection (MOCP) amps (unit)		15	15	15
[3] Minimum circuit ampacity (MCA) (unit)		10	10	10

[1] 1 Disposable frame type filter.
[2] 2 HACR type circuit breaker or fuse.
[3] 3 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F.

INSTALLATION CLEARANCES WITH ELECTRIC HEAT

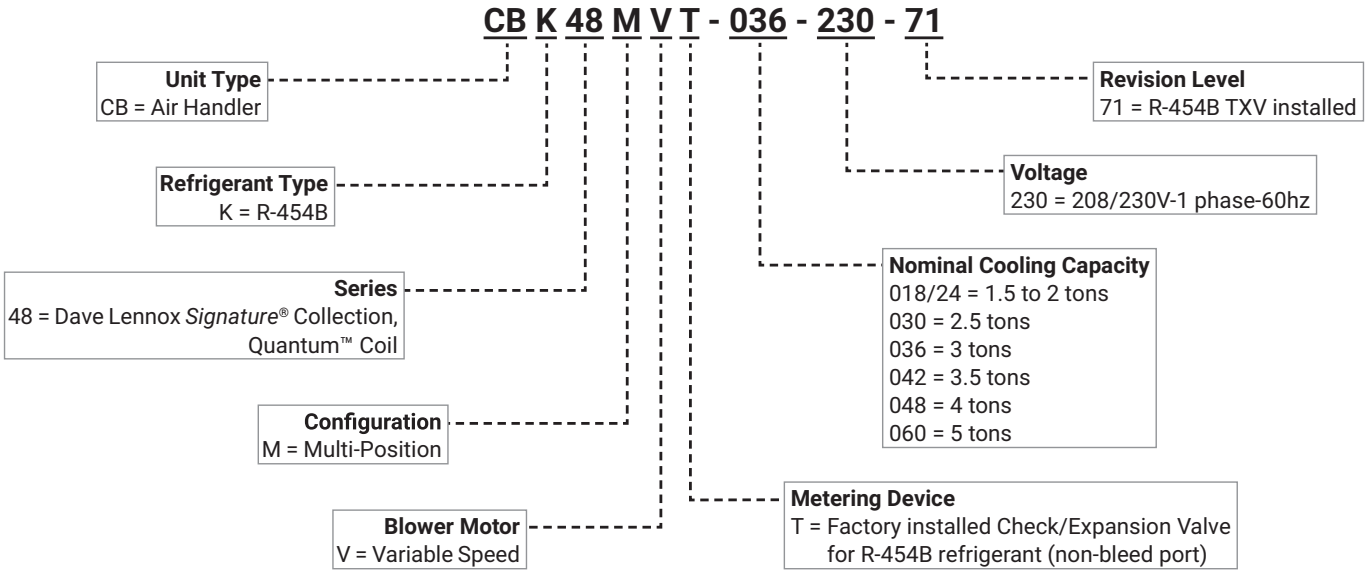
4 to 20kW Electric Heat		**25kW Electric Heat**	
Cabinet	0 inch (0 mm)	Cabinet	0 inch (0 mm)
To Plenum	0 inch (0 mm)	To Plenum	1 inch (25 mm)
To Outlet Duct	0 inch (0 mm)	To Outlet Duct within 3 feet (914 mm)	1 inch (25 mm)
Floor	0 inch (0 mm)	Floor	See Note #1
Service / Maintenance	See Note #2	Service / Maintenance	See Note #2

[1] 1 Units installed on combustible floors in the downflow position with electric heat DO require a downflow combustible flooring base.
[2] 2 Front service access - 24 inches (610 mm) minimum.
NOTE - If cabinet depth is more than 24 inches (610 mm), allow a minimum of the cabinet depth plus 2 inches (51 mm).

REPLACEMENT CIRCUIT BREAKERS

Voltage	Description	Catalog No.
208/240V - 1 Phase	25 amp, 2 pole	**41K13**
	30 amp, 2 pole	**17K70**
	35 amp, 2 pole	**72K07**
	40 amp, 2 pole	**49K14**
	45 amp, 2 pole	**17K71**
	50 amp, 2 pole	**41K12**
	60 amp, 2 pole	**17K72**
208/240V - 3 Phase	30 amp, 3 pole	**64W47**
	35 amp, 3 pole	**41K14**
	40 amp, 3 pole	**41K16**
	45 amp, 3 pole	**18M86**
	50 amp, 3 pole	**41K15**
	60 amp, 3 pole	**41K17**

Model Number Identification



Blower Data

CBK48MVT-018/024 BLOWER PERFORMANCE

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

"ADJUST" Jumper Setting	Jumper Speed Positions							
	"HEAT" Speed				"COOL" Speed			
	1 cfm	2 cfm	3 cfm	4 cfm	1 cfm	2 cfm	3 cfm	4 cfm
+	460	685	885	1050	460	685	885	1050
NORM	400	575	795	940	400	575	795	940
–	365	515	715	830	365	515	715	830

NOTES - The effect of static pressure, filter and electric heater resistance is included in the air volumes listed.
First stage cooling air volume is 70% of COOL speed setting. Continuous fan speed is approximately 28%, 38%, 70% and 100% (Jumper selectable) of the same second-stage COOL speed selected, minimum 250 cfm.
Lennox iHarmony® Zoning System applications - minimum blower speed is 250 cfm.

CBK48MVT-018/024 BLOWER MOTOR WATTS

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	NA	32	44	58	71	90	104	131	145
	Tap 2	NA	56	85	103	121	139	165	190	207
	Tap 3	NA	105	131	161	183	202	241	263	292
	Tap 4	NA	164	194	220	253	277	310	330	360
"COOL" Speed	Tap 1	NA	32	44	58	71	90	104	131	145
	Tap 2	NA	56	85	103	121	139	165	190	207
	Tap 3	NA	105	131	161	183	202	241	263	292
	Tap 4	NA	164	194	220	253	277	310	330	360

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	NA	27	42	52	69	79	99	114	133
	Tap 2	NA	44	59	77	95	117	137	152	183
	Tap 3	NA	79	108	126	159	181	199	231	252
	Tap 4	NA	117	145	167	197	228	254	273	313
"COOL" Speed	Tap 1	NA	27	42	52	69	79	99	114	133
	Tap 2	NA	44	59	77	95	117	137	152	183
	Tap 3	NA	79	108	126	159	181	199	231	252
	Tap 4	NA	117	145	167	197	228	254	273	313

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	NA	24	40	48	60	76	94	106	117
	Tap 2	NA	37	48	68	93	106	129	145	157
	Tap 3	NA	70	85	106	129	153	181	203	222
	Tap 4	NA	90	117	138	162	190	216	236	265
"COOL" Speed	Tap 1	NA	24	40	48	60	76	94	106	117
	Tap 2	NA	37	48	68	93	106	129	145	157
	Tap 3	NA	70	85	106	129	153	181	203	222
	Tap 4	NA	90	117	138	162	190	216	236	265

CBK48MVT-030 BLOWER PERFORMANCE

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

"ADJUST" Jumper Setting	Jumper Speed Positions							
	"HEAT" Speed				"COOL" Speed			
	1 cfm	2 cfm	3 cfm	4 cfm	1 cfm	2 cfm	3 cfm	4 cfm
+	630	875	1095	1315	630	875	1095	1315
NORM	545	785	995	1195	545	785	995	1195
–	510	700	890	1075	510	700	890	1075

NOTES - The effect of static pressure, filter and electric heater resistance is included in the air volumes listed.
First stage cooling air volume is 70% of COOL speed setting. Continuous fan speed is approximately 28%, 38%, 70% and 100% (Jumper selectable) of the same second-stage COOL speed selected, minimum 250 cfm.
Lennox iHarmony® Zoning System applications - minimum blower speed is 250 cfm.

CBK48MVT-030 BLOWER MOTOR WATTS

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	NA	35	55	76	95	116	138	164	179
	Tap 2	NA	80	100	122	148	171	194	214	239
	Tap 3	NA	140	167	189	216	237	273	291	322
	Tap 4	NA	231	262	295	328	355	377	412	441
"COOL" Speed	Tap 1	NA	35	55	76	95	116	138	164	179
	Tap 2	NA	80	100	122	148	171	194	214	239
	Tap 3	NA	140	167	189	216	237	273	291	322
	Tap 4	NA	231	262	295	328	355	377	412	441

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	NA	36	48	61	80	92	114	124	139
	Tap 2	NA	61	84	104	122	143	169	186	210
	Tap 3	NA	109	134	153	178	203	231	254	281
	Tap 4	NA	174	205	238	264	284	310	338	372
"COOL" Speed	Tap 1	NA	36	48	61	80	92	114	124	139
	Tap 2	NA	61	84	104	122	143	169	186	210
	Tap 3	NA	109	134	153	178	203	231	254	281
	Tap 4	NA	174	205	238	264	284	310	338	372

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	NA	29	43	58	77	88	102	119	134
	Tap 2	NA	44	64	89	106	125	157	174	202
	Tap 3	NA	85	104	129	152	176	199	219	239
	Tap 4	NA	133	157	185	207	231	258	285	317
"COOL" Speed	Tap 1	NA	29	43	58	77	88	102	119	134
	Tap 2	NA	44	64	89	106	125	157	174	202
	Tap 3	NA	85	104	129	152	176	199	219	239
	Tap 4	NA	133	157	185	207	231	258	285	317

CBK48MVT-036 BLOWER PERFORMANCE

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

"ADJUST" Jumper Setting	Jumper Speed Positions							
	"HEAT" Speed				"COOL" Speed			
	1	2	3	4	1	2	3	4
	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm
+	920	1255	1410	1580	920	1255	1410	1580
NORM	815	1165	1315	1435	815	1165	1315	1435
–	720	1010	1155	1285	720	1010	1155	1285

NOTES - The effect of static pressure, filter and electric heater resistance is included in the air volumes listed.
First stage cooling air volume is 70% of COOL speed setting. Continuous fan speed is approximately 28%, 38%, 70% and 100% (Jumper selectable) of the same second-stage COOL speed selected, minimum 250 cfm.
Lennox iHarmony® Zoning System applications - minimum blower speed is 250 cfm.

CBK48MVT-036 BLOWER MOTOR WATTS

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	n/a	88	108	132	161	190	208	234	248
	Tap 2	n/a	174	212	237	269	304	328	370	385
	Tap 3	n/a	232	282	314	341	374	410	434	473
	Tap 4	n/a	332	365	409	438	480	520	546	576
"COOL" Speed	Tap 1	n/a	88	108	132	161	190	208	234	248
	Tap 2	n/a	174	212	237	269	304	328	370	385
	Tap 3	n/a	232	282	314	341	374	410	434	473
	Tap 4	n/a	332	365	409	438	480	520	546	576

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	n/a	70	89	113	137	155	188	199	233
	Tap 2	n/a	145	168	201	221	258	279	316	348
	Tap 3	n/a	200	223	265	293	316	359	374	403
	Tap 4	n/a	259	291	309	351	390	429	447	488
"COOL" Speed	Tap 1	n/a	70	89	113	137	155	188	199	233
	Tap 2	n/a	145	168	201	221	258	279	316	348
	Tap 3	n/a	200	223	265	293	316	359	374	403
	Tap 4	n/a	259	291	309	351	390	429	447	488

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	n/a	50	78	97	119	144	163	185	199
	Tap 2	n/a	105	130	156	177	212	239	264	280
	Tap 3	n/a	144	167	197	224	255	281	316	340
	Tap 4	n/a	191	229	253	283	310	339	366	398
"COOL" Speed	Tap 1	n/a	50	78	97	119	144	163	185	199
	Tap 2	n/a	105	130	156	177	212	239	264	280
	Tap 3	n/a	144	167	197	224	255	281	316	340
	Tap 4	n/a	191	229	253	283	310	339	366	398

CBK48MVT-042 BLOWER PERFORMANCE

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

"ADJUST" Jumper Setting	Jumper Speed Positions							
	"HEAT" Speed				"COOL" Speed			
	1	2	3	4	1	2	3	4
	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm
+	1100	1320	1540	1760	1100	1320	1540	1760
NORM	1000	1200	1400	1600	1000	1200	1400	1600
–	900	1080	1260	1440	900	1080	1260	1440

NOTES - The effect of static pressure, filter and electric heater resistance is included in the air volumes listed.
First stage cooling air volume is 70% of COOL speed setting. Continuous fan speed is approximately 28%, 38%, 70% and 100% (Jumper selectable) of the same second-stage COOL speed selected, minimum 450 cfm.
Lennox iHarmony® Zoning System applications - minimum blower speed is 450 cfm.

CBK48MVT-042 BLOWER MOTOR WATTS

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	NA	121	154	177	199	233	252	283	315
	Tap 2	NA	189	221	247	282	310	344	370	403
	Tap 3	NA	283	312	341	382	422	454	481	515
	Tap 4	NA	407	446	488	528	567	583	646	671
"COOL" Speed	Tap 1	NA	121	154	177	199	233	252	283	315
	Tap 2	NA	189	221	247	282	310	344	370	403
	Tap 3	NA	283	312	341	382	422	454	481	515
	Tap 4	NA	407	446	488	528	567	583	646	671

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	NA	104	134	153	184	207	236	257	286
	Tap 2	NA	142	171	203	234	253	298	327	351
	Tap 3	NA	212	240	269	308	337	371	408	429
	Tap 4	NA	309	341	367	406	441	476	516	559
"COOL" Speed	Tap 1	NA	104	134	153	184	207	236	257	286
	Tap 2	NA	142	171	203	234	253	298	327	351
	Tap 3	NA	212	240	269	308	337	371	408	429
	Tap 4	NA	309	341	367	406	441	476	516	559

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	NA	78	104	126	155	175	199	209	247
	Tap 2	NA	115	139	168	196	218	247	274	309
	Tap 3	NA	165	192	220	247	290	316	360	376
	Tap 4	NA	237	269	301	327	356	407	430	481
"COOL" Speed	Tap 1	NA	78	104	126	155	175	199	209	247
	Tap 2	NA	115	139	168	196	218	247	274	309
	Tap 3	NA	165	192	220	247	290	316	360	376
	Tap 4	NA	237	269	301	327	356	407	430	481

CBK48MVT-048 BLOWER PERFORMANCE

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

"ADJUST" Jumper Setting	Jumper Speed Positions							
	"HEAT" Speed				"COOL" Speed			
	1	2	3	4	1	2	3	4
	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm
+	1670	1870	2100	2200	1670	1870	2100	2200
NORM	1460	1670	1870	2100	1460	1670	1870	2100
–	1230	1410	1600	1800	1230	1410	1600	1800

NOTES - The effect of static pressure, filter and electric heater resistance is included in the air volumes listed.
First stage cooling air volume is 70% of COOL speed setting. Continuous fan speed is approximately 28%, 38%, 70% and 100% (Jumper selectable) of the same second-stage COOL speed selected, minimum 450 cfm.
Lennox iHarmony® Zoning System applications - minimum blower speed is 450 cfm.

CBK48MVT-048 BLOWER MOTOR WATTS

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	NA	335	374	399	436	495	518	572	611
	Tap 2	NA	459	502	537	586	644	689	724	759
	Tap 3	NA	668	738	778	845	881	957	996	1019
	Tap 4	NA	808	865	922	975	1003	1025	1017	987
"COOL" Speed	Tap 1	NA	335	374	399	436	495	518	572	611
	Tap 2	NA	459	502	537	586	644	689	724	759
	Tap 3	NA	668	738	778	845	881	957	996	1019
	Tap 4	NA	808	865	922	975	1003	1025	1017	987

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	NA	225	264	289	336	358	396	432	464
	Tap 2	NA	320	374	398	434	484	523	558	610
	Tap 3	NA	451	498	529	583	619	682	721	768
	Tap 4	NA	643	699	731	795	848	919	966	998
"COOL" Speed	Tap 1	NA	225	264	289	336	358	396	432	464
	Tap 2	NA	320	374	398	434	484	523	558	610
	Tap 3	NA	451	498	529	583	619	682	721	768
	Tap 4	NA	643	699	731	795	848	919	966	998

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	NA	146	178	207	227	265	299	317	359
	Tap 2	NA	207	243	272	305	345	371	419	438
	Tap 3	NA	290	347	383	412	447	486	525	548
	Tap 4	NA	410	440	491	528	572	613	651	694
"COOL" Speed	Tap 1	NA	146	178	207	227	265	299	317	359
	Tap 2	NA	207	243	272	305	345	371	419	438
	Tap 3	NA	290	347	383	412	447	486	525	548
	Tap 4	NA	410	440	491	528	572	613	651	694

CBK48MVT-060 BLOWER PERFORMANCE

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

"ADJUST" Jumper Setting	Jumper Speed Positions							
	"HEAT" Speed				"COOL" Speed			
	1	2	3	4	1	2	3	4
	cfm	cfm	cfm	cfm	cfm	cfm	cfm	cfm
+	1695	1890	2140	2210	1695	1890	2140	2210
NORM	1525	1680	1850	2075	1525	1680	1850	2075
–	1300	1450	1630	1800	1300	1450	1630	1800

NOTES - The effect of static pressure, filter and electric heater resistance is included in the air volumes listed.
First stage cooling air volume is 70% of COOL speed setting. Continuous fan speed is approximately 28%, 38%, 70% and 100% (Jumper selectable) of the same second-stage COOL speed selected, minimum 450 cfm.
Lennox iHarmony® Zoning System applications - minimum blower speed is 450 cfm.

CBK48MVT-060 BLOWER MOTOR WATTS

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	NA	334	368	412	449	491	532	557	603
	Tap 2	NA	462	511	549	601	640	681	720	762
	Tap 3	NA	670	710	765	820	868	921	963	1005
	Tap 4	NA	757	810	853	909	961	1001	1034	1026
"COOL" Speed	Tap 1	NA	334	368	412	449	491	532	557	603
	Tap 2	NA	462	511	549	601	640	681	720	762
	Tap 3	NA	670	710	765	820	868	921	963	1005
	Tap 4	NA	757	810	853	909	961	1001	1034	1026

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	NA	245	285	319	350	398	425	462	497
	Tap 2	NA	330	368	414	443	469	505	558	600
	Tap 3	NA	442	497	515	554	603	643	685	735
	Tap 4	NA	600	653	701	752	798	842	889	935
"COOL" Speed	Tap 1	NA	245	285	319	350	398	425	462	497
	Tap 2	NA	330	368	414	443	469	505	558	600
	Tap 3	NA	442	497	515	554	603	643	685	735
	Tap 4	NA	600	653	701	752	798	842	889	935

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

Jumper Speed Positions		Motor Watts @ Various External Static Pressures - in. wg.								
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
"HEAT" Speed	Tap 1	NA	181	204	235	261	304	323	357	383
	Tap 2	NA	218	259	283	315	357	390	422	457
	Tap 3	NA	300	333	365	395	443	476	527	559
	Tap 4	NA	400	430	470	515	543	592	639	678
"COOL" Speed	Tap 1	NA	181	204	235	261	304	323	357	383
	Tap 2	NA	218	259	283	315	357	390	422	457
	Tap 3	NA	300	333	365	395	443	476	527	559
	Tap 4	NA	400	430	470	515	543	592	639	678

	Model Number	No. of Stages	Volts Input	kW Input	[1] Btuh Input	[2] Blower Motor Full Load Amps	[3] Minimum Circuit Ampacity	[5] Maximum Overcurrent Protection
4 kW 4 lbs.	ECB48-4 **(27A46)** Terminal Block ECB48-4CB **(27A50)** 30A Circuit breaker	1	208	3.0	10,250	4.0	23	[4] **25**
			220	3.4	11,450	4.0	24	[4] **25**
			230	3.7	12,550	4.0	25	[4] **25**
			240	4.0	13,650	4.0	26	30
5 kW 4 lbs.	ECB48-5 **(27A47)** Terminal Block ECB48-5CB **(27A51)** 35A Circuit breaker	1	208	3.8	12,800	4.0	28	[4] **30**
			220	4.2	14,300	4.0	29	[4] **30**
			230	4.6	15,700	4.0	30	[4] **30**
			240	5.0	17,100	4.0	31	35
6 kW 4 lbs.	ECB48-6 **(27A48)** Terminal Block ECB48-6CB **(27A52)** 40A Circuit breaker	1	208	4.5	15,400	4.0	32	[4] **35**
			220	5.0	17,100	4.0	33	[4] **35**
			230	5.5	18,800	4.0	35	[4] **35**
			240	6.0	20,500	4.0	36	40
8 kW 5 lbs.	ECB48-8 **(27A49)** Terminal Block ECB48-8CB **(27A53)** 50A Circuit breaker	2	208	6.0	20,500	4.0	41	[4] **45**
			220	6.7	22,900	4.0	43	[4] **45**
			230	7.3	25,100	4.0	45	[4] **45**
			240	8.0	27,300	4.0	47	50
9 kW 5 lbs.	ECB48-9CB **(27A54)** 60A Circuit breaker	2	208	6.8	23,100	4.0	46	[4] **50**
			220	7.6	25,800	4.0	48	[4] **50**
			230	8.3	28,200	4.0	50	[4] **50**
			240	9.0	30,700	4.0	52	60

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

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

[2] 2 Amps shown are for blower motor only.

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

[4] 4 Bold text indicates that the circuit breaker on “CB” circuit breaker models must be replaced with size noted. See Replacement Circuit Breakers on page 9.

[5] 5 HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA — CBK48MVT-030 | SINGLE PHASE

	Model Number	No. of Stages	Volts Input	kW Input	[1] Btuh Input	[2] Blower Motor Full Load Amps	[3] Minimum Circuit Ampacity		[5] Maximum Overcurrent Protection		Single Point Power Source	
							CkT 1	Ckt 2	CkT 1	Ckt 2	[3] Minimum Circuit Ampacity	[5] Maximum Overcurrent Protection
4 kW 4 lbs.	ECB48-4 **(27A46)** Terminal Block ECB48-4CB **(27A50)** 30A Circuit breaker	1	208	3.0	10,250	4.0	23	- - -	[4] **25**	- - -	23	25
			220	3.4	11,450	4.0	24	- - -	[4] **25**	- - -	24	25
			230	3.7	12,550	4.0	25	- - -	[4] **25**	- - -	25	25
			240	4.0	13,650	4.0	26	- - -	30	- - -	26	30
5 kW 4 lbs.	ECB48-5 **(27A47)** Terminal Block ECB48-5CB **(27A51)** 35A Circuit breaker	1	208	3.8	12,800	4.0	28	- - -	[4] **30**	- - -	28	30
			220	4.2	14,300	4.0	29	- - -	[4] **30**	- - -	29	30
			230	4.6	15,700	4.0	30	- - -	[4] **30**	- - -	30	30
			240	5.0	17,100	4.0	31	- - -	35	- - -	31	35
6 kW 4 lbs.	ECB48-6 **(27A48)** Terminal Block ECB48-6CB **(27A52)** 40A Circuit breaker	1	208	4.5	15,400	4.0	32	- - -	[4] **35**	- - -	32	35
			220	5.0	17,100	4.0	33	- - -	[4] **35**	- - -	33	35
			230	5.5	18,800	4.0	35	- - -	[4] **35**	- - -	35	35
			240	6.0	20,500	4.0	36	- - -	40	- - -	36	40
8 kW 5 lbs.	ECB48-8 **(27A49)** Terminal Block ECB48-8CB **(27A53)** 50A Circuit breaker	2	208	6.0	20,500	4.0	41	- - -	[4] **45**	- - -	41	45
			220	6.7	22,900	4.0	43	- - -	[4] **45**	- - -	43	45
			230	7.3	25,100	4.0	45	- - -	[4] **45**	- - -	45	45
			240	8.0	27,300	4.0	47	- - -	50	- - -	47	50
9 kW 5 lbs.	ECB48-9CB **(27A54)** 60A Circuit breaker	2	208	6.8	23,100	4.0	46	- - -	[4] **50**	- - -	46	50
			220	7.6	25,800	4.0	48	- - -	[4] **50**	- - -	48	50
			230	8.3	28,200	4.0	50	- - -	[4] **50**	- - -	50	50
			240	9.0	30,700	4.0	52	- - -	60	- - -	52	60
12.5 kW 10 lbs.	ECB48-12.5CB **(27A55)** (1) 30A and (1) 45A Circuit breaker	2	208	9.4	32,000	4.0	24	38	[4] **25**	[4] **40**	61	70
			220	10.5	35,800	4.0	25	40	[4] **25**	[4] **40**	65	70
			230	11.5	39,200	4.0	26	42	30	45	67	70
			240	12.5	42,600	4.0	27	44	30	45	71	80
15 kW 12 lbs.	ECB48-15CB **(27A56)** (1) 35A and (1) 60A Circuit breaker	2	208	11.3	38,400	4.0	28	45	[4] **30**	[4] **45**	73	80
			220	12.6	43,000	4.0	29	48	[4] **30**	[4] **50**	77	80
			230	13.8	47,000	4.0	30	50	[4] **30**	[4] **50**	80	80
			240	15.0	51,200	4.0	31	52	35	60	83	90

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

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

[2] 2 Amps shown are for blower motor only.

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

[4] 4 Bold text indicates that the circuit breaker on “CB” circuit breaker models must be replaced with size noted. See Replacement Circuit Breakers on page 9.

[5] 5 HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA — CBK48MVT-036 | SINGLE PHASE

	Model Number	No. of Stages	Volts Input	kW Input	[1] Btuh Input	[2] Blower Motor Full Load Amps	[3] Minimum Circuit Ampacity		[5] Maximum Overcurrent Protection		Single Point Power Source	
							Ckt 1	Ckt 2	Ckt 1	Ckt 2	[3] Minimum Circuit Ampacity	[5] Maximum Overcurrent Protection
4 kW 4 lbs.	ECB48-4 **(27A46)** Terminal Block ECB48-4CB **(27A50)** 35A Circuit breaker	1	208	3.0	10,250	5.9	25	- - -	[4] **25**	- - -	25	25
			220	3.4	11,450	5.9	26	- - -	30	- - -	26	30
			230	3.7	12,550	5.9	27	- - -	30	- - -	27	30
			240	4.0	13,650	5.9	28	- - -	30	- - -	28	30
5 kW 4 lbs.	ECB48-5 **(27A47)** Terminal Block ECB48-5CB **(27A51)** 35A Circuit breaker	1	208	3.8	12,800	5.9	30	- - -	[4] **30**	- - -	30	30
			220	4.2	14,300	5.9	31	- - -	35	- - -	31	35
			230	4.6	15,700	5.9	32	- - -	35	- - -	32	35
			240	5.0	17,100	5.9	33	- - -	35	- - -	33	35
6 kW 4 lbs.	ECB48-6 **(27A48)** Terminal Block ECB48-6CB **(27A52)** 40A Circuit breaker	1	208	4.5	15,400	5.9	34	- - -	[4] **35**	- - -	34	35
			220	5.0	17,100	5.9	36	- - -	40	- - -	36	40
			230	5.5	18,800	5.9	37	- - -	40	- - -	37	40
			240	6.0	20,500	5.9	39	- - -	40	- - -	39	40
8 kW 5 lbs.	ECB48-8 **(27A49)** Terminal Block ECB48-8CB **(27A53)** 50A Circuit breaker	2	208	6.0	20,500	5.9	43	- - -	[4] **45**	- - -	43	45
			220	6.7	22,900	5.9	46	- - -	50	- - -	46	50
			230	7.3	25,100	5.9	47	- - -	50	- - -	47	50
			240	8.0	27,300	5.9	49	- - -	50	- - -	49	50
9 kW 5 lbs.	ECB48-9CB **(27A54)** 60A Circuit breaker	2	208	6.8	23,100	5.9	48	- - -	[4] **50**	- - -	48	50
			220	7.6	25,800	5.9	50	- - -	[4] **50**	- - -	50	60
			230	8.3	28,200	5.9	52	- - -	60	- - -	52	60
			240	9.0	30,700	5.9	54	- - -	60	- - -	54	60
12.5 kW 10 lbs.	ECB48-12.5CB **(27A55)** (1) 30A and (1) 45A Circuit breaker	2	208	9.4	32,000	5.9	26	38	30	[4] **40**	64	70
			220	10.5	35,800	5.9	27	40	30	[4] **40**	67	70
			230	11.5	39,200	5.9	28	42	30	45	70	70
			240	12.5	42,600	5.9	29	44	30	45	72	80
15 kW 12 lbs.	ECB48-15CB **(27A56)** (1) 35A and (1) 60A Circuit breaker	2	208	11.3	38,400	5.9	30	45	[4] **30**	[4] **50**	75	80
			220	12.6	43,000	5.9	31	48	35	[4] **50**	79	80
			230	13.8	47,000	5.9	32	50	35	[4] **50**	82	90
			240	15.0	51,200	5.9	33	52	35	60	86	90
20 kW 19 lbs.	ECB48-20CB **(27A57)** (2) 60A Circuit breaker	2	208	15.0	51,200	5.9	48	50	[4] **50**	[4] **50**	98	100
			220	16.8	57,300	5.9	50	53	[4] **50**	60	103	110
			230	18.4	62,700	5.9	52	55	60	60	107	110
			240	20.0	68,200	5.9	54	57	60	60	112	125

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

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

[2] 2 Amps shown are for blower motor only.

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

[4] 4 Bold text indicates that the circuit breaker on “CB” circuit breaker models must be replaced with size noted. See Replacement Circuit Breakers on page 9.

[5] 5 HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA — CBK48MVT-036 | THREE PHASE

Model Number	No. of Stages	Volts Input	kW Input	[1] Btuh Input	[2] Blower Motor Full Load Amps	[3] Minimum Circuit Ampacity		[5] Maximum Overcurrent Protection		Single Point Power Source	
						Ckt 1	Ckt 2	Ckt 1	Ckt 2	[3] Minimum Circuit Ampacity	[5] Maximum Overcurrent Protection
8 kW 5 lbs. ECB48-8 **(27A61)** Terminal Block	1	208	6.0	20,500	5.9	28	- - -	30	- - -	28	30
		220	6.7	22,900	5.9	29	- - -	30	- - -	29	30
		230	7.3	25,100	5.9	30	- - -	30	- - -	30	35
		240	8.0	27,300	5.9	31	- - -	35	- - -	31	35
10 kW 6 lbs. ECB48-10 **(27A62)** Terminal Block	1	208	7.5	25,600	5.9	33	- - -	35	- - -	33	35
		220	8.4	28,700	5.9	35	- - -	35	- - -	35	35
		230	9.2	31,400	5.9	36	- - -	40	- - -	36	40
		240	10.0	34,100	5.9	37	- - -	40	- - -	37	40
15 kW 12 lbs. ECB48-15CB **(27A63)** 50A Circuit breaker	1	208	11.3	38,400	5.9	46	- - -	50	- - -	46	50
		220	12.6	43,000	5.9	49	- - -	50	- - -	49	50
		230	13.5	47,000	5.9	51	- - -	[4] **60**	- - -	51	60
		240	15.0	51,200	5.9	52	- - -	[4] **60**	- - -	52	60
20 kW 19 lbs. ECB48-20CB **(27A64)** (2) 35A Circuit breaker	2	208	15.0	51,200	5.9	33	26	35	[4] **30**	59	60
		220	16.8	57,300	5.9	35	28	35	[4] **30**	62	70
		230	18.4	62,700	5.9	36	29	[4] **40**	[4] **30**	65	70
		240	20.0	68,200	5.9	37	30	[4] **40**	35	67	70

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

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

[2] 2 Amps shown are for blower motor only.

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

[4] 4 Bold text indicates that the circuit breaker on “CB” circuit breaker models must be replaced with size noted. See Replacement Circuit Breakers on page 9.

[5] 5 HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA — CBK48MVT-042 | SINGLE PHASE

Model Number	No. of Stages	Volts Input	kW Input	[1] Btuh Input	[2] Blower Motor Full Load Amps	[3] Minimum Circuit Ampacity		[5] Maximum Overcurrent Protection		Single Point Power Source	
						Ckt 1	Ckt 2	Ckt 1	Ckt 2	[3] Minimum Circuit Ampacity	[5] Maximum Overcurrent Protection
4 kW 4 lbs. ECB48-4 **(27A46)** Terminal Block ECB48-4CB **(27A50)** 35A Circuit breaker	1	208	3.0	10,250	7.4	27	- - -	[4] **30**	- - -	27	30
		220	3.4	11,450	7.4	28	- - -	[4] **30**	- - -	28	30
		230	3.7	12,550	7.4	29	- - -	[4] **30**	- - -	29	30
		240	4.0	13,650	7.4	30	- - -	[4] **30**	- - -	30	35
5 kW 4 lbs. ECB48-5 **(27A47)** Terminal Block ECB48-5CB **(27A51)** 35A Circuit breaker	1	208	3.8	12,800	7.4	32	- - -	35	- - -	32	35
		220	4.2	14,300	7.4	33	- - -	35	- - -	33	35
		230	4.6	15,700	7.4	34	- - -	35	- - -	34	35
		240	5.0	17,100	7.4	35	- - -	35	- - -	35	40
6 kW 4 lbs. ECB48-6 **(27A48)** Terminal Block ECB48-6CB **(27A52)** 40A Circuit breaker	1	208	4.5	15,400	7.4	36	- - -	40	- - -	36	40
		220	5.0	17,100	7.4	38	- - -	40	- - -	38	40
		230	5.5	18,800	7.4	39	- - -	40	- - -	39	40
		240	6.0	20,500	7.4	41	- - -	[4] **45**	- - -	41	45
8 kW 5 lbs. ECB48-8 **(27A49)** Terminal Block ECB48-8CB **(27A53)** 50A Circuit breaker	2	208	6.0	20,500	7.4	45	- - -	[4] **45**	- - -	45	50
		220	6.7	22,900	7.4	47	- - -	50	- - -	47	50
		230	7.3	25,100	7.4	49	- - -	50	- - -	49	50
		240	8.0	27,300	7.4	51	- - -	[4] **60**	- - -	51	60
9 kW 5 lbs. ECB48-9CB **(27A54)** 60A Circuit breaker	2	208	6.8	23,100	7.4	50	- - -	[4] **45**	- - -	50	50
		220	7.6	25,800	7.4	52	- - -	60	- - -	52	60
		230	8.3	28,200	7.4	54	- - -	60	- - -	54	60
		240	9.0	30,700	7.4	56	- - -	60	- - -	56	60
12.5 kW 10 lbs. ECB48-12.5CB **(27A55)** (1) 30A and (1) 45A Circuit breaker	2	208	9.4	32,000	7.4	28	38	30	[4] **40**	66	70
		220	10.5	35,800	7.4	29	40	30	[4] **40**	69	70
		230	11.5	39,200	7.4	30	42	30	45	72	80
		240	12.5	42,600	7.4	31	44	[4] **35**	45	74	80
15 kW 12 lbs. ECB48-15CB **(27A56)** (1) 35A and (1) 60A Circuit breaker	2	208	11.3	38,400	7.4	32	45	35	[4] **50**	77	80
		220	12.6	43,000	7.4	33	48	35	[4] **50**	81	90
		230	13.5	47,000	7.4	34	50	35	[4] **50**	84	90
		240	15.0	51,200	7.4	35	52	35	60	87	90
20 kW 19 lbs. ECB48-20CB **(27A57)** (2) 60A Circuit breaker	2	208	15.0	51,200	7.4	50	50	[4] **50**	[4] **50**	100	100
		220	16.8	57,300	7.4	52	53	60	60	105	110
		230	18.4	62,700	7.4	54	55	60	60	109	110
		240	20.0	68,200	7.4	56	57	60	60	113	125

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

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

[2] 2 Amps shown are for blower motor only.

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

[4] 4 Bold text indicates that the circuit breaker on “CB” circuit breaker models must be replaced with size noted. See Replacement Circuit Breakers on page 9.

[5] 5 HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA — CBK48MVT-042 | THREE PHASE

Model Number	No. of Stages	Volts Input	kW Input	[1] Btuh Input	[2] Blower Motor Full Load Amps	[3] Minimum Circuit Ampacity		[5] Maximum Overcurrent Protection		Single Point Power Source	
						Ckt 1	Ckt 2	Ckt 1	Ckt 2	[3] Minimum Circuit Ampacity	[5] Maximum Overcurrent Protection
8 kW ECB48-8 **(27A61)** 5 lbs. Terminal block	1	208	6.0	20,500	7.4	30	- - -	35	- - -	30	35
		220	6.7	22,900	7.4	31	- - -	35	- - -	31	35
		230	7.3	25,100	7.4	32	- - -	35	- - -	32	35
		240	8.0	27,300	7.4	33	- - -	35	- - -	33	35
10 kW ECB48-10 **(27A62)** 6 lbs. Terminal block	1	208	7.5	25,600	7.4	35	- - -	40	- - -	35	40
		220	8.4	28,700	7.4	37	- - -	40	- - -	37	40
		230	9.2	31,400	7.4	38	- - -	40	- - -	38	40
		240	10.0	34,100	7.4	39	- - -	40	- - -	39	40
15 kW ECB48-15CB **(27A63)** 12 lbs. 50A Circuit breaker	1	208	11.3	38,400	7.4	48	- - -	50	- - -	48	50
		220	12.6	43,000	7.4	51	- - -	[4] **60**	- - -	51	60
		230	13.5	47,000	7.4	52	- - -	[4] **60**	- - -	52	60
		240	15.0	51,200	7.4	54	- - -	[4] **60**	- - -	54	60
20 kW ECB48-20CB **(27A64)** 19 lbs. (2) 35A Circuit breaker	2	208	15.0	51,200	7.4	35	26	[4] **40**	[4] **30**	61	70
		220	16.8	57,300	7.4	37	28	[4] **40**	[4] **30**	64	70
		230	18.4	62,700	7.4	38	29	[4] **40**	[4] **30**	67	70
		240	20.0	68,200	7.4	39	30	[4] **40**	35	69	70

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

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

[2] 2 Amps shown are for blower motor only.

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

[4] 4 Bold text indicates that the circuit breaker on “CB” circuit breaker models must be replaced with size noted. See Replacement Circuit Breakers on page 9.

[5] 5 HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA — CBK48MVT-048 AND CBK48MVT-060 | SINGLE PHASE

Model Number	No. of Stages	Volts Input	kW Input	[1] Btuh Input	[2] Blower Motor Full Load Amps	[3] Minimum Circuit Ampacity			[5] Maximum Overcurrent Protection			Single Point Power Source	
						Ckt 1	Ckt 2	Ckt 3	Ckt 1	Ckt 2	Ckt 3	[3] Minimum Circuit Ampacity	[5] Maximum Overcurrent Protection
4 kW 4 lbs. ECB48-4 **(27A46)** Terminal Block ECB48-4CB **(27A50)** 35A Circuit breaker	1	208	3.0	10,250	7.4	27	- - -	- - -	[4] **30**	- - -	- - -	27	30
		220	3.4	11,450	7.4	28	- - -	- - -	[4] **30**	- - -	- - -	28	30
		230	3.7	12,550	7.4	29	- - -	- - -	[4] **30**	- - -	- - -	29	30
		240	4.0	13,650	7.4	30	- - -	- - -	[4] **30**	- - -	- - -	30	35
5 kW 4 lbs. ECB48-5 **(27A47)** Terminal Block ECB48-5CB **(27A51)** 35A Circuit breaker	1	208	3.8	12,800	7.4	32	- - -	- - -	35	- - -	- - -	32	35
		220	4.2	14,300	7.4	33	- - -	- - -	35	- - -	- - -	33	35
		230	4.6	15,700	7.4	34	- - -	- - -	35	- - -	- - -	34	35
		240	5.0	17,100	7.4	35	- - -	- - -	35	- - -	- - -	35	40
6 kW 4 lbs. ECB48-6 **(27A48)** Terminal Block ECB48-6CB **(27A52)** 40A Circuit breaker	1	208	4.5	15,400	7.4	36	- - -	- - -	40	- - -	- - -	36	40
		220	5.0	17,100	7.4	38	- - -	- - -	40	- - -	- - -	38	40
		230	5.5	18,800	7.4	39	- - -	- - -	40	- - -	- - -	39	40
		240	6.0	20,500	7.4	41	- - -	- - -	[4] **45**	- - -	- - -	41	45
8 kW 5 lbs. ECB48-8 **(27A49)** Terminal Block ECB48-8CB **(27A53)** 50A Circuit breaker	2	208	6.0	20,500	7.4	45	- - -	- - -	[4] **45**	- - -	- - -	45	50
		220	6.7	22,900	7.4	47	- - -	- - -	50	- - -	- - -	47	50
		230	7.3	25,100	7.4	49	- - -	- - -	50	- - -	- - -	49	50
		240	8.0	27,300	7.4	51	- - -	- - -	[4] **60**	- - -	- - -	51	60
9 kW 5 lbs. ECB48-9CB **(27A54)** 60A Circuit breaker	2	208	6.8	23,100	7.4	50	- - -	- - -	[4] **50**	- - -	- - -	50	50
		220	7.6	25,800	7.4	52	- - -	- - -	60	- - -	- - -	52	60
		230	8.3	28,200	7.4	54	- - -	- - -	60	- - -	- - -	54	60
		240	9.0	30,700	7.4	56	- - -	- - -	60	- - -	- - -	56	60
12.5 kW 10 lbs. ECB48-12.5CB **(27A55)** (1) 30A and (1) 45A Circuit breaker	2	208	9.4	32,000	7.4	28	38	- - -	30	[4] **40**	- - -	66	70
		220	10.5	35,800	7.4	29	40	- - -	30	[4] **40**	- - -	69	70
		230	11.5	39,200	7.4	30	42	- - -	30	45	- - -	72	80
		240	12.5	42,600	7.4	31	44	- - -	[4] **35**	45	- - -	74	80
15 kW 12 lbs. ECB48-15CB **(27A56)** (1) 35A and (1) 60A Circuit breaker	2	208	11.3	38,400	7.4	32	45	- - -	35	[4] **50**	- - -	77	80
		220	12.6	43,000	7.4	33	48	- - -	35	[4] **50**	- - -	81	90
		230	13.5	47,000	7.4	34	50	- - -	35	[4] **50**	- - -	84	90
		240	15.0	51,200	7.4	35	52	- - -	35	60	- - -	87	90
20 kW 19 lbs. ECB48-20CB **(27A57)** (2) 60A Circuit breaker	2	208	15.0	51,200	7.4	50	50	- - -	[4] **50**	[4] **50**	- - -	100	100
		220	16.8	57,300	7.4	52	53	- - -	60	60	- - -	105	110
		230	18.4	62,700	7.4	54	55	- - -	60	60	- - -	109	110
		240	20.0	68,200	7.4	56	57	- - -	60	60	- - -	113	125
25 kW 19 lbs. ECB48-25CB **(27A58)** (1) 60A and (2) 45A Circuit breaker	3	208	18.8	64,100	7.4	47	38	38	[4] **50**	[4] **40**	[4] **40**	122	125
		220	21.0	71,700	7.4	49	40	40	[4] **50**	[4] **40**	[4] **40**	129	150
		230	23.0	78,300	7.4	51	42	42	60	45	45	134	150
		240	25.0	85,300	7.4	53	44	44	60	45	45	140	150

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

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

[2] 2 Amps shown are for blower motor only.

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

[4] 4 Bold text indicates that the circuit breaker on “CB” circuit breaker models must be replaced with size noted. See Replacement Circuit Breakers on page 9.

[5] 5 HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA — CBK48MVT-048 AND CBK48MVT-060 | THREE PHASE

Model Number	No. of Stages	Volts Input	kW Input	[1] Btuh Input	[2] Blower Motor Full Load Amps	[3] Minimum Circuit Ampacity		[5] Maximum Overcurrent Protection		Single Point Power Source	
						Ckt 1	Ckt 2	Ckt 1	Ckt 2	[3] Minimum Circuit Ampacity	[5] Maximum Overcurrent Protection
8 kW 5 lbs. ECB48-8 **(27A61)** Terminal block	1	208	6.0	20,500	7.4	30	- - -	35	- - -	30	35
		220	6.7	22,900	7.4	31	- - -	35	- - -	31	35
		230	7.3	25,100	7.4	32	- - -	35	- - -	32	35
		240	8.0	27,300	7.4	33	- - -	35	- - -	33	35
10 kW 6 lbs. ECB48-10 **(27A62)** Terminal block	1	208	7.5	25,600	7.4	35	- - -	40	- - -	35	40
		220	8.4	28,700	7.4	37	- - -	40	- - -	37	40
		230	9.2	31,400	7.4	38	- - -	40	- - -	38	40
		240	10.0	34,100	7.4	39	- - -	40	- - -	39	40
15 kW 12 lbs. ECB48-15CB **(27A63)** 50A Circuit breaker	1	208	11.3	38,400	7.4	48	- - -	50	- - -	48	50
		220	12.6	43,000	7.4	51	- - -	[4] **60**	- - -	51	60
		230	13.5	47,000	7.4	52	- - -	[4] **60**	- - -	52	60
		240	15.0	51,200	7.4	54	- - -	[4] **60**	- - -	54	60
20 kW 19 lbs. ECB48-20CB **(27A64)** (2) 35A Circuit breaker	2	208	15.0	51,200	7.4	35	26	[4] **40**	[4] **30**	61	70
		220	16.8	57,300	7.4	37	28	[4] **40**	[4] **30**	64	70
		230	18.4	62,700	7.4	38	29	[4] **40**	[4] **30**	67	70
		240	20.0	68,200	7.4	39	30	[4] **40**	35	69	70
25 kW 19 lbs. ECB48-25CB **(27A65)** (1) 50A and (1) 40A Circuit breaker	2	208	18.8	64,100	7.4	42	33	[4] **45**	[4] **35**	74	80
		220	21.0	71,700	7.4	44	34	[4] **45**	[4] **35**	78	80
		230	23.0	78,300	7.4	45	36	50	40	81	90
		240	25.0	85,300	7.4	47	38	50	40	84	90

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

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

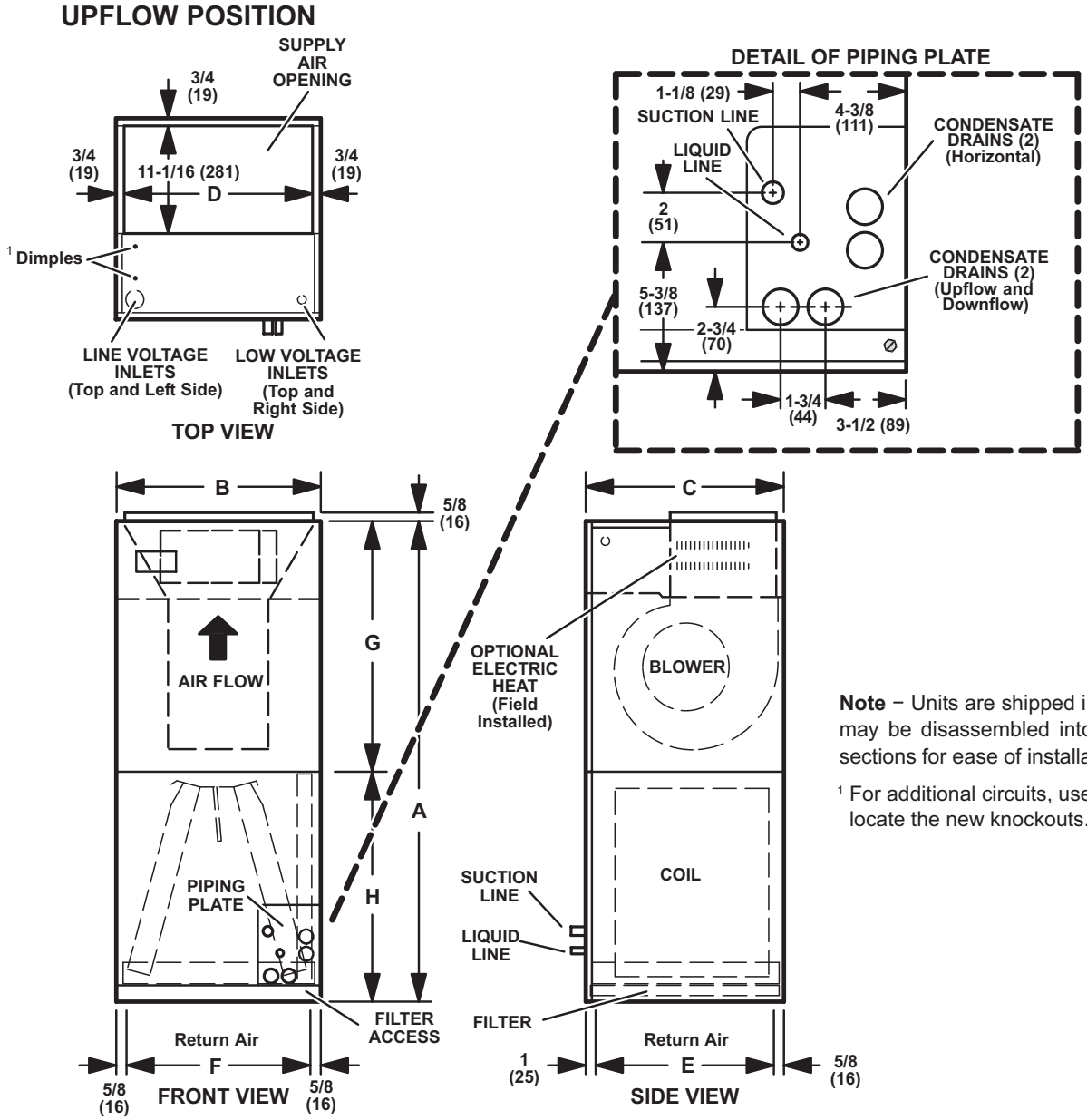
[2] 2 Amps shown are for blower motor only.

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

[4] 4 Bold text indicates that the circuit breaker on “CB” circuit breaker models must be replaced with size noted. See Replacement Circuit Breakers on page 9.

[5] 5 HACR type circuit breaker or fuse.

Dimensions – Upflow

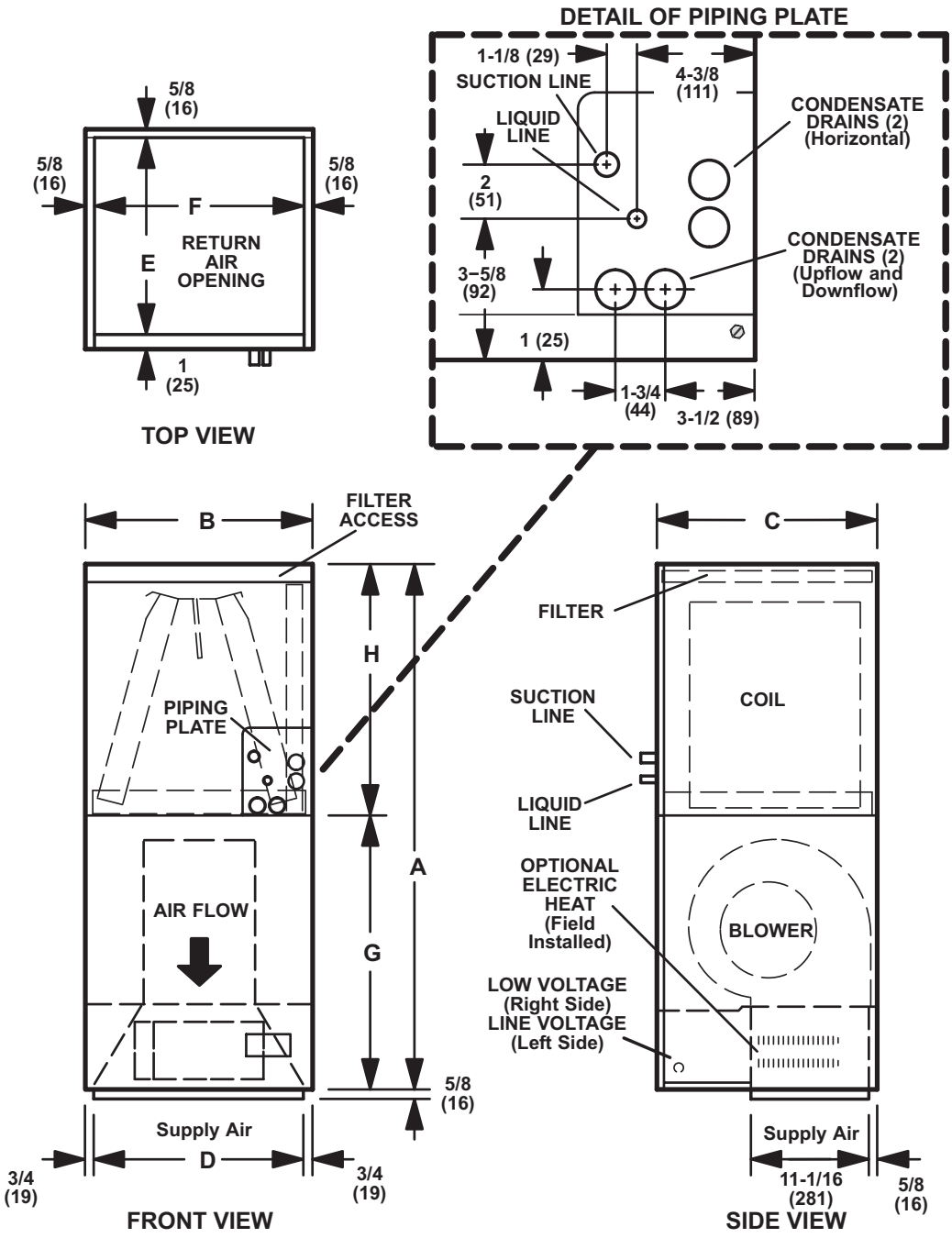


Note − Units are shipped in one piece but may be disassembled into two separate sections for ease of installation.

[1] For additional circuits, use the dimples to locate the new knockouts.

Size	A		B		C		D		E		F		G		H	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
018/024	49-1/4	1251	21-1/4	540	20-5/8	524	19-3/4	502	19	483	20	508	24-5/8	625	24-5/8	625
030 036	51	1295	21-1/4	540	22-5/8	575	19-3/4	502	21	533	20	508	26-3/8	670	24-5/8	625
042 048	58-1/2	1486	21-1/4	540	24-5/8	625	19-3/4	502	23	584	20	508	27-7/8	708	30-5/8	778
060	62-1/2	1588	21-1/4	540	24-5/8	625	19-3/4	502	23	584	20	508	27-7/8	708	34-5/8	879

Dimensions – Downflow

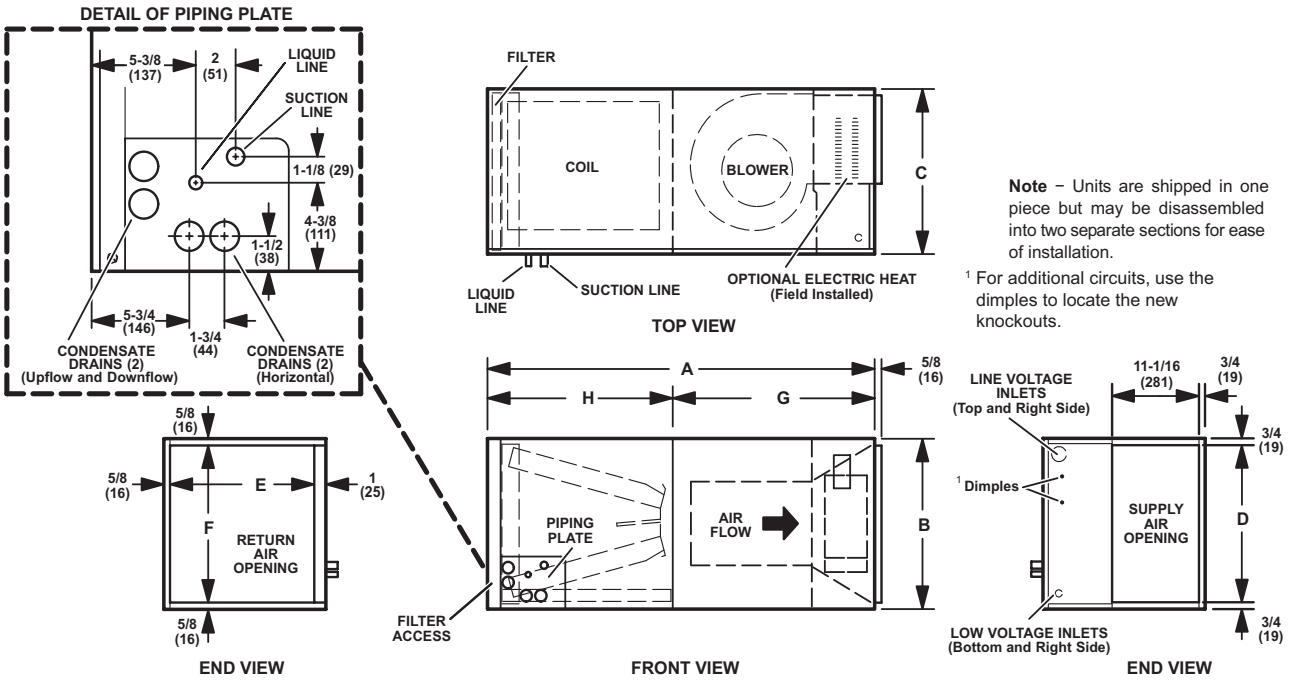


Note − Units are shipped in one piece but may be disassembled into two separate sections for ease of installation.

Size	A		B		C		D		E		F		G		H	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
018/024	49-1/4	1251	21-1/4	540	20-5/8	524	19-3/4	502	19	483	20	508	24-5/8	625	24-5/8	625
030 036	51	1295	21-1/4	540	22-5/8	575	19-3/4	502	21	533	20	508	26-3/8	670	24-5/8	625
042 048	58-1/2	1486	21-1/4	540	24-5/8	625	19-3/4	502	23	584	20	508	27-7/8	708	30-5/8	778
060	62-1/2	1588	21-1/4	540	24-5/8	625	19-3/4	502	23	584	20	508	27-7/8	708	34-5/8	879

Dimensions – Horizontal

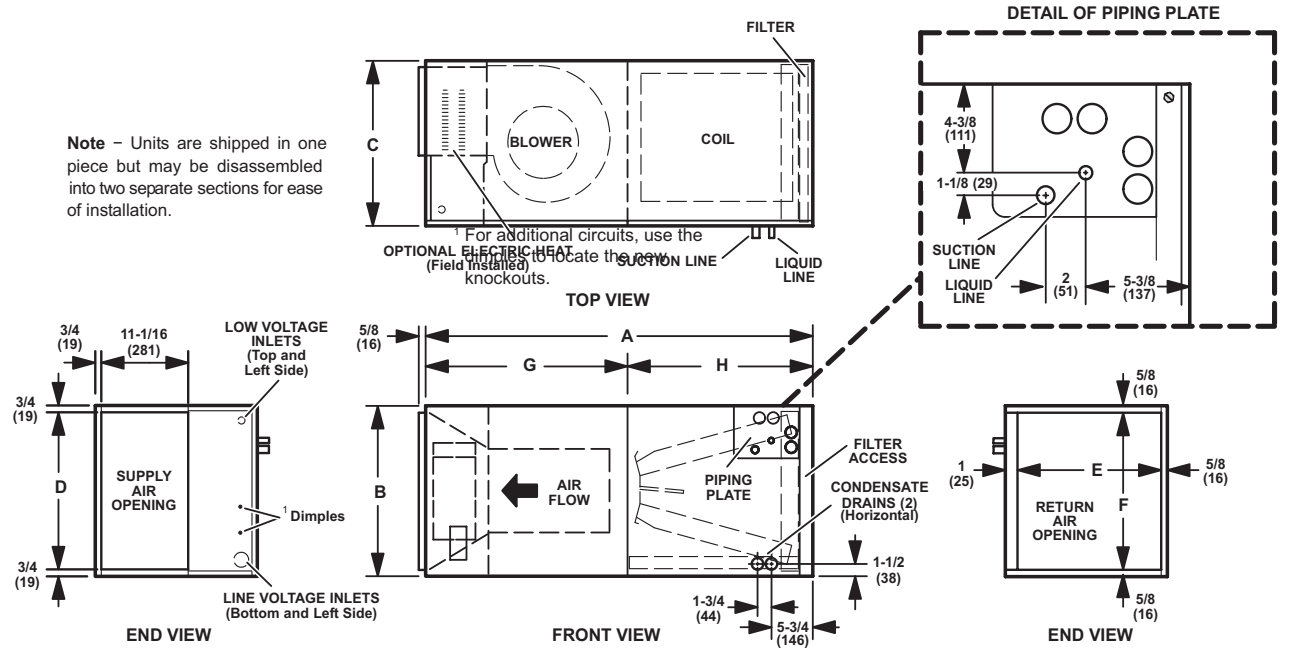
RIGHT-HAND AIR DISCHARGE



Note – Units are shipped in one piece but may be disassembled into two separate sections for ease of installation.

[1] For additional circuits, use the dimples to locate the new knockouts.

LEFT-HAND AIR DISCHARGE



Note – Units are shipped in one piece but may be disassembled into two separate sections for ease of installation.

[1] For additional circuits, use the dimples to locate the new knockouts.

Size	A		B		C		D		E		F		G		H	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
018/024	49-1/4	1251	21-1/4	540	20-5/8	524	19-3/4	502	19	483	20	508	24-5/8	625	24-5/8	625
030 036	51	1295	21-1/4	540	22-5/8	575	19-3/4	502	21	533	20	508	26-3/8	670	24-5/8	625
042 048	58-1/2	1486	21-1/4	540	24-5/8	625	19-3/4	502	23	584	20	508	27-7/8	708	30-5/8	778
060	62-1/2	1588	21-1/4	540	24-5/8	625	19-3/4	502	23	584	20	508	27-7/8	708	34-5/8	879

Installation Clearances

Cabinet	0 inch (0mm)
To Plenum	1 inch (25mm)
To Outlet Duct within 3 ft. (914mm)	1 inch (25mm)
Floor	See Note #1
Service / Maintenance	See Note #2

1 Units installed on combustible floors in the down-flow position with electric heat require optional down-flow additive base.

2 Front Service Access - 24 inches (610mm) minimum.

NOTE - If cabinet depth is more than 24 inches (610 mm), allow a minimum of the cabinet depth plus 2 inches (51 mm).

⚠ WARNING

During blower operation, the ECM motor emits energy that may interfere with pacemaker operation. Interference is reduced by both the sheet metal cabinet and distance.

⚠ WARNING

Improper installation of the air handler can result in personal injury or death.

Do not allow external combustion products or other contaminants to enter the return air system or to be mixed with air that will be supplied to the living space. Use sheet metal screws and joint tape or duct mastic to seal return air system to air handler. In platform installations, the air handler should be sealed airtight to the return air plenum. A door must never be used as a portion of the return air duct system. The base must provide a stable support and an airtight seal to the air handler. Allow absolutely no sagging, cracks, gaps. etc.

For no reason should return and supply air duct systems ever be connected to or from other heating devices such as a fireplace or stove. etc. Fire, explosion, carbon monoxide poisoning, personal injury and/or property damage could result.

Requirements

In addition to conforming to manufacturer's installation instructions and local municipal building codes, installation of Lennox air handler units (with or without optional electric heat), MUST conform with the following National Fire Protection Association (NFPA) standards:

- NFPA No. 90A – Standard for Installation of Air Conditioning and Ventilation Systems
- NFPA No. 90B — Standard for Installation of Residence Type Warm Air Heating and Air Conditioning Systems

This unit is approved for installation clearance to combustible material as stated on the unit rating plate. Accessibility and service clearances must take precedence over combustible material clearances.

Installation Requirements

CBK48MVT units are factory-configured for upflow and horizontal right-hand discharge installation. For downflow or horizontal left-hand discharge, certain field modifications are required.

DISASSEMBLE AND REASSEMBLE AIR HANDLER UNIT

This unit consists of two sections which are shipped assembled from the factory. If necessary, the unit may be disassembled to facilitate setting the unit. Follow the steps below:

To disassemble:

1 - Remove access panels.

2 - Remove both blower and coil assemblies. This will lighten the cabinet for lifting.

3 - Remove one screw from the left and right posts inside the unit. Remove one screw from each side on the back of the unit. Unit sections will now separate.

To reassemble:

1 - Align cabinet sections together.

2 - Reinstall screws.

3 - Replace blower and coil assemblies.

4 - Replace access panel.

UPFLOW APPLICATION

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

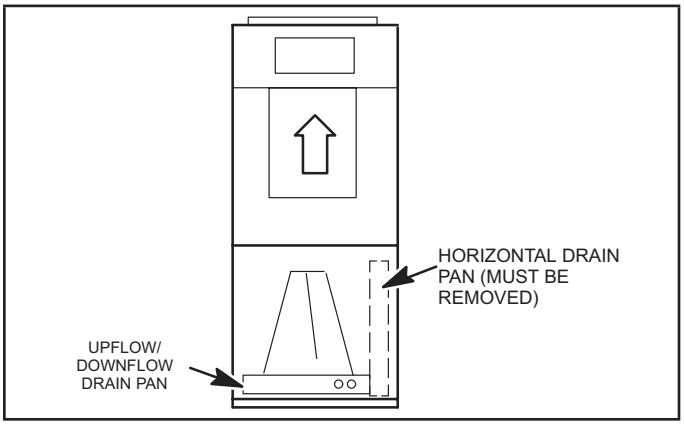


FIGURE 1. Upflow Configuration

1 - The horizontal drain pan must be removed when the coil blower is installed in the upflow position. Removing horizontal drain pain will allow proper airflow and increase efficiency.

2 - After removing horizontal drain pan, place the unit in desired location. Set unit so that it is level. Connect return and supply air plenums as required using sheet metal screws as illustrated in Figure 1.

3 - Install units that have no return air plenum on a stand that is at least 14" from the floor to allow for proper air return. Lennox offers an optional upflow unit stand as listed in Table 1.

TABLE 1. Optional Unit Side Stand (Upflow Only)

Models	Kit Numbers
-018, -024	45K31
-030, -036, -048, -060	45K32

HORIZONTAL RIGHT-HAND DISCHARGE APPLICATION

***NOTE** - When air handler is located above a finished space, the secondary drain pan must have a larger footprint than the air handler. In addition, a 3/4" (19.1MM) overflow drain line must be:*

- *Connected to secondary drain pan*

or

- *Connected to the overflow drain outlet of the air handler drain pan.*

Use the following procedures to configure the unit for horizontal right-hand discharge operations:

***NOTE** - For horizontal applications, a secondary drain pan is recommended. Refer to local codes.*

4 - No further adjustment is necessary. Set unit so that it is sloped 1/4 inch (6.35mm) towards the drain pan end of the unit.

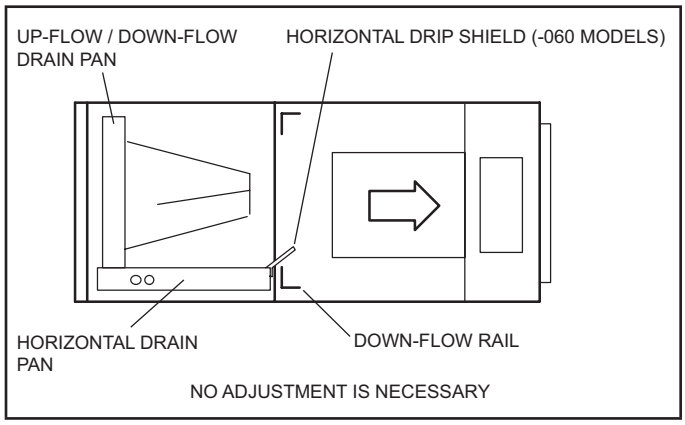


FIGURE 2. Right-Hand Discharge Configuration

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 (12.7mm) to avoid damaging the coil or filter as illustrated in Figure 3. Use sheet metal screws to connect the return and supply air plenums as required.

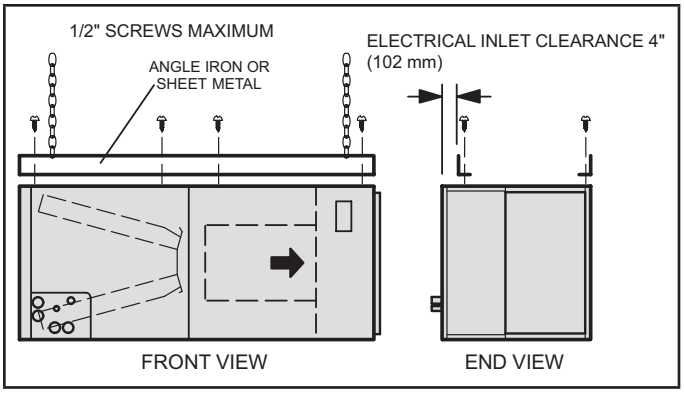


FIGURE 3. Suspending Horizontal Unit

HORIZONTAL RIGHT-HAND DISCHARGE APPLICATION IN HIGH HUMIDITY AREAS

For horizontal applications in high humidity areas remove the downflow rail closest to the drain pan.

To remove rail:

1 - Remove the screws from the rail at the back of unit and at the cabinet support rail.

2 - Remove the downflow rail then replace screws.

3 - Seal around the exiting drain pipe, liquid line, and suction line to prevent humid air from infiltrating into the unit.

***NOTE –** For horizontal applications, a secondary drain pan is recommended. Refer to local codes.*

***NOTE –** When air handler is located above a finished space, the secondary drain pan must have a larger footprint than the air handler. In addition, a 3/4" (19.1MM) overflow drain line must be:*

- *Connected to secondary drain pan*

or

- *Connected to the overflow drain outlet of the air handler drain pan.*

***NOTE - (-060 Model Only)** Before operating the unit, remove access panels and the horizontal drip shield and the corrugated padding between the blower and coil assembly. Discard the corrugated padding and the downflow drip shields.*

***NOTE - (-060 Model Only)** Install the horizontal shield on the front edge of the horizontal drain pan as illustrated in figure 2.*

⚠ 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.

HORIZONTAL LEFT-HAND DISCHARGE APPLICATION

Use the following procedures to configure the unit for horizontal left-hand discharge operations:

NOTE – *For horizontal applications, a secondary drain pan is recommended. Refer to local codes.*

NOTE - (-060 Model Only) *Before operating the unit, remove access panels and the horizontal drip shield and the corrugated padding between the blower and coil assembly. Discard the corrugated padding and the downflow drip shields. (The shields are used for downflow applications only.)*

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

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

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

4 - Remove screws from top cap. Remove horizontal drip shield screw located in the center of the back coil end seal as illustrated in figure 4.

5 - Rotate horizontal drip shield 180º front-to-back.

6 - Remove plastic plug from left hole on coil front end seal and reinstall plug in back hole. Reinstall horizontal drip shield screw in front coil end seal. Drip shield should drain downward into horizontal drain pan inside coil.

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 4.

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

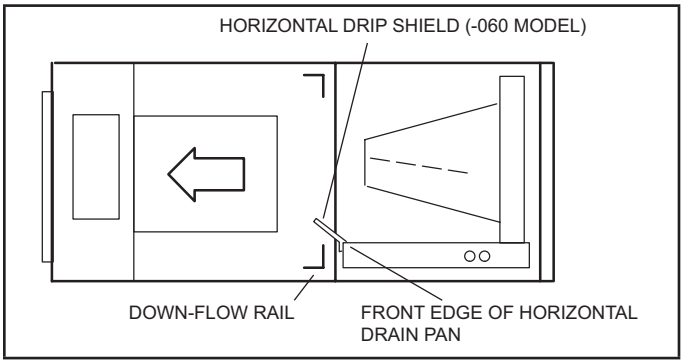


FIGURE 4. Left-Hand Discharge Configuration

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 in figures 4 and 5.

9 - Install the horizontal shield (-060 model) on the front edge of the horizontal drain pan as illustrated in figures 4 and 5.

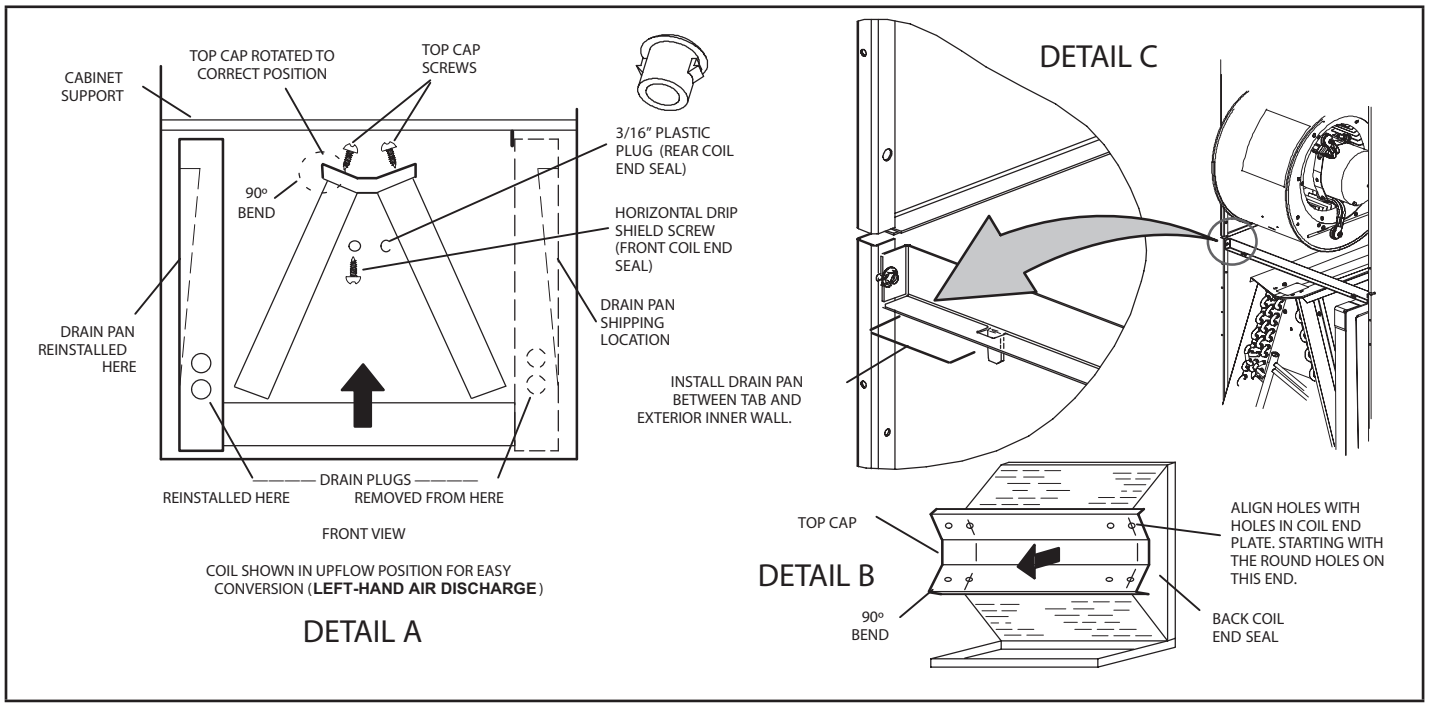


FIGURE 5. Field Modification for Left-Hand Discharge

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 3. Connect return and supply air plenums as required using sheet metal screws.

DOWNFLOW APPLICATION

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

⚠ IMPORTANT

If electric heat section with circuit breakers (ECB29/ECB31) is installed in a CBK48MVT unit in a downflow application, the circuit breakers must be rotated 180° to the UP position. See ECB29/ECB31 installation instructions for more details.

Table 2 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 6.

3 - Rotate cabinet 180º from the upright position. See figure 6. 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 7 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 8.

TABLE 2. 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"
-048, -060	19-7/8"	4-11/16"

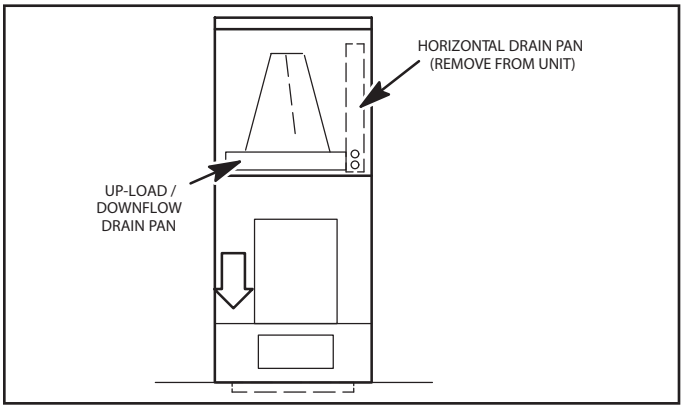


FIGURE 6. Downflow Discharge Position

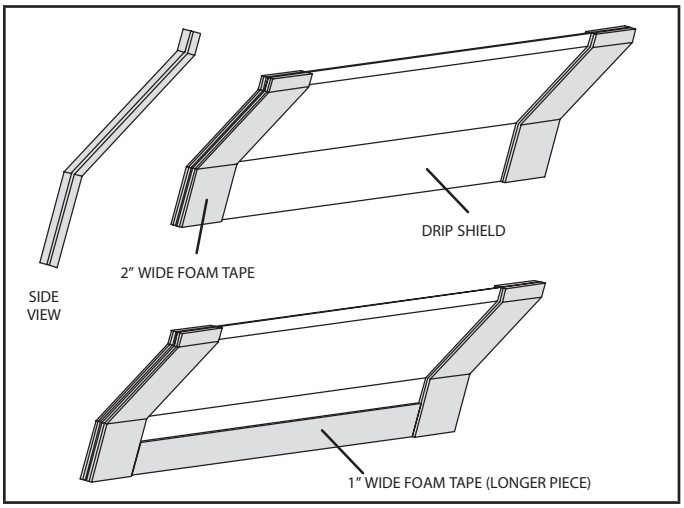


FIGURE 7. Applying Foam Tape to Drip Shield

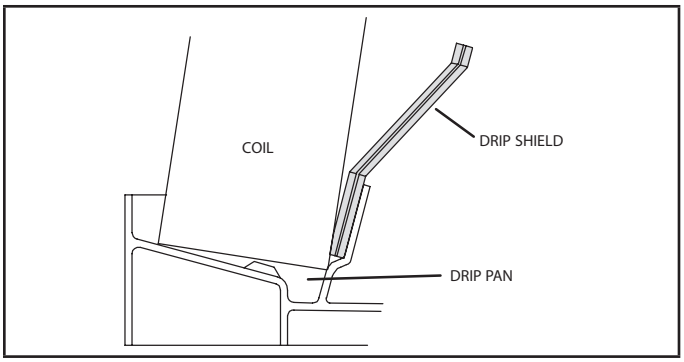


FIGURE 8. Downflow Drip Shields

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.*

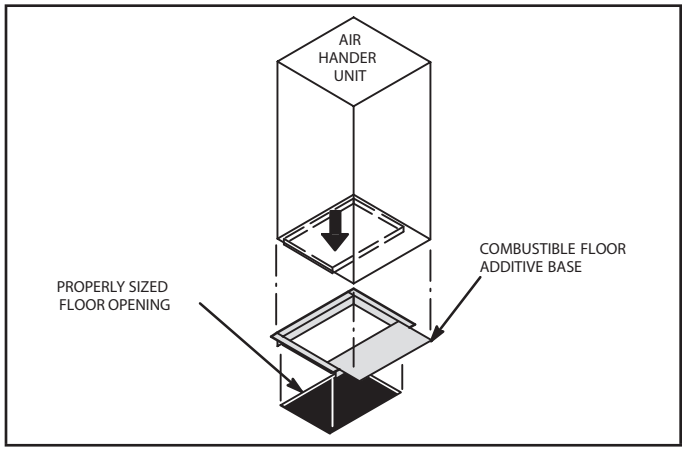


FIGURE 9. Downflow Combustible Flooring Base

8 - For downflow installation on combustible flooring, an additive base must be used as illustrated in figure 9. See CBK48MVT 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 10. After opening has been cut, set the additive base into opening. Connect outlet air plenum to the additive base. Set the unit on the additive base so flanges of the unit drop into the base opening and seal against the insulation strips. The unit is now locked in place. Install return air plenum and secure with sheet metal screws.

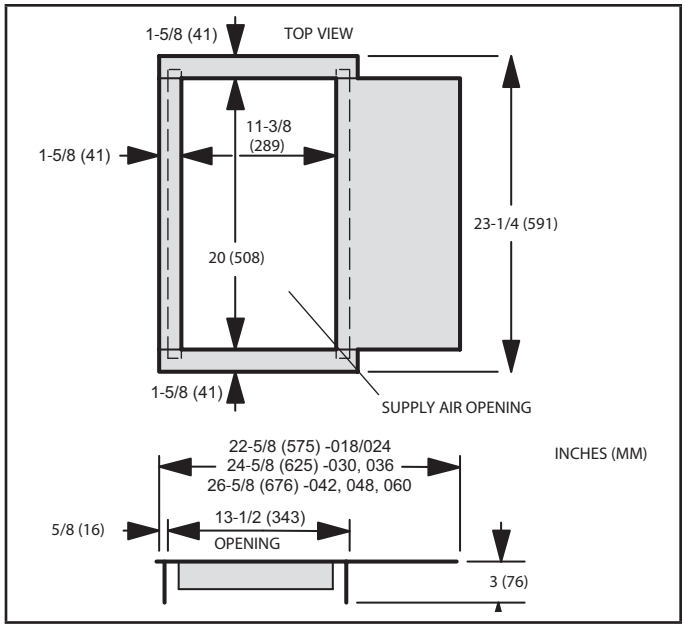


FIGURE 10. Downflow Combustible Base Dimensions

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

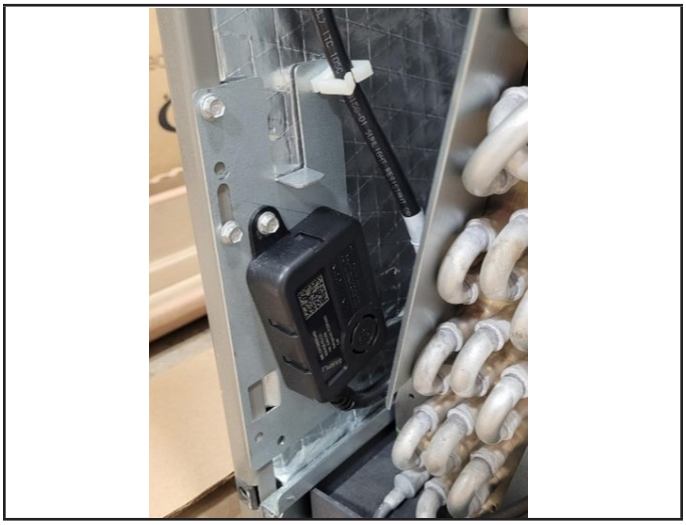


FIGURE 11

2 - Follow instructions for right-hand discharge as outlined in previous section.

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

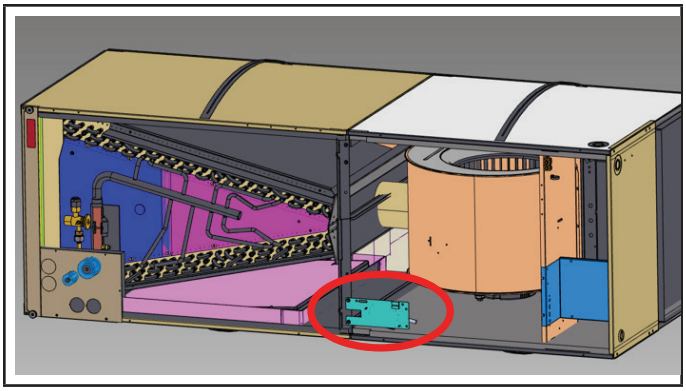


FIGURE 12

4 - Loop any excess wire through the plastic “M” wire clips 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. 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 13.

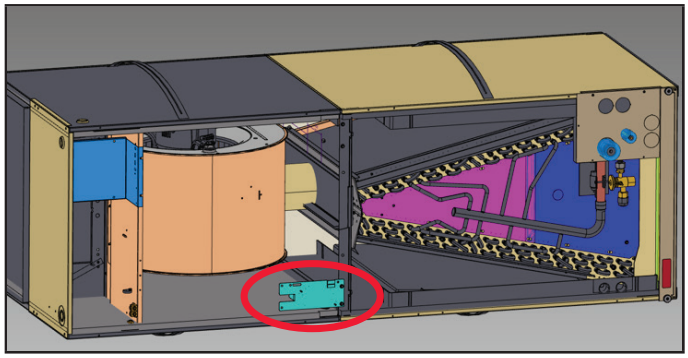


FIGURE 13

4 - Loop any excess wire through the plastic “M” wire clips 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 14.

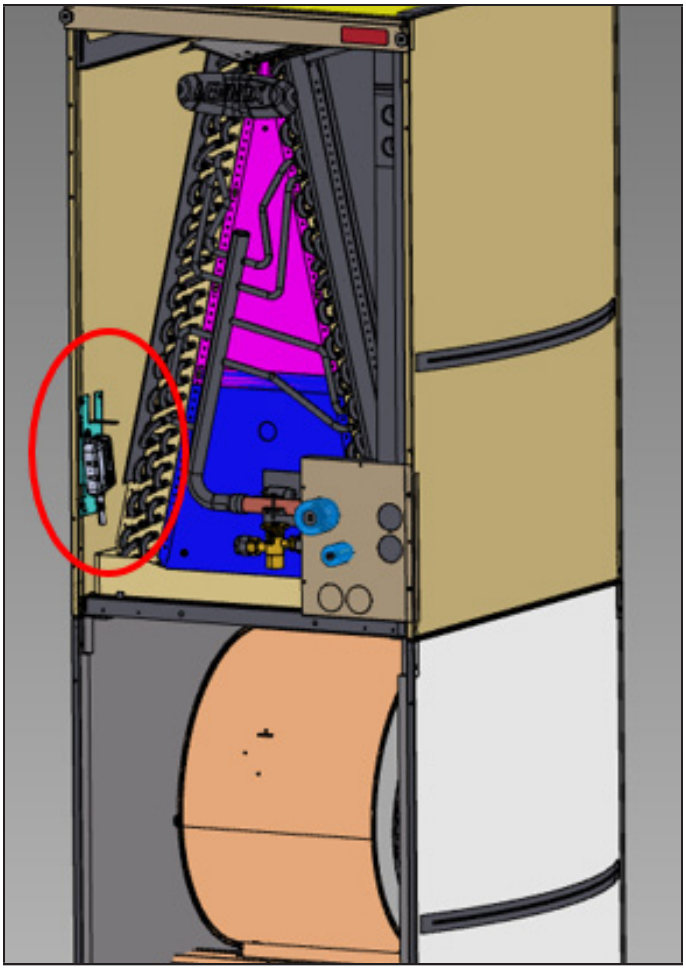


FIGURE 14

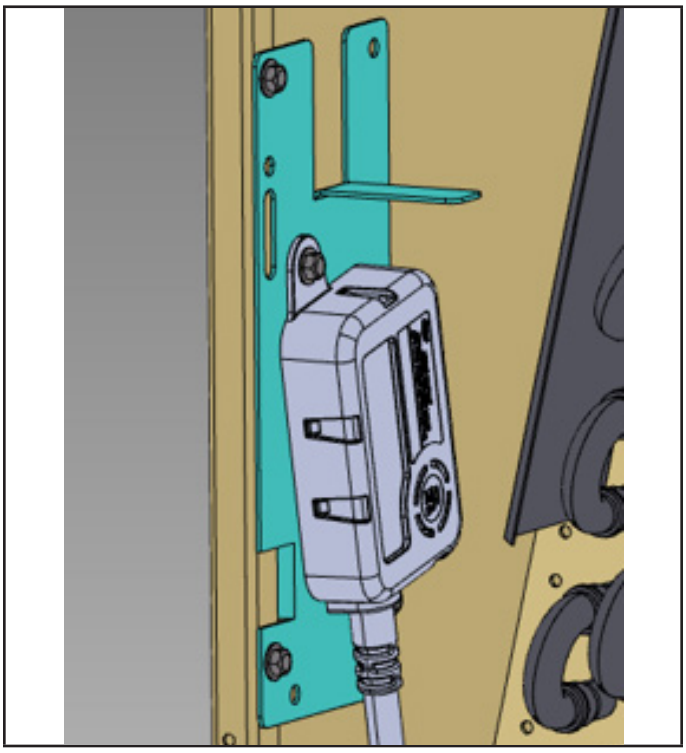


FIGURE 14 (Detail)

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

Brazing Connections

⚠ IMPORTANT

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

⚠ WARNING

Polyol ester (POE) and polyvinyl ester (PVE) oils used with R454B refrigerant 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.

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

⚠ 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 3. CBK48MVT Refrigerant Connections and Line Set Requirements

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

***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.*

Installing the Unit

⚠ WARNING

To prevent serious injury or death:

1. Lock-out/tag-out before performing maintenance.
2. If system power is required (e.g., smoke detector maintenance), disable power to blower, remove fan belt where applicable, and ensure all controllers and thermostats are set to the “OFF” position before performing maintenance.
3. Always keep hands, hair, clothing, jewelry, tools, etc. away from moving parts.

These units are factory-configured for upflow and horizontal right-hand discharge installation. For downflow or horizontal left-hand discharge, certain field modifications are required.

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.
- 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*.

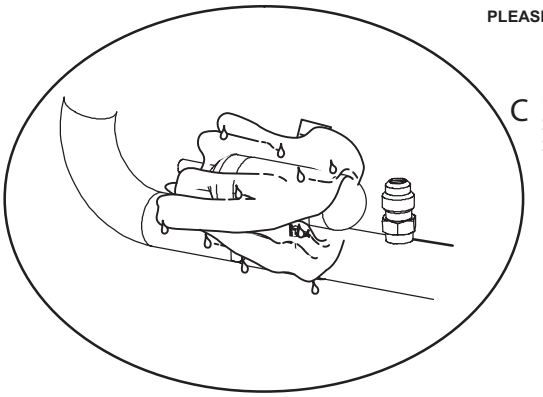
NOTE *– Intrinsically safe components must be replaced, not repaired.*

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.*

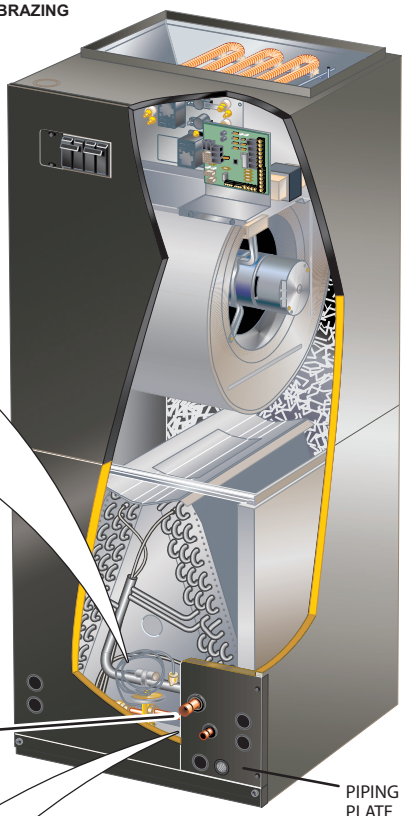
- Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. The following leak detection methods are deemed acceptable for all refrigerant systems. Electronic 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.

PLEASE READ IMPORTANT ISSUES CONCERNING BRAZING

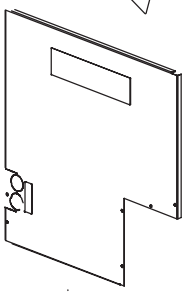


C USE A WET RAG TO PROTECT CTXV SENSING BULB WHEN BRAZING SUCTION LINE CONNECTIONS.



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.



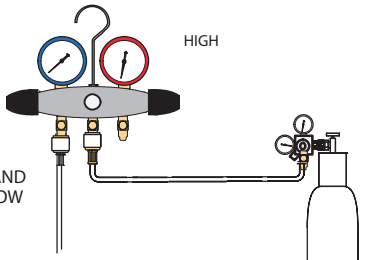
A REMOVE ACCESS PANEL

B REMOVE RUBBER PLUG FROM BOTH LIQUID AND SUCTION LINES

NOTE — CBK48MVT 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.

PIPING PLATE

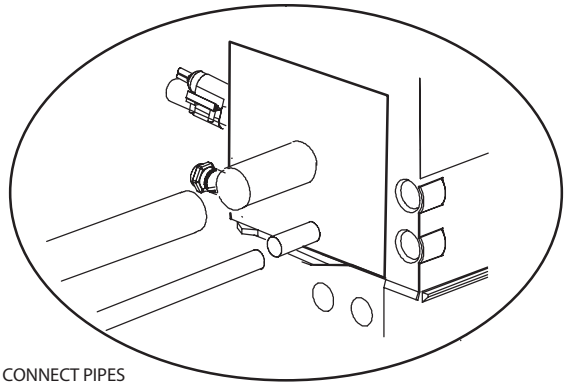
D EITHER REMOVE OR PUSH PIPE WRAPPING BACK THROUGH HOLE IN PIPING PLATE BEFORE LINE SET CONNECTION AND BRAZING.



F CONNECT GAUGES AND START NITROGEN FLOW

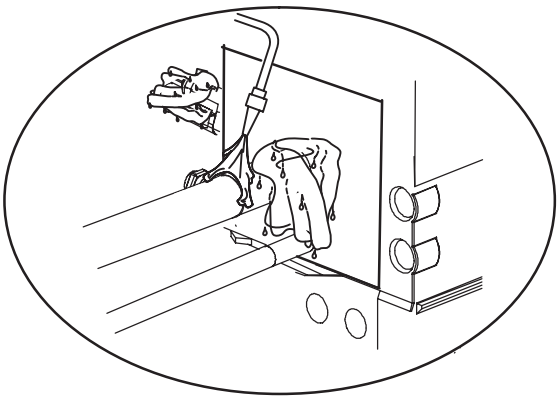
FLOW REGULATED NITROGEN (AT 1 TO 2 PSIG) THROUGH THE REFRIGERATION GAUGE SET INTO THE VALVE STEM POR T CONNECTION ON THE OUTDOOR UNIT LIQUID LINE SER VICE VALVE AND OUT OF THE VALVE STEM PORT CONNECTION ON THE SUCTION SERVICE VALVE.

NITROGEN



E CONNECT PIPES

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



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

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

I REPEAT PREVIOUS PROCEDURE FOR LIQUID LINE.

REFER TO INSTRUCTIONS PROVIDED WITH OUTDOOR UNIT FOR LEAK TESTING, EV ACUATING AND CHARGING PROCEDURES

REFRIGERANT SYSTEM INSTALLATIONS SHALL BE INSTALLED AND TESTED PER ASHRAE STANDARD 15.2, SECTION 10.0

FIGURE 15. Brazing Connections

Installing the Condensate Drain

⚠ 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.

MAIN DRAIN

Connect the main drain and route downward to drain line or sump. Do not connect drain to a closed waste system. See Figure 17 for typical drain trap configuration.

OVERFLOW DRAIN

It is recommended that the overflow drain is connected to an overflow drain line for all units. If overflow drain is not connected, it must be plugged with provided cap.

For downflow orientation, the overflow drain **MUST** be connected and routed to a overflow drain line. See Figure 16 for main and overflow drain locations based on coil orientation.

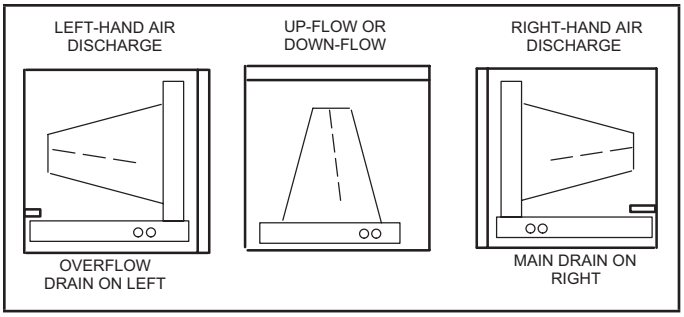


FIGURE 16. Main and Overflow Drain Locations Based on Coil Orientation

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.

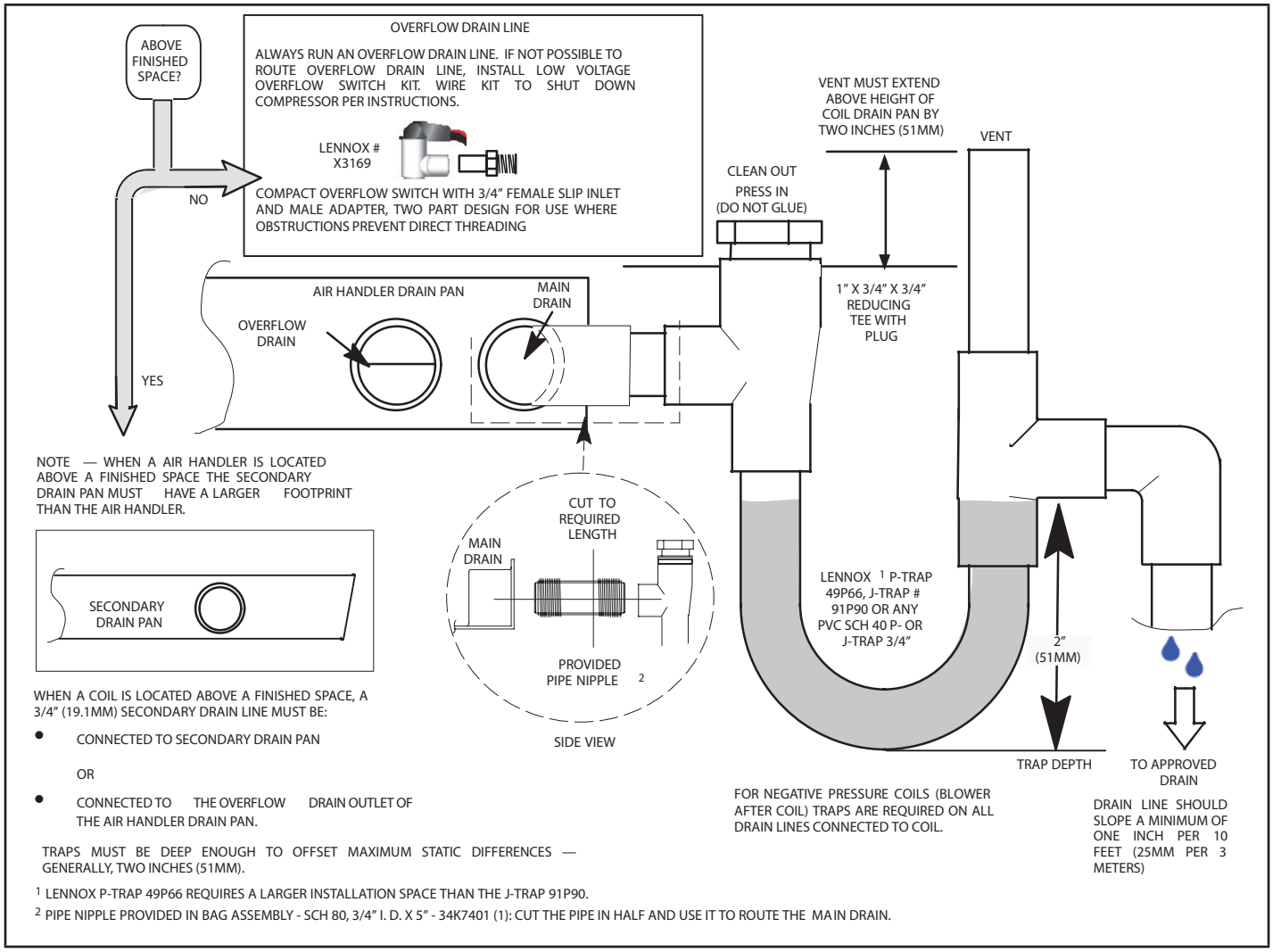


FIGURE 17. Typical Main and Overflow Drain Installations

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 4 for replacement filter sizes.

TABLE 4. Filter Dimensions

CBK48MVT	Filter Size – In. (mm)
-018/024, -030, -036	20 x 20 x 1 (508 x 508 x 25)
-042, -048, -060	20 x 24 x 1 (508 x 610 x 25)

Sealing the Unit

⚠ 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.

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.

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.

Field Control Wiring

⚠ 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.

Wiring must conform to the current National Electric Code ANSI/NFPA No. 70, or Canadian Electric Code Part I, CSA Standard C22.1, and local building codes. Refer to following wiring diagrams. See unit nameplate for minimum circuit ampacity and maximum over-current protection size.

⚠ WARNING

Run 24V Class II wiring only through specified low voltage opening. Run line voltage wiring only through specified high voltage opening. Do not combine voltage in one opening

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.

Separate openings have been provided for 24V low voltage and line voltage. Refer to the dimension illustration of specific location.

⚠ CAUTION

USE COPPER CONDUCTORS ONLY.

WIRING CONNECTIONS

1 - Install line voltage power supply to unit from a properly installed circuit breaker.

2 - Ground unit at unit disconnect switch or to an earth ground.

NOTE – *Connect conduit to the unit using a proper conduit fitting. Units are approved for use only with copper conductors. A complete unit wiring diagram is located on the back side of the unit's access panel.*

3 - Install low voltage wiring from outdoor to indoor unit and from thermostat to indoor unit.

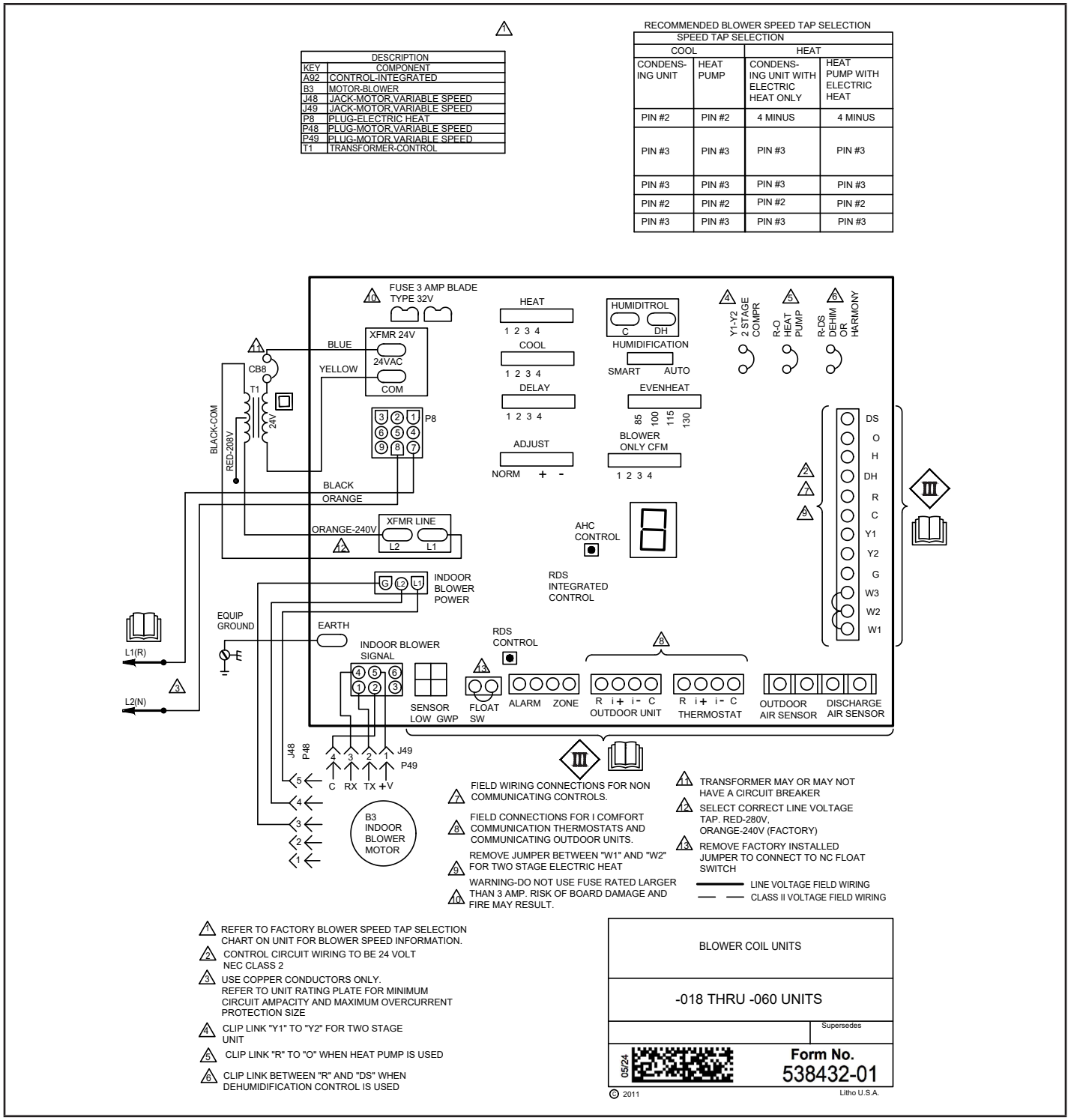


FIGURE 18. CBK48MVT Air Handler Unit Typical Wiring Diagram

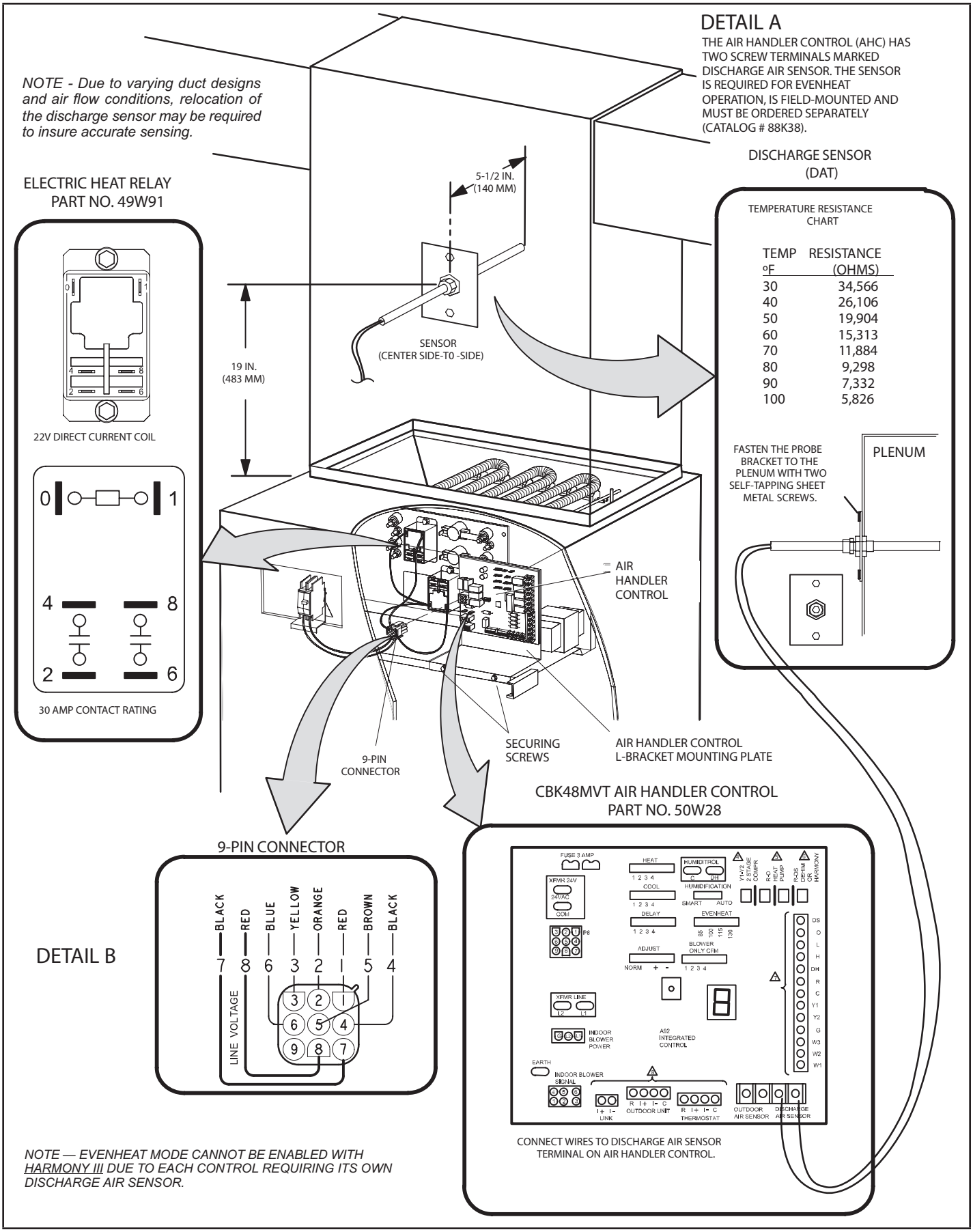


FIGURE 19. Component Connections

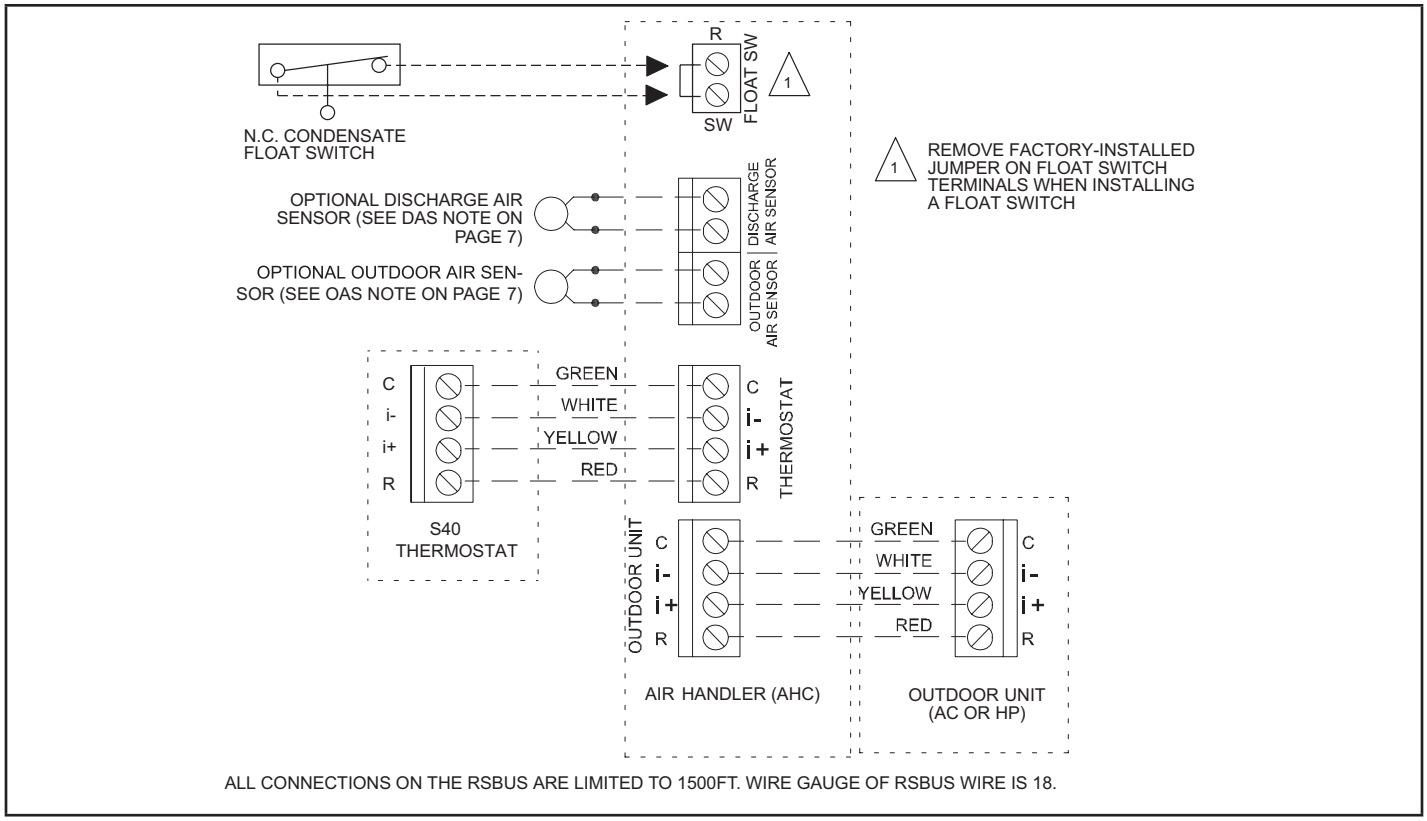


FIGURE 20. Communicating System Wiring

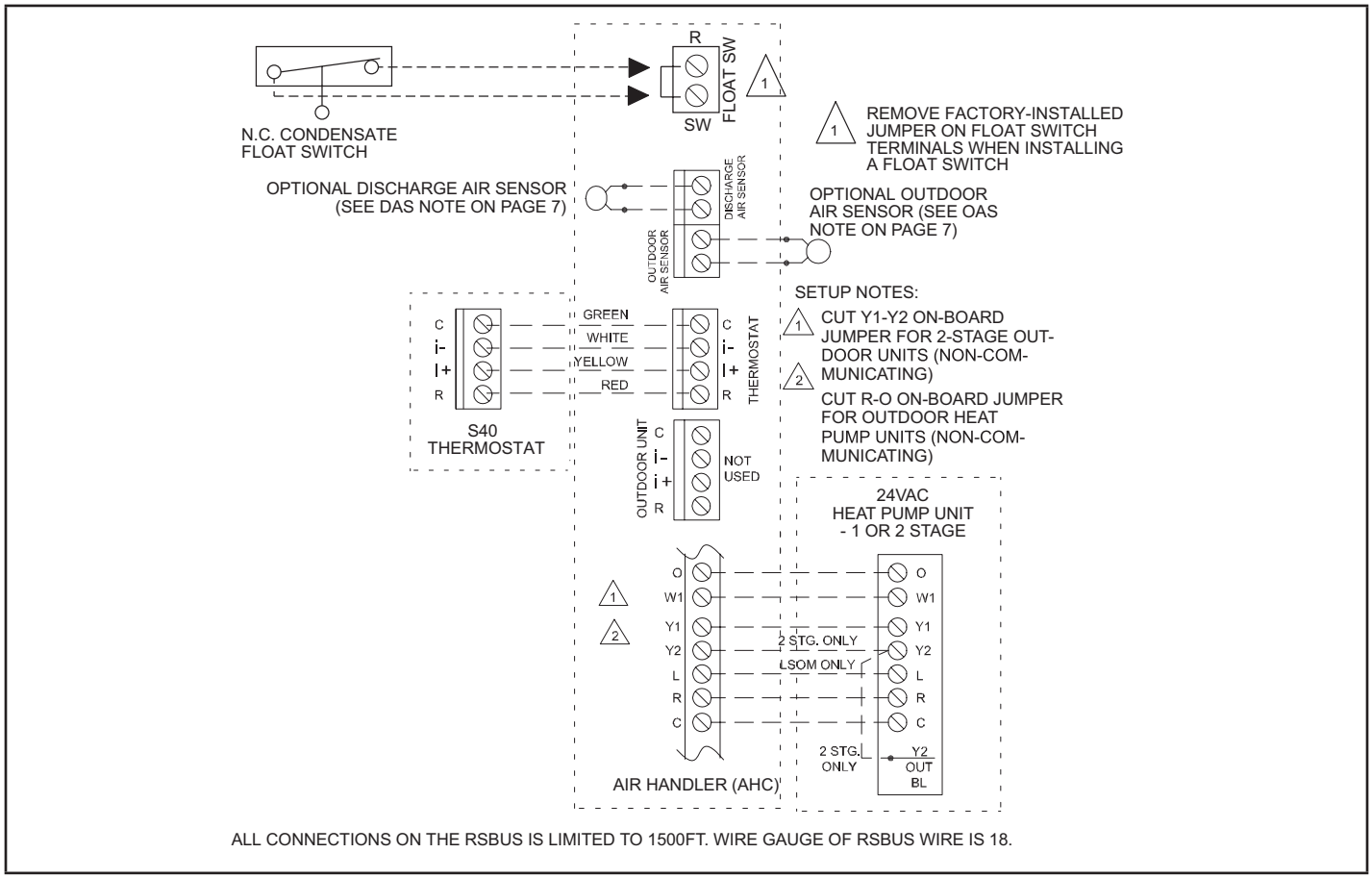
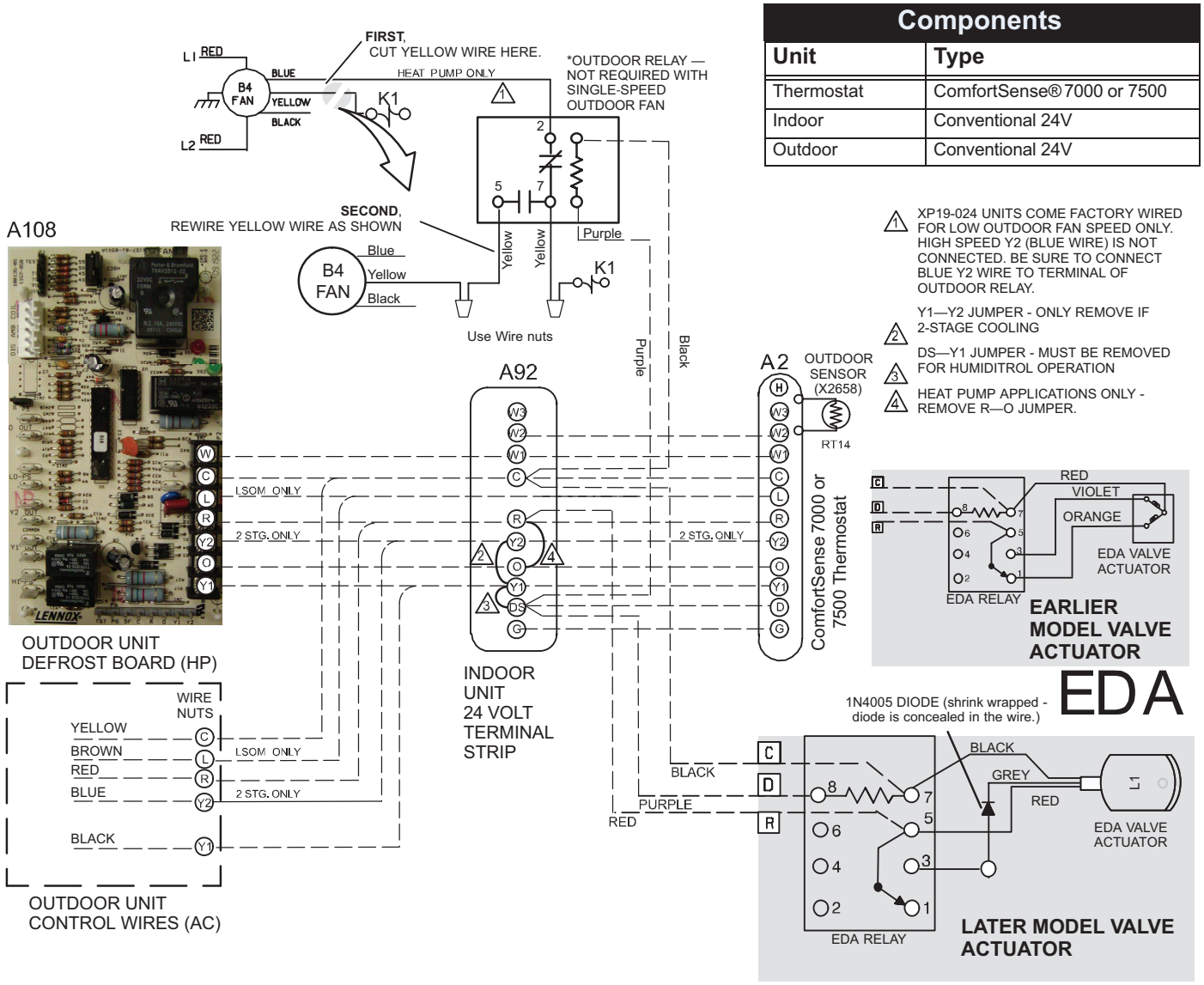


FIGURE 21. Communicating Indoor / Non-Communicating Outdoor (HP) System Wiring

⚠ CAUTION

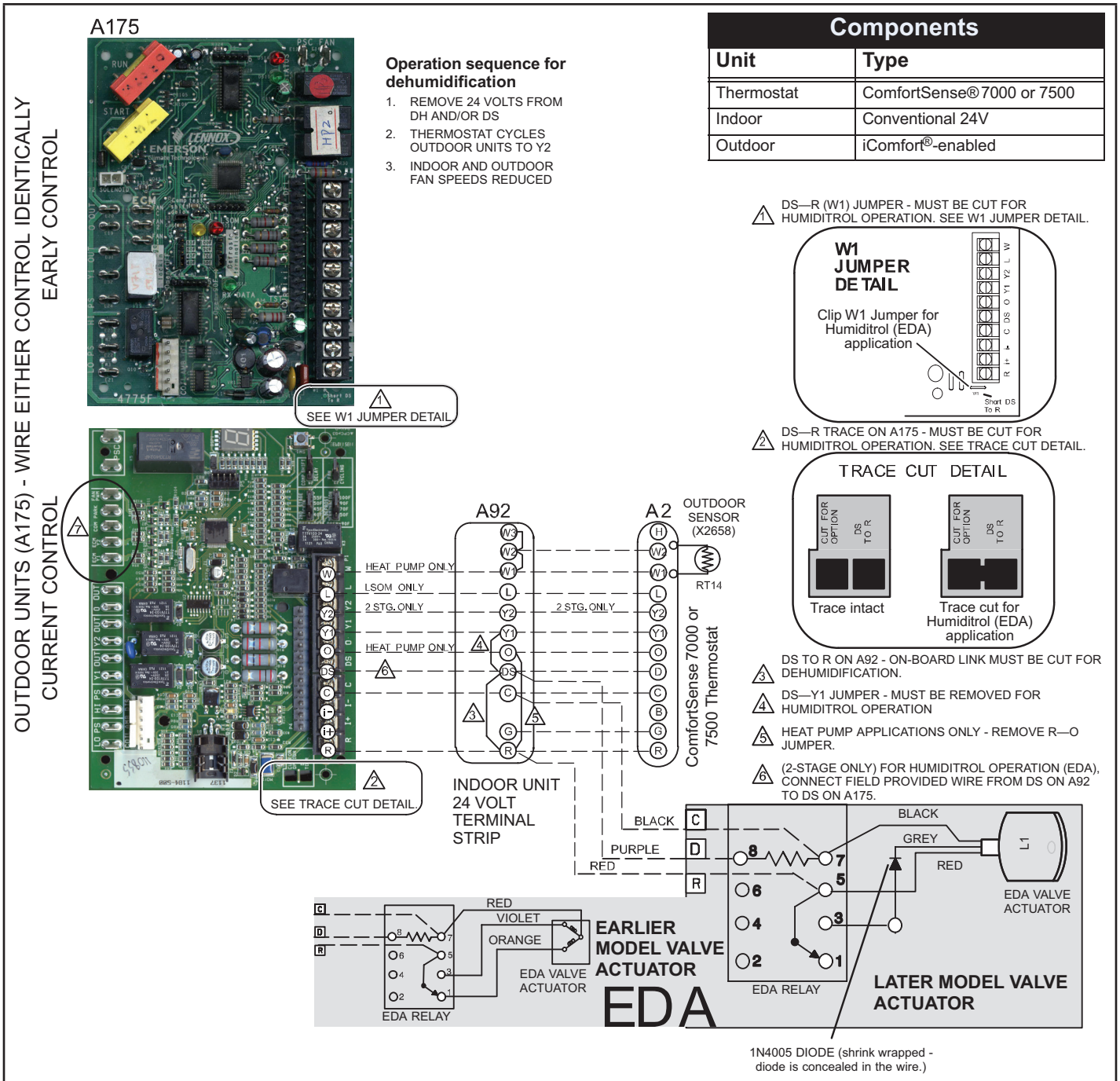
ELECTROSTATIC DISCHARGE (ESD) Precautions and Procedures	Electrostatic discharge can affect electronic components. Take care during unit installation and service to protect the unit's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the unit,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

Components	
Unit	**Type**
Thermostat	ComfortSense® 7000 or 7500
Indoor	Conventional 24V
Outdoor	Conventional 24V



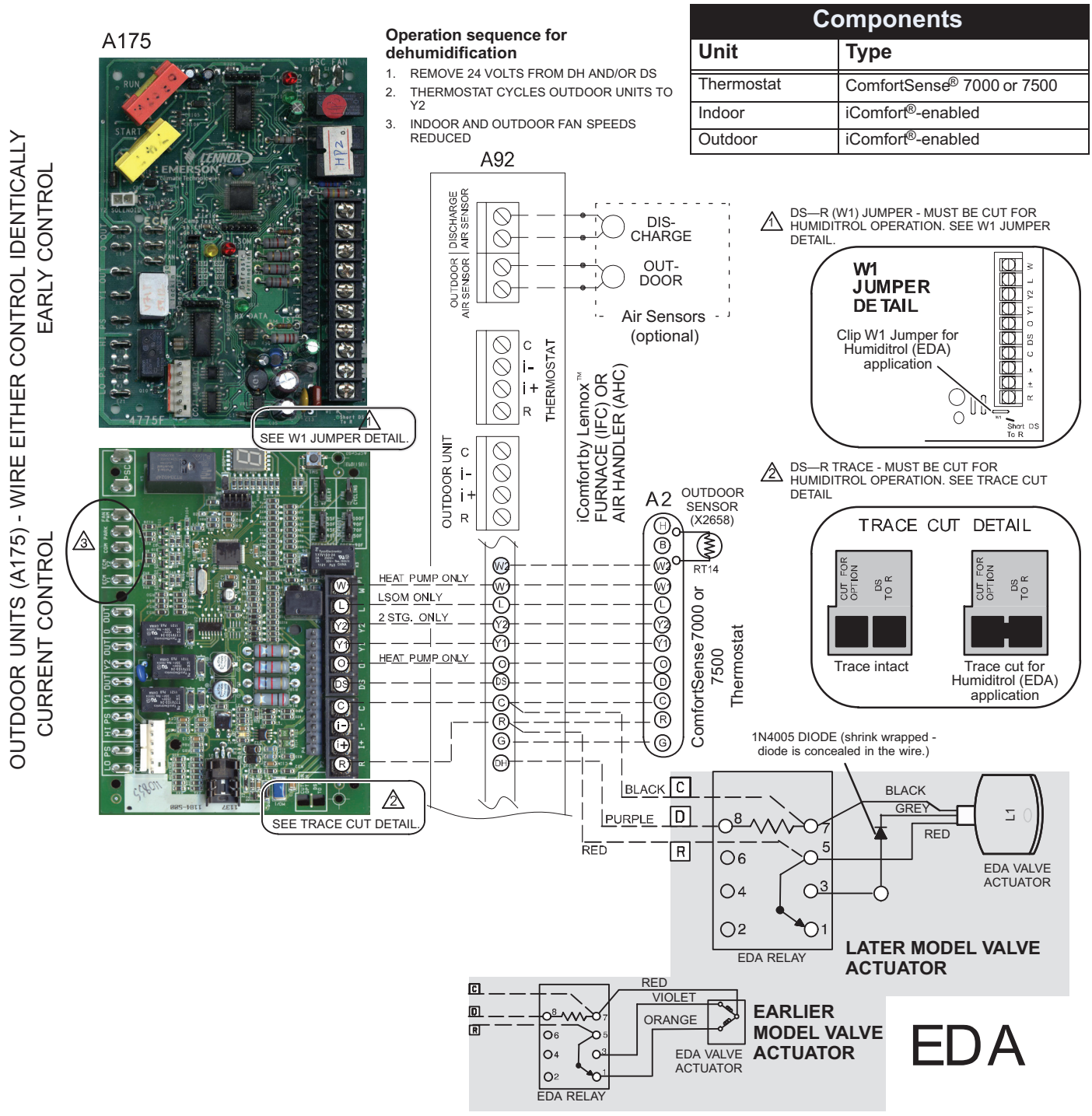
NUMBER OF WIRES REQUIRED—Indoor unit to:				Thermostat to:
System type	**Humiditrol® EDA**	**Comfort Sense 7000 or 7500 Thermostats**	**Outdoor Unit**	**Outdoor Air Sensor**
1 stage AC	3	7*	3	2
2 stage AC		8*	4	
1 stage HP		8*	5	
2 stage HP		9*	6	
*Includes conductor for 2-stage heat				

FIGURE 22. Field Wiring (Non-Communicating Systems)



NUMBER OF WIRES REQUIRED—Indoor unit to:				Thermostat to:
System Type	Humiditrol® EDA	ComfortSense® 7000 or 7500 Thermostats	Outdoor Unit	Outdoor Air Sensor
1-stage AC	3	7	4	2
2-stage AC		8	5	
1-stage HP		9	6	
2-stage HP		10	7)	

FIGURE 23. 24V Field Wiring (Non-Communicating Systems)



NUMBER OF WIRES REQUIRED—Indoor unit to:				Air Sensors (Optional)	
System Type	Humiditrol® EDA	ComfortSense® 7000 or 7500 Thermostats	Outdoor unit	Outdoor	Discharge
1-stage AC	3	8	4	2	2
2-stage AC		10	5		
1-stage HP		8	6		
2-stage HP		10	7		

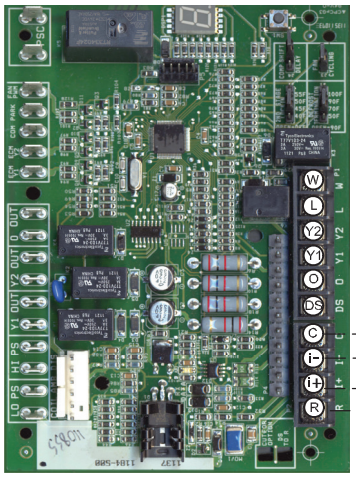
FIGURE 24. Field Wiring (Non-Communicating Systems)

OUTDOOR UNITS (A175) - WIRE EITHER CONTROL IDENTICALLY

EARLY CONTROL

CURRENT CONTROL

A175



Components	
Unit	**Type**
Thermostat	iComfort®
Indoor	iComfort®-enabled
Outdoor	iComfort®-enabled

Operation sequence for dehumidification

1. REMOVE 24 VOLTS FROM DH AND/OR DS
2. THERMOSTAT CYCLES OUTDOOR UNITS TO Y2
3. INDOOR AND OUTDOOR FAN SPEEDS REDUCED

MAXIMUM TOTAL LENGTH OF ALL CONNECTIONS ON THE RSBUS IS LIMITED TO 1500FT.
WIRE GAUGE OF RSBUS WIRE IS 18.

iComfort by Lennox™
FURNACE (IFC) OR
AIR HANDLER (AHC)

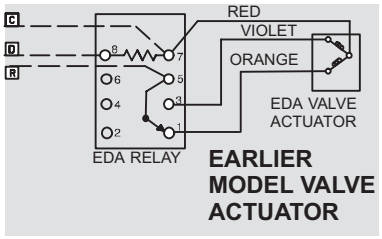
A92

Air Sensors (optional)
DIS-CHARGE
OUT-DOOR

THERMOSTAT
GREEN
WHITE
YELLOW
RED

iComfort® THERMOSTAT (or S30 Smart Hub)

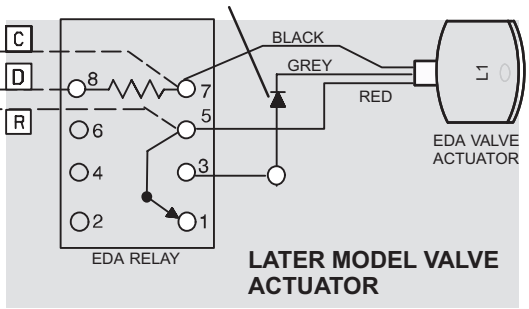
OUTDOOR UNIT



EARLIER MODEL VALVE ACTUATOR

EDA

1N4005 DIODE (shrink wrapped - diode is concealed in the wire.)



LATER MODEL VALVE ACTUATOR

⚠1 IN COMMUNICATING SYSTEM, THERMOSTAT DS INPUT IS NOT USED AND DEHUMIDIFICATION IS CONTROLLED VIA DEHUMIDIFICATION RELAY THAT CONTROLS 24VAC OUTPUT ON DH TERMINAL.

NUMBER OF WIRES REQUIRED—Indoor unit to:				Air Sensors (Optional)	
System Type	**Humiditrol® EDA**	**iComfort® Thermostat**	**Outdoor unit**	**Discharge**	**Outdoor**
1-stage AC	3	4	4	2	2
2-stage AC					
1-stage HP					
2-stage HP					

FIGURE 25. Field Wiring (Communicating Systems)

SENSOR CONNECTIONS AND WIRING REQUIREMENTS

The following are sensor connections and wiring requirements for the discharge air and outdoor air sensors.

Discharge Sensor (DAT)

The Air Handler Control has two screw terminals marked **Discharge Air Sensor**. The sensor is REQUIRED for EVENHEAT operation and is field mounted and ordered separately using Lennox Catalog # 88K38.

In the EVENHEAT mode, the discharge air sensor cycles the electric heating elements as needed to maintain the Air Handler control EVENHEAT jumper selected discharge setpoint.

The discharge air sensor should be mounted downstream of the electric heat elements as illustrated in figure 15, detail A. It must be placed in a location with unobstructed airflow, where other accessories (such as humidifiers, UV lights, etc.) will not interfere with its accuracy.

Wiring distance between the Control and the discharge air sensor should not exceed 10 feet (3 meters) when wired with 18-gauge thermostat wire.

Outdoor Air Sensor

This is a two screw terminal for connection to a Lennox X2658 outdoor temperature sensor. The Control takes no action on the sensor status other than to communicate the temperature to the RSBus network. Wiring distance between the AHC and outdoor temperature sensor should not exceed 200 feet when wired with 18-gauge thermostat wire.

- Minimum temperature: -40ºF (-40ºC)
- Maximum temperature: 70ºF (158ºC)

AIR HANDLER CONTROL 9-PIN CONNECTOR (P8)

1 - Air Handler (no electric heat) – Two wire factory harness (wired to pins 7 and 8) which provides 230 VAC power to Air Handler Control.

2 - Air Handler (with electric heat) – Eight wire factory harness (all pin position are wired as noted in table 5).

NOTE *- See figure 19, detail B for wire colors.*

TABLE 1. Electric Heat Connection (P8)

Position	Function / Description
1	Heat stage 1 relay coil
2	Heat stage 2 relay coil
3	Relay coil return
4	Heat stage 3 relay coil
5	Heat stage 4 relay coil
6	Heat stage 5 relay coil
7	L1 230VAC supply from heater kit
8	L2 230VAC supply from heater kit
9	Not used

CONTROL CONNECTIONS AND WIRING REQUIREMENTS

This section provides information on communicating and non-communicating control connections and wire run lengths.

TABLE 2. Air Handler Control Connections – Communicating

Label	Label	Function
Thermostat	R	24VAC
	i+	RSbus data high connection
	i-	RSbus data low connection
	C	24VAC command (ground)
Outdoor Unit	R	24VAC
	i+	RSbus data high connection
	i-	RSbus data low connection
	C	24VAC command (ground)
Link	i+	Not used
	i-	

TABLE 3. Run Length – Communicating

Wire Run Length	AWG #	Insulation / Core Types
Maximum length or wiring for all connections on the RSbus is limited to 1500 feet (457 meters)	18	Color-coded, temperature rating 95°F (35°C) minimum, solid core. (Class II Rated Wiring)

TABLE 4. Run Length – Non-Communicating

Wire Run Length	AWG #	Insulation / Core Types
Less than 100’ (30m)	18	Color-coded, temperature rating 95°F (35°C) minimum, solid core. (Class II Rated Wiring)
More than 100’ (30m)	16	

TABLE 5. Air Handler Control Connections

Indoor Control Terminal Label	Function		
	Non-Communicating Room Thermostat (Indoor and Outdoor -24 volts)	Indoor Communicating Outdoor Non-Communicating	Full Communication (Indoor & Outdoor)
W1 (Input)	Indicates a first-stage heating demand. This input is an anticipator for the thermostat.	N/A	N/A
W2 (Input)	Indicates a second-stage heating demand. W1 input must be active to recognize second-stage heat demand.	N/A	N/A
W3 (Input)	Indicates a third-stage heating demand. W1 and W2 inputs must be active to recognize third-stage heat demand.	N/A	N/A
Y1 & Y2 (Input/ Output)	Room thermostat inputs 24 volts to the Y1 and Y2 terminals on the indoor control. The 24 volt signal is then passed through to the outdoor unit. During a second-stage demand, both Y1 and Y2 are active. The Y1 terminal is connected to Y2 by link (Solid jumper on control that would be cut for 2 stage applications)	The room thermostat communicated with the indoor control. The indoor control outputs 24 volts on its Y1 and Y2 terminals which are hard wired to the non-communicating outdoor unit.	In a full communicating system, no wiring is required on Y1 and Y2 terminals.
G (Input)	Indicates a 24 volt indoor blower demand.	In a communicating system, "G" input to indoor control is used by non-communicating IAQ devices (such as LVCS, HRV or ERV) to ensure indoor blower demand.	In communicating system "G" input to indoor control is used by non-communicating IAQ devices (such as L VCS, HRV or ERV) to ensure indoor blower demand .
C	The C terminal shall interconnect the signal ground of the room thermostat with secondary transformer ground (TR) and chassis ground (GND)		
R	The R terminal shall be capable of providing the power to the thermostat and all the associated loads .		
O (Input/Output)	Room thermostat inputs 24 volts to the O terminal on the indoor con trol. The O terminal is connected to R by link (Solid jumper on control that would be cut if unit was a heat pump)	The room thermostat communicated with the indoor control. The indoor control outputs 24 volts on its O terminals which are hard wired to the non-communicating outdoor unit. If there is 24 volts on O, the reversing valve will be energized and the outdoor unit will run in the cooling mode. If O does not have 24 volts, the outdoor unit will run in heating mode.	In a full communicating system, O terminal is not wired.
DS (Input)	Used for Harmony III zoning systems, or thermostat with dehumidification capability. The DS terminal is connected to R by link (Solid jumper on control that would be cut if for the above applications). Harmony III control - This will allow the control to vary the voltage signal to the indoor blower motor to control required CFM. Dehumidification - Allow a 24 volt signal on the DS to turn off and on the dehumidification mode.	N/A	N/A
DH (Output)	The DH terminal provides a 24VAC output for dehumidification needs in communicating systems .		
H (Output)	The H terminal provides a 24VAC output for humidification needs in both communicating and non-communicating mode .		
L (Input)	The L terminal is provided for connection to devices with Lennox System Operation Monitor (LSOM) capabilities. The control interprets the fault signals and transmits them as an alarm message on the communication line. There are ten (10) identified LSOM fault codes. Each is mapped to the communication Alarm codes.		

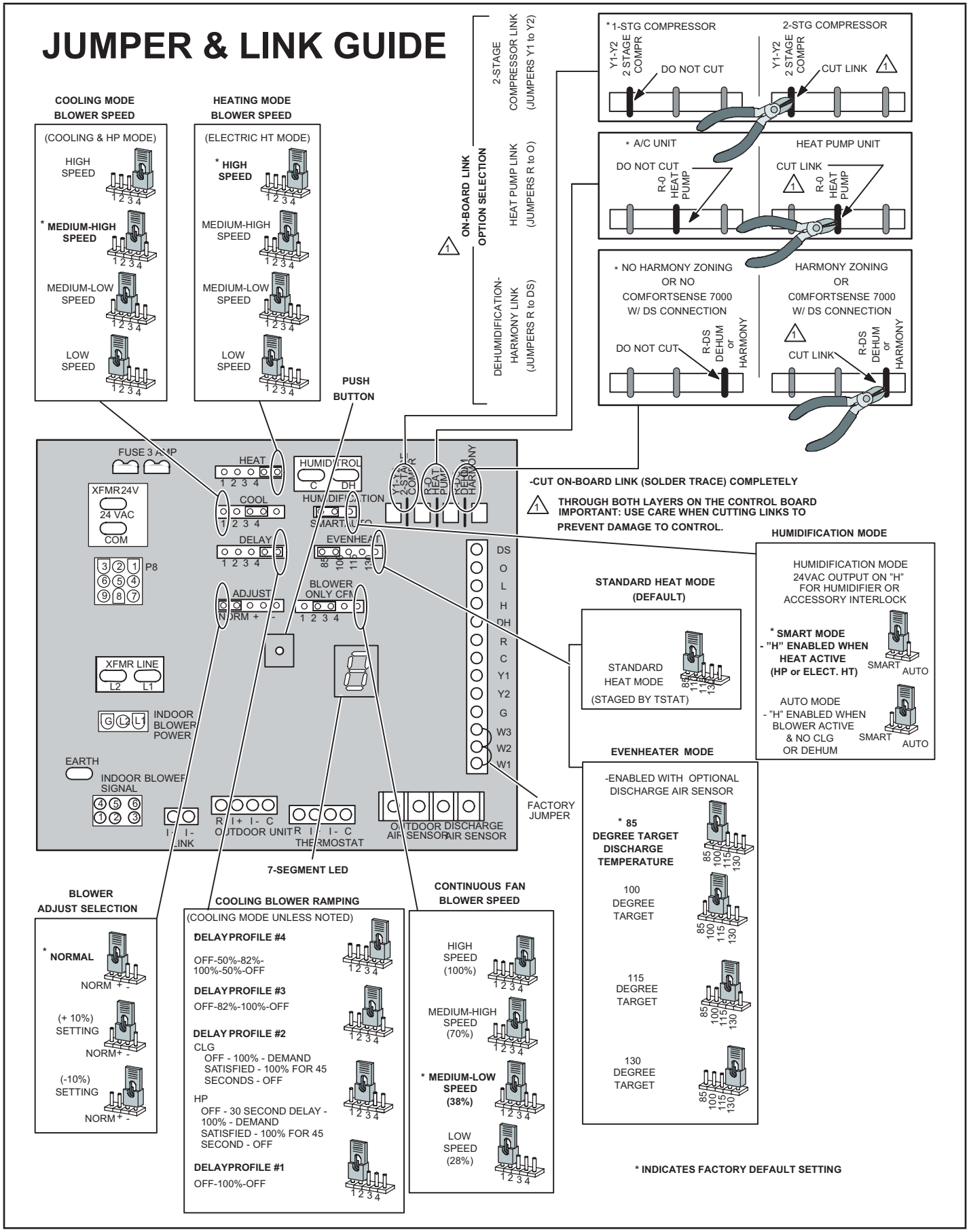


FIGURE 26. Air Handler Configuration

Air Handler Control Button, Display and Jumpers

Use figure 26 as a reference for jumper settings. If any of the referenced jumpers are missing, the Air Handler Control will display Error Code **130** as per table 8, and the Air Handler Control will automatically use the **factory default** setting shown in figure 26.

⚠ IMPORTANT

Before changing any clippable links or jumper settings, make sure the motor has completely stopped. Any changes will not take place while the motor is running.

PUSH BUTTON

An on-board push button is provided for the purpose of placing the Air Handler Control in different operation modes and can be used to recall stored error codes. When button is pushed and held, Air Handler Control will cycle through a menu of options depending on current operating mode. Every three seconds a new menu item will be displayed. If the button is released while that item is shown on the display, Air Handler Control will enter displayed operating mode, or execute defined operation sequence for that menu option. Once all items on menu have been displayed the menu resumes from the beginning (if button is still held).

1 - Press the diagnostic push button and hold it to cycle through a menu of options. Every five seconds a new menu item will be displayed. Release the button when the desired mode is displayed.

2 - When the solid "E" is displayed, the control enters the Error Code Recall mode. Error Code Recall mode menu options: No change (displaying error history) remains in Error Code Recall mode; solid "≡" exits Error Code Recall mode; and solid "c" clears the error history. Must press button while flashing "c" is displayed to clear error codes

3 - When the solid "-" is displayed, the control enters the applicable mode. Field configuration mode menu options: Solid "C" starts pressure switch calibration; blinking "-" exits current active mode.

JUMPERS

Jumpers are used for non-communicating mode only.

1 - **Humidification** – Controls the status of **H** terminal on the thermostat block. Configurations are as follows:

- If jumper is installed in **SMART** Humidification position (Default), **H** terminal is active if heat demand is present and indoor blower is running.
- If jumper is installed in **AUTO** Humidification position, **H** terminal is energized whenever indoor blower is running.

2 - **EvenHeat** – Target Discharge Air Temperature selection is used to set discharge air temperatures for EvenHeat operation.

NOTE - *Optional Discharge Air Temperature Sensor, Lennox Catalog # 88K38 is REQUIRED for EVENHEAT operation and must be ordered separately.*

3 - **Blower Only CFM** – Used to select Indoor blower CFM for continuous operation.

4 - **Heat** – Used to select Indoor blower CFM for electrical heat by placing the jumper in proper position. Actual CFM values for different air handler sizes are shown in Targeted CFM tables starting on page 53.

5 - **Cool** – Used to select cooling indoor blower CFM by placing the jumper in proper position. Actual CFM values for different air handler sizes are shown in Targeted CFM tables starting on page 53.

6 - **Adjust** - Used to select the indoor blower CFM adjustment value by placing the jumper in appropriate position.

- If **NORM** is selected, indoor blower runs at normal speeds.
- If + is selected, indoor blower runs at approximately 10% higher speed than NORM setting.
- If - is selected, indoor blower runs at approximately 10% lower speed than **NORM** setting.

If the jumper is missing, the Air Handler Control will activate the *Configuration Jumper is Missing* alarm in and will automatically use the default factory setting in table 10. See figure 26 for jumper configurations. Actual CFM values for different air handler sizes are shown in Targeted CFM tables starting on page 53.

7 - **Delay** – Indoor blower cooling profile, delay for cooling and heat pump operations.

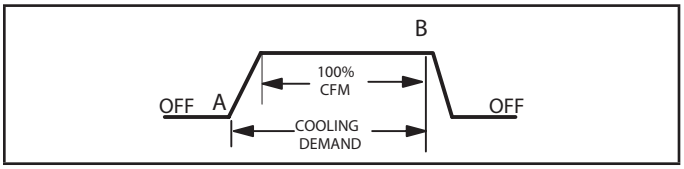
- For heat pump **heating** operation only delay profiles 1 and 2 are applicable. If profiles 3 or 4 have been selected, heat pump operation will use profile 1 only.
- For heat pump **cooling** operation all 4 profiles are operational.

If the jumper is missing, the Air Handler Control will activate the *Configuration Jumper is Missing* alarm and will automatically use the default factory setting in table 10. See figure 26 for jumper configurations.

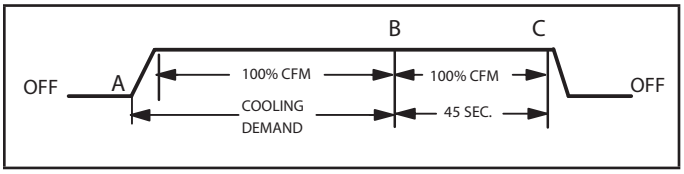
Delay Profile 1

A - When cool or heat demand is initiated, motor ramps up to 100% and runs at 100% until demand is satisfied.

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



Delay Profile 2
Cooling – Air Conditioner and Heat Pump

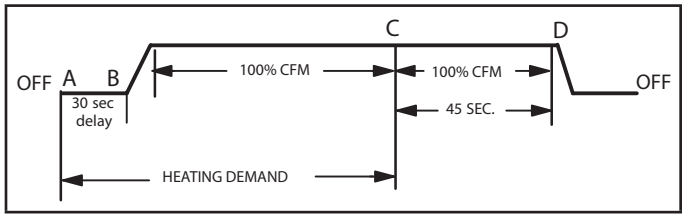


A - When cool demand is initiated, motor ramps up to 100% and runs at 100% until demand is satisfied.

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

C - Motor ramps down to stop.

Heating – Heat Pump Only



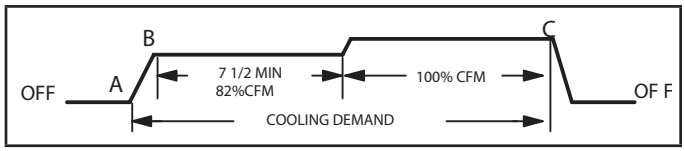
A - When heat demand is initiated, 30 seconds **motor on** delay starts.

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

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

D - Motor ramps down to stop.

Delay Profile 3

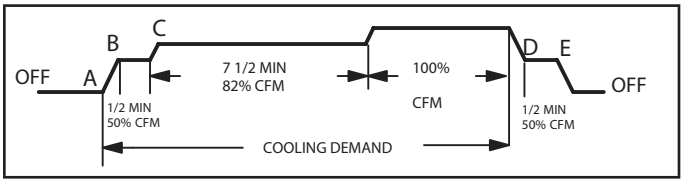


A - When cooling demand is initiated, motor ramps up to 82%.

B - Motor runs at 82% for approximately 7.5 minutes and then ramps up to 100% (unless the demand has been satisfied) and motor runs at 100% until demand is satisfied.

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

Delay Profile 4



A - When cooling demand is initiated, motor ramps up to 50%.

B - Motor runs at 50% for 30 seconds and ramps up to 82%.

C - Motor runs at 82% for approximately 7.5 minutes and then ramps up to 100% (unless the demand has been satisfied) and motor runs at 100% until demand is satisfied.

D - Once demand is met, motor runs at 50% for 30 seconds.

E - Motor ramps down to stop.

DISPLAY

An on-board single character LED display (see figure 20 for LED display location) indicates general system status information such as mode of operation, indoor blower CFM and error codes. Multi-character strings are displayed with character ON for one second, OFF for 0.5 seconds and one second pause between the character groups.

TABLE 6. AHC System Status Codes

AHC Single Character Display	Action
Letter or Number	Unit Size Code displayed represents air handler model size and capacity . See *Configuring Unit Size Codes* in figure 22.
=	If three horizontal bars are displayed, AHC does not recognize air handler model size and capacity. See Configuring Unit Size Codes in Figure 22.
.	Idle mode (decimal point / no unit operation)
A	Cubic feet per minute (cfm) setting for indoor blower (1 second ON, 0.5 second OFF) / cfm setting for current mode displayed . Example: A 1200
C	Cooling stage (1 second ON, 0.5 second OFF) / 1 or 2 displayed / Pause / cfm setting displayed / Pause / Repeat codes). Example C 1 or C2
d	Dehumidification mode (1 second ON) / 1 second OFF) / cfm setting displayed / Pause / Repeat Codes)
d F	Defrost mode. (Y, W and O call)
H	Heat Stage (1 second ON, 0.5 second OFF) / 1 or 2 displayed / Pause / cfm setting displayed / Pause / Repeat codes. Example: H 1 or H2 or H3
h	Variable Capacity Heat (1 second ON, 0.5 second OFF) / % of input rate displayed / Pause/ cfm setting / Pause/ Repeat codes. Example: h 1 or h2
U	Discharge air sensor temperature (indoor blower must be operating) U 105

TABLE 7. AHC Configuration, Test and Error Recall (Fault and Lockout) Function

NOTE — AHC MUST BE IN IDLE MODE)		
Single Character LED Display		Action
Solid	-	Push and hold button until solid appears, release button. Display will blink.
Blinking	-	Push and hold button until required symbol displays . H A or P
CONFIGURING ELECTRIC HEAT SECTIONS		
Solid	H	Release push button - control will cycle the indoor blower motor on to the selected heat speed and stage the electric heat relays on and off to automatically detect number of electric heat sections. Control will store the number of electric heat sections. Control will automatically exit ***current active mode***.
INDOOR BLOWER TEST		
Solid	A	Release push button - control cycles indoor blower on for ten seconds at 70% of maximum air for selected capacity size unit. Control will automatically exit ***current active mode***.
CONFIGURING UNIT SIZE CODES		
Single Character LED Display		Action
Solid	P	RELEASE push button - This mode allows the field to select a unit size code (number or letter) that matches the air handler model size and capacity. IMPORT ANT — All field replacement controls may be manually configured to confirm air handler model size and capacity.
Blinking	P	1. When the correct Unit Sized Code is displayed, RELEASE push button. Selected code will flash for 10 second period. 2. During ten second period, HOLD push button until code stops blinking (three seconds minimum). 3. Air Handler Control will store code in memory and exit ***current active mode***. LED display will go blank and then the Unit Size Code will display for 2 to 5 seconds. NOTE - If ten second period expires, or push button is held less than 3 seconds, control will automatically exit ***current active mode*** and go into IDLE Mode without storing unit size code. If this occurs, then Unit Size Code configuring procedure must be repeated.
ERROR CODE RECALL MODE (NOTE — CONTROL MUST BE IN IDLE MODE)		
Solid	E	To enter ***Error Code Recall Mode*** — PUSH and HOLD button until solid E appears, then RELEASE button. Control will display up to ten error codes stored in memory. If E000 is displayed, there are no stored error codes.
Solid	=	To exit ***Error Code Recall Mode*** — PUSH and HOLD button until solid three horizontal bars appear, then RELEASE button. *NOTE - Error codes are not cleared*
Solid	c	To clear error codes stored in memory, continue to HOLD push button while the three horizontal bars are displayed. Release push button when solid c is displayed.
Blinking	c	Push and hold for one (1) second, release button. Seven-segment will display 0000 and exit error recall mode.

TABLE 8. AHC Single Character Display Alert Codes (Communicating and Non-Communicating)

Alert Code	Priority	Alert	How to Clear
E 105	Critical	The air-handler has lost communication with the rest of the system.	Equipment is unable to communicate. This may indicate the existence of other alarms / codes. In most cases errors are related to electrical noise. Make sure high voltage power is separated from RSBus. Check for mis-wired and/or loose connections between the thermostat, indoor unit and outdoor unit. Check for a high voltage source of noise close to the system. Generally, this is a self-recoverable error.
E 114	Critical	There is a frequency/distortion problem with the power to the air-handler.	This alarm/code may indicate transformer overloading. Check the voltage and line power frequency. Check the generator operating frequency, if the system is running on back-up power. Correct voltage and frequency problems. System resumes normal operation 5 seconds after fault recovered.
E 115	Critical	The 24VAC to the air-handler control is lower than the required range of 18 to 30VAC.	24-volt power low (range is 18 to 30 volts). Check and correct voltage. Check for additional power-robbing equipment connected to system. This alarm / code may require the installation of an additional or larger VA transformer.
E 120	Moderate	There is a delay in the air-handler responding to the system.	Typically, this alarm/code does not cause any issues and will clear on its own. The alarm/code is usually caused by a delay in the outdoor unit responding to the thermostat. Check all wiring connections. Cleared after unresponsive device responds to any inquiry.
E 124	Critical	The iComfort™ thermostat has lost communication with the air-handler for more than 3 minutes.	Equipment lost communication with the icomfort ™ thermostat. Check the wiring connections, ohm wires and cycle power. The alarm stops all associated HVAC operations and waits for a heartbeat message from the unit that's not communicating. The alarm/ fault clears after communication is re-established.
E 125	Critical	There is a hardware problem with the air-handler control.	There is a control hardware problem. Replace the control if the problem prevents operation and is persistent. The alarm / fault is cleared 300 seconds after the fault recovers.
E 130	Moderate	An air-handler configuration jumper is missing.	Configuration jumper(s) missing on control (applicable in non-communicating applications only). Replace the jumper or put wire between terminals on control. Cleared after jumper is connected.
E 131	Critical	The air-handler control parameters are corrupted.	Reconfigure the system. Replace the control if heating or cooling is not available.
E 132	Critical	The air-handler control software is corrupted.	Recycle power. If failure re-occurs, replace the control. System reset is required to recover.
E 150	Critical	A leak of refrigerant has been detected by the refrigerant detection system.	This may indicate the presence of a leak at or in the indoor unit coil of the equipment, that will need to be repaired for proper and safe system operation. Additionally it may indicate that proper refrigerant charge will need to be verified. This fault cannot be cleared while the refrigerant detection system sensor is reporting the presence of a leak.
E 151	Critical	The refrigerant detection system sensor is reporting a fault.	The refrigerant detection sensor in the indoor unit is reporting an issue that prevents it from functioning properly, and replacement of the sensor may be necessary. This fault clears when the sensor no longer reports the presence of a fault condition.
E 154	Critical	Communications with the refrigerant detection sensor has been lost or interrupted.	There may be an issue with the wiring harness connecting the sensor of the refrigerant detection system to the indoor unit control board, either with the wiring itself or with the connector (see figure 2). Check the wiring and the connector for damage or improper connectivity. Check the sensor for damage or signs that it must be replaced. This fault clears when communications with the sensor has been reestablished, but latches for a minimum of 5 minutes. Retest of the presence of fault can be effected by pressing the RDS test button on the indoor unit control board.
E 160	Critical	The refrigerant detection system sensor is of an incorrect type.	The sensor of the refrigerant detection system is of a type not suitable for use in the application. Replace the sensor with a Lennox approved replacement part. This fault clears when a sensor suitable for the application is detected by the refrigerant detection system, but will latch for a minimum of 5 minutes. Retest of the presence of the fault can be effected by pressing the RDS test button on the indoor unit control board.
E 163	Critical	The refrigerant detection system controller has failed.	There appears to be an issue with the refrigerant detection system controller on the indoor unit control board, preventing the refrigerant detection system from operating properly. This may require the replacement of the indoor unit control board. This fault clears when the refrigerant detection system controller operates normally.

TABLE 9. AHC Single Character Display Alert Codes (Communicating and Non-Communicating) (cont'd)

Alert Code	Priority	Alert	How to Clear
E345	Critical	The O relay on the air-handler has failed. Either the pilot relay contacts did not close or the relay coil did not energize.	O relay failed. Pilot relay contacts did not close or the relay coil did not energize. Replace control. The alarm clears after a reset
E346	Critical	The R to O jumper was not removed on the air-handler control.	Configuration link(s) not removed on control. Cut / remove R to O jumper. Applicable with non communicating outdoor unit with communicating indoor unit. The fault clears after the R to O jumper is cut/removed.
E347	Critical	The Y1 relay on the air-handler has failed. Either the pilot relay contacts did not close or the relay coil did not energize.	Operation stopped. Y1 relay failed. Pilot relay contacts did not close or the relay coil did not energize. The indoor unit cannot verify that the relay is closed. The alarm clears after a reset and Y1 input sensed.
E348	Critical	The Y2 relay on the air-handler has failed. Either the pilot relay contacts did not close or the relay coil did not energize.	Operation stopped. Y2 relay failed. Pilot relay contacts did not close or the relay coil did not energize. The indoor unit cannot verify that the relay is closed. The alarm clears after a reset and Y2 input sensed.
E350	Critical	The air-handler's electric heat is not configured.	Heat call with no configured or mis-configured electric heat. Configure electric heat in the air-handler. The fault clears electrical heat is successfully detected.
E351	Critical	There is a problem with the air-handler's first stage electric heat. Either the pilot relay contacts did not close, or the relay coil in the electric heat section did not energize.	Heat section / stage 1 failed. Pilot relay contacts did not close, or the relay coil in the electric heat section did not energize. The alarm clears after stage 1 relay is detected.
E352	Moderate[1]	There is a problem with the air-handler's second stage electric heat. Either the pilot relay contacts did not close, or the relay coil in the electric heat section did not energize. The air-handler will operate on first stage electric heat until the issue is resolved.	Heat section / stage 2 failed (same as code 351). Pilot relay contacts did not close, or the relay coil in the electric heat section did not energize. The air-handler will operate on stage 1 heat only. The alarm clears after stage 2 relay is detected.
E353	Moderate[1]	There is a problem with the air-handler's third stage electric heat. Either the pilot relay contacts did not close, or the relay coil in the electric heat section did not energize. The air-handler will operate on first stage electric heat until the issue is resolved.	Heat section / stage 3 failed (same as code 351). Pilot relay contacts did not close, or the relay coil in the electric heat section did not energize. The air-handler will operate on stage 1 heat only. The alarm clears after sage 2 relay is detected.
E354	Moderate[1]	There is a problem with the air-handler's fourth stage electric heat. Either the pilot relay contacts did not close, or the relay coil in the electric heat section did not energize. The air-handler will operate on first stage electric heat until the issue is resolved.	Heat section / stage 4 failed (same as code 351). Pilot relay contacts did not close, or the relay coil in the electric heat section did not energize. The air-handler will operate on stage 1 heat only. The alarm clears after stage 2 relay is detected.
E355	Moderate[1]	There is a problem with the air-handler's fifth stage electric heat. Either the pilot relay contacts did not close, or the relay coil in the electric heat section did not energize. The air-handler will operate on first stage electric heat until the issue is resolved.	Heat section / stage 5 failed (same as code 351). Pilot relay contacts did not close, or the relay coil in the electric heat section did not energize. The air-handler will operate on stage 1 heat only. The alarm clears after stage 2 relay is detected.
E409	Moderate	The secondary voltage for the air-handler has fallen below 18VAC. If this continues for 10 minutes, the icomfort™ thermostat will turn off the air-handler.	Secondary voltage is below 18V AC. After 10 minutes, operation is discontinued. Check the indoor line voltage, transformer output voltage. The alarm clears after the voltage is higher than 20VAC for 2 seconds or after a power reset.

Unit Operating Sequences

This section details unit operating sequence for non-communicating systems.

NOTE - For communicating systems, see the thermostat installation instruction.

TABLE 10. CBK48MVT with ComfortSense™ 7500 Thermostat and Single-Stage Outdoor Unit Operating Sequence

Operating Sequence		System Demand								System Response		
System Condition	Step	Thermostat Demand						Relative Humidity		Comp	Air Handler CFM (COOL)	Comments
		Y1	Y2	O	G	W1	W2	Status	D			
NO CALL FOR DEHUMIDIFICATION												
Normal Operation	1	On		On	On			Acceptable	24 VAC	High	100%	Compressor and indoor air handler follow thermostat demand
BASIC MODE (Only active on a Y1 thermostat demand)												
Normal Operation	1	On		On	On			Acceptable	24 VAC	High	100%	ComfortSense ™ 7500 thermostat energizes Y1 and de-energizes D on a call for dehumidification. *NOTE - No over cooling.*
Dehumidification Call	2	On		On	On			Demand	0 VAC	High	70%	
PRECISION MODE (Operates independent of a Y1 thermostat demand)												
Normal Operation	1	On		On	On			Acceptable	24 VAC	High	100%	Dehumidification mode begins when humidity is greater than set point
Dehumidification call	2	On		On	On			Demand	0 VAC	High	70%	
Dehumidification call ONLY	1	On		On	On			Demand	0 VAC	High	70%	ComfortSense ™ 7500 will keep outdoor unit energized after cooling temperature setpoint has been reach in order to maintain room humidity setpoint. *NOTE - Allow to over cool 2^0F from cooling set point.*

TABLE 11. CBK48MVT with ComfortSense™ 7500 Thermostat and Two-Stage Outdoor Unit Operating Sequence

Operating Sequence		System Demand								System Response		
		Thermostat Demand						Relative Humidity				
System Condition	Step	Y1	Y2	O	G	W1	W2	Status	D	Compressor	Air Handler CFM (COOL)	Comments
No Call for Dehumidification												
Normal Operation - Y1	1	On		On	On			Acceptable	24 VAC	Low	70%	Compressor and indoor air handler follow thermostat demand
Normal Operation - Y2	2	On	On	On	On			Acceptable	24 VAC	High	100%	
Room Thermostat Calls for First-Stage Cooling												
BASIC MODE (Only active on a Y1 thermostat demand)												
Normal Operation	1	On		On	On			Acceptable	24 VAC	Low	70%	ComfortSense ™ 7500 thermostat energizes Y2 and de-energizes D on a call for dehumidification *NOTE - No over cooling.*
Dehumidification Call	2	On	On	On	On			Demand	0 VAC	High	70%	
PRECISION MODE (Operates independent of a Y1 thermostat demand)												
Normal Operation	1	On		On	On			Acceptable	24 VAC	Low	70%	Dehumidification mode begins when humidity is greater than set point
Dehumidification call	2	On	On	On	On			Demand	0 VAC	High	70%	
Dehumidification call ONLY	1	On	On	On	On			Demand	0 VAC	High	70%	ComfortSense ™ 7500 thermostat will keep outdoor unit energized after cooling temperature setpoint has been reached in order to maintain room humidity setpoint. *NOTE — Allow to over cool 2^0F from cooling set point.*
Room Thermostat Calls for First- and Second-Stage Cooling												
BASIC MODE (Only active on a Y1 thermostat demand)												
Normal Operation	1	On	On	On	On			Acceptable	24 VAC	High	100%	ComfortSense ™ 7500 thermostat energizes Y2 and de-energizes D on a call for dehumidification *NOTE — No over cooling.*
Dehumidification Call	2	On	On	On	On			Demand	0 VAC	High	70%	
PRECISION MODE (Operates independent of a Y1 thermostat demand)												
Normal Operation	1	On	On	On	On			Acceptable	24 VAC	High	100%	Dehumidification mode begins when humidity is greater than set point
Dehumidification call	2	On	On	On	On			Demand	0 VAC	High	70%	
Dehumidification call ONLY	1	On	On	On	On			Demand	0 VAC	High	70%	ComfortSense ™ 7500 thermostat will keep outdoor unit energized after cooling temperature setpoint has been reached in order to maintain room humidity setpoint. *NOTE — Allow to over cool 2^0F from cooling set point.*

Unit Operating Sequences

This section identifies the requirements for configuring the air handler unit for unit size, heat mode selection and EvenHeat.

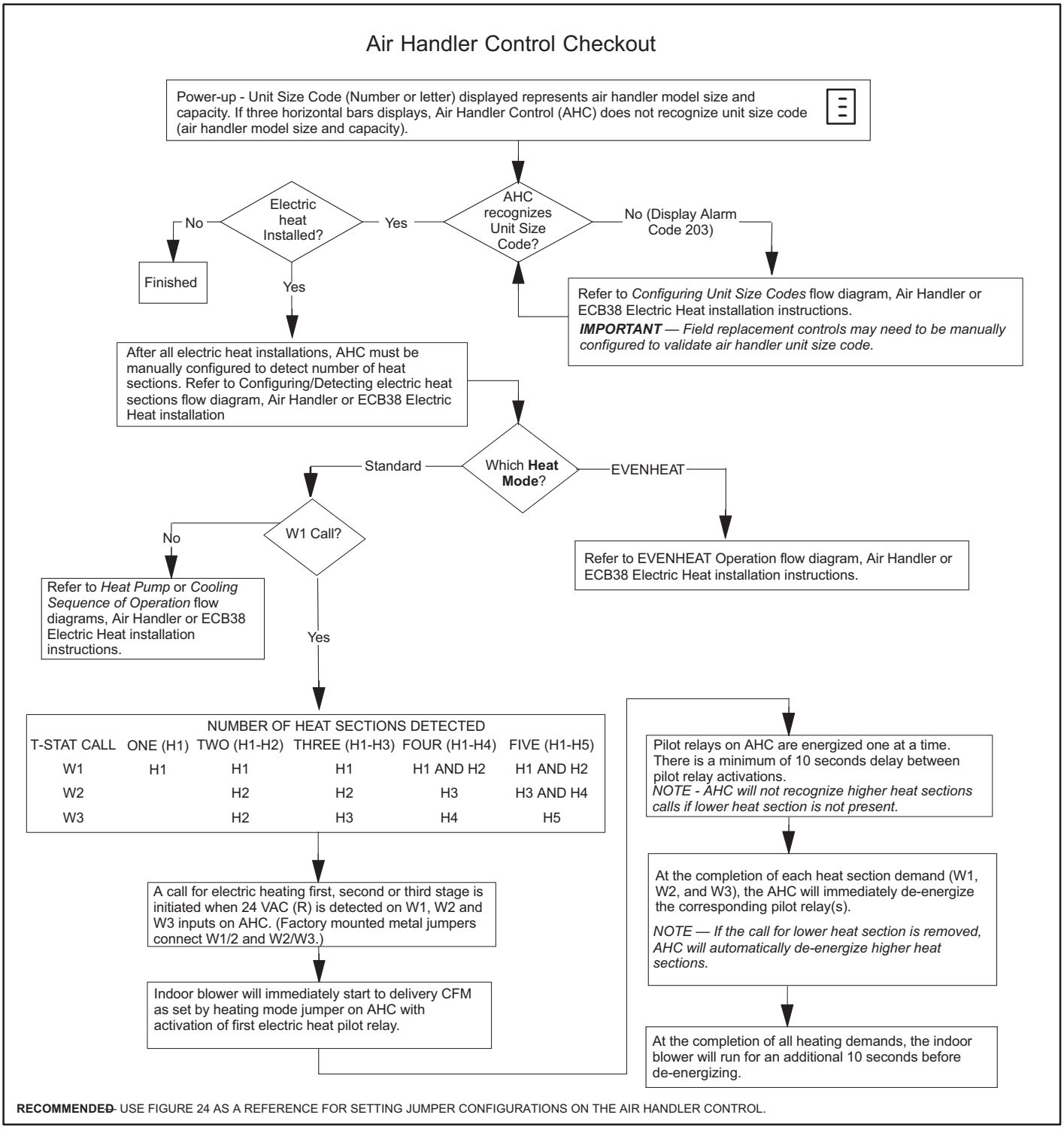


FIGURE 27. Air Handler Control Checkout

Configuring Unit Size Codes (Model Number)

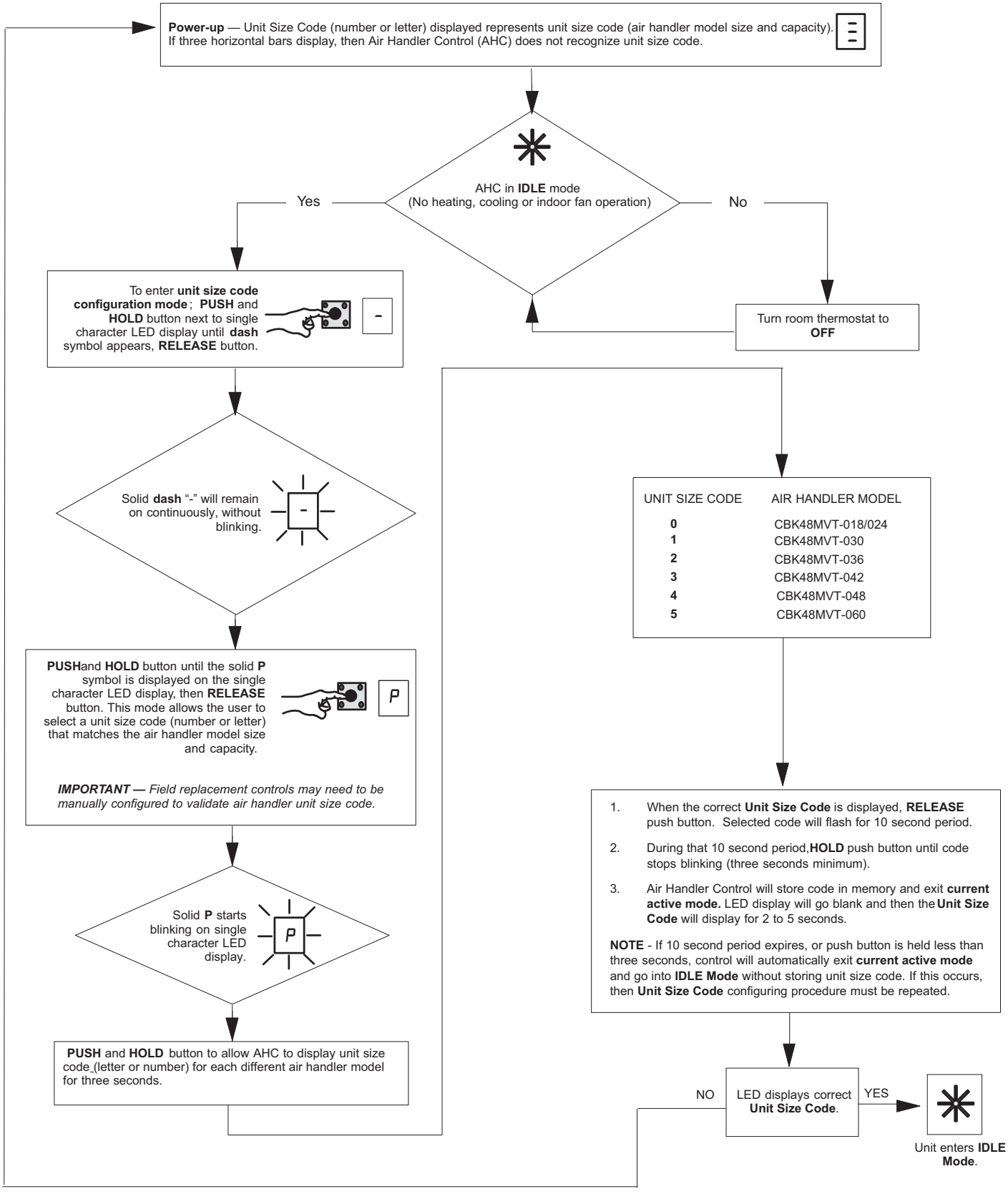


FIGURE 28. Configure Unit Size Codes

Configuring/Detecting Electric Heat Sections

IMPORTANT — All electric heat installations require the Air Handler Control (AHC) to be manually configured to detect number of heat sections.

NOTE — All field replacement AHC will require configuring/detecting electric heat sections.

RECOMMENDED — USE FIGURE 24 AS A REFERENCE FOR SETTING JUMPER CONFIGURATIONS ON THE AIR HANDLER CONTROL.

Which Heat Mode?

Standard

- Set desired Heating Mode Blower Speed jumper pin.
- Electric heat is staged by room thermostat. (AHC comes with factory jumper between W1 to W2 and W2 to W3)
- Refer to Air Handler Control Checkout flow diagram for operation.

EVENHEAT

- Set desired Heating Mode Blower Speed jumper pin.
- Install and wire discharge air temperature sensor.
- Set desired Target Discharge Temperature jumper pin. If jumper pin is missing or discharge air temperature sensor is not detected, AHC defaults to Standard Heat Mode . Target settings are 85, 100, 115 and 130ºF) .
- Refer to EVENHEAT Operation flow diagram for operation.

Configuration

AHC in Idle Mode (No heating cooling or indoor fan operation)

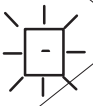
Yes

To enter electric heat mode configuration , push and hold button next to single character LED display until dash symbol (solid bar) appears, then release button.

No

Turn room thermostat to OFF .

Solid dash starts blinking on single character LED display



Push and hold button until the solid H symbol is displayed on the single character LED display, then release button.

1. AHC will start the indoor blower motor to the selected heat jumper speed setting and cycle the electric heat relays ON to automatically detect number of electric heat sections. (Electric heat section may be wired to energize more than one element)
2. AHC waits for maximum of ten seconds to detect electric heat 22 volt DC relay coils are energizing:
   - A If relay coil current is detected within ten seconds, AHC will show a 1 on the single character LED display indicating that the first stage has been detected. As each additional heat section is detected, single character LED display on the AHC will display that electric element number. (Example: Last number displayed by the single character LED display is 3, the AHC is configured to operate three electric heat sections.)
   - B If relay coil current is not detected within ten seconds, the AHC will exit the current active mode and resume operation with electric heat disabled.
3. AHC will automatically exit current configuration mode when configuration is completed. To verify that the number of electric sections detected matches the installed electric heat package, the field MUST CONFIRM that the last number the single character LED display before exiting the Configuring/Detection Mode matches the number of installed electric heat sections. AHC stores the number of electric heat stages in non-volatile memory.
4. After the detection is finished, unit will continue to operate for an additional 30 seconds.

NOTE — If AHC push button is pushed or power is cycled on AHC is unable to verify all 22 volt DC electric heat relay(s) were energized using electric heater detection, configuration will be stopped. Configuration function must be repeated.

Finished

FIGURE 29. Heat Mode Selection

EVENHEAT OPERATION

INPUTS	OUTPUTS		
Room Thermostat Demand	Target Discharge Air Temperature Set at 85ºF	Target Discharge Air Temperature Set at 100ºF	Target Discharge Air Temperature Set at 1 15ºF/130ºF
Y1	Heat Pump First Stage	Heat Pump First Stage	Heat Pump First + First Electric Heat Section (H1)
Y1 + Y2	Heat Pump First and Second Stage	Heat Pump First and Second Stage + First Electric Heat Section (H1)	Heat Pump First and Second Stage + First Electric Heat Section (H1) + Second Electric Heat Section (H2) if number of electric heater sections detected is more than two.
Y1 + W1 and/or W2	Heat Pump First Stage + First Electric Heat Section (H1)	Heat Pump First Stage + First Electric Heat Section + Second Electric Heat Section (H2) if number of electric heater sections detected is more than two.	Heat Pump First Stage + First Electric Heat Section (H1) Second Electric Heat Section (H2) if number of electric heater sections detected is more than two.
Y1 and Y2 + W1 and/or W2	Heat Pump First and Second Stage+ First Electric Heat Section (H1)	Heat Pump First and Second Stage + First Electric Heat Section + Second Electric Heat Section (H2) if number of electric heater sections detected is more than two.	Heat Pump First and Second Stage + First Electric Heat Section (H1) Second Electric Heat Section (H2) if number of electric heater sections detected is more than two.
W1 and/or W2	First Electric Heat Section (H1)	First Electric Heat Section (H1) + Second Electric Heat Section (H2) if number of electric heater sections detected is more than two.	First Electric Heat Section (H1) + Second Electric Heat Section (H2) if number of electric heater sections detected is more than two.

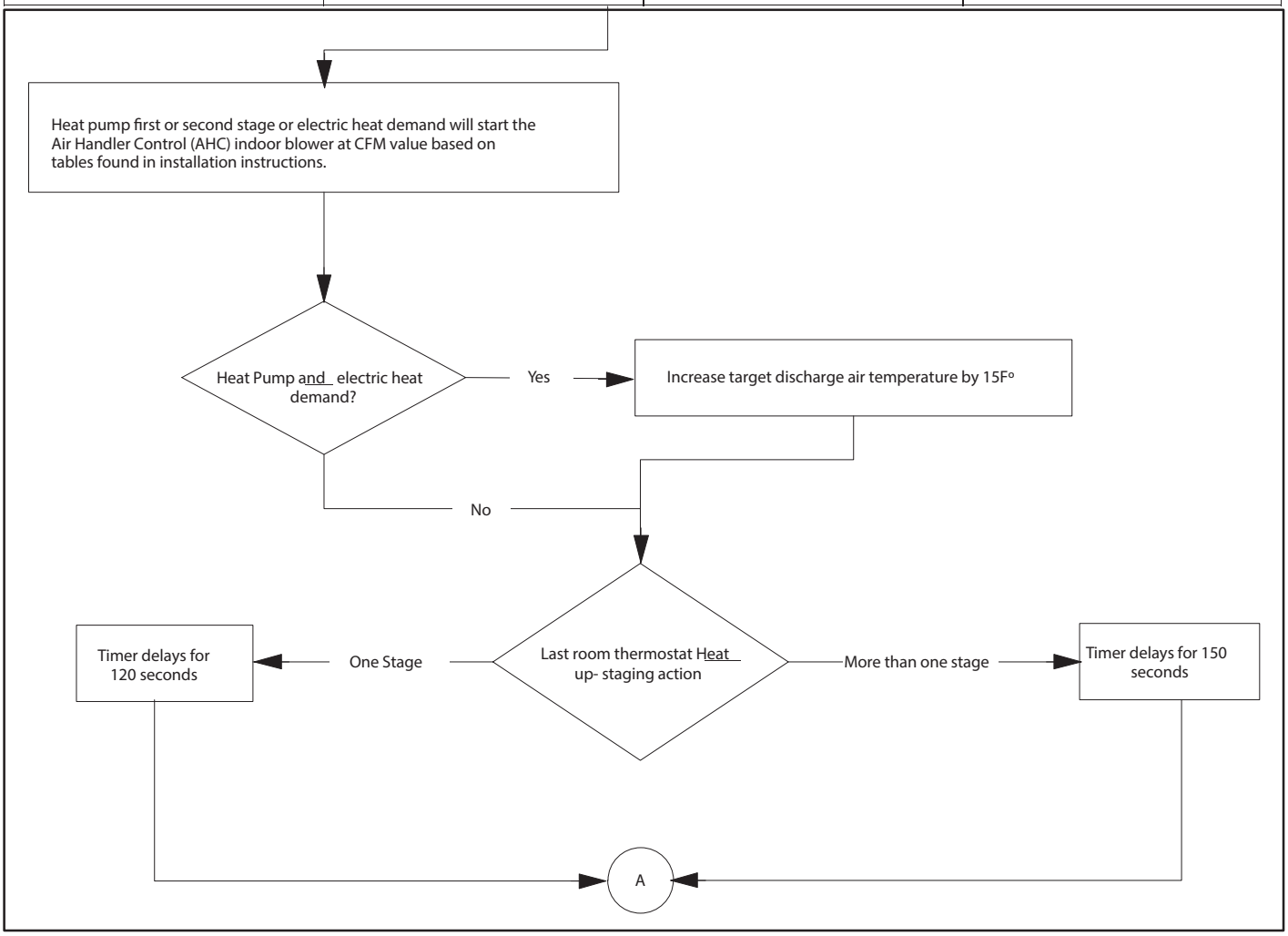
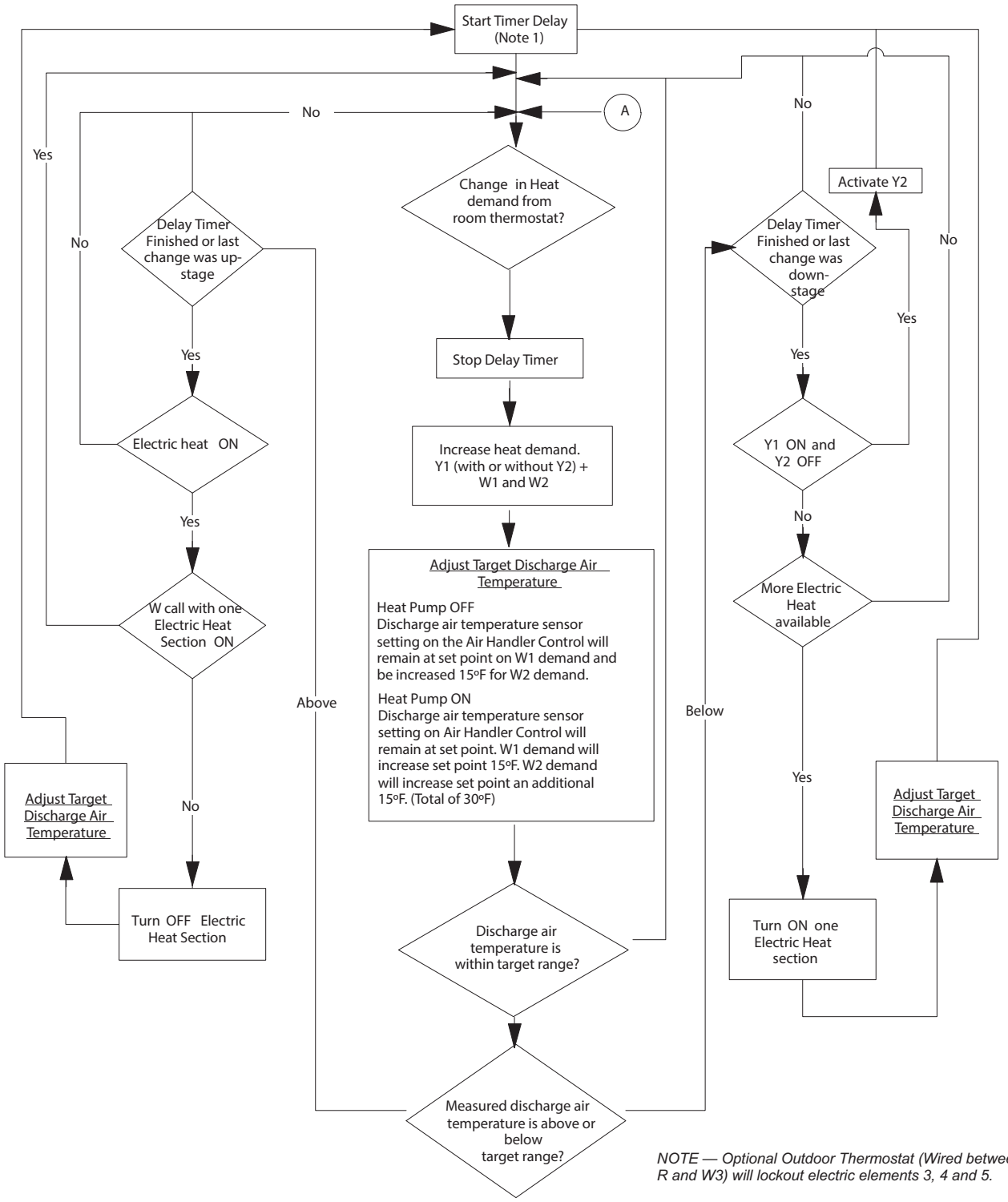


FIGURE 30. EVENHEAT Operation (1 of 2)

Note 1 Activation delay

- 120 seconds if one heat stage is or deactivated
- 150 seconds if more than one stage is activated or deactivated.



NOTE — Optional Outdoor Thermostat (Wired between R and W3) will lockout electric elements 3, 4 and 5.

FIGURE 31. EVENHEAT Operation ((2 of 2)

Heat Pump Operation (Heating and Cooling)

Air Handler Control AHC) Indoor Blower Mode Speed and Profiles settings

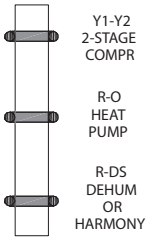
1. Set Cooling Mode Blower Speed jumper pin . (Low and high indoor blower CFM settings are identical for cooling and heat pump)
2. Set Blower Adjust Selection jumper pin.
3. Set Cooling Mode Blower Ramping jumper pin (Cooling calls - All ramping profiles are active) (Heating calls - Only ramping profiles 1 and 2 are active. If profiles 3 or 4 are selected, AHC will default to profile 1)
   - A Profile 1 does not provide any ramping profiles.
   - B Profile 2 provides a 30 second indoor blower ON delay at the start of a heat pump heating demand. (45 second indoor blower OFF delay)
4. Simultaneous Heat Pump and electric heat call: Indoor Blower will operate at the highest CFM requested by the heat pump or the electric heat blower speed selection.

Single or Two-Stage Unit

1. AHC on-AHC link must be cut between Y1 and Y2 to allow two stage cooling operation.
2. AHC on-AHC link must be cut between R and O to allow heat pump operation.

CUT ON-BOARD LINK Y1-Y2 FOR TWO-STAGE A/C

CUT ON-BOARD LINK R -O.



IMPORTANT — USE CARE WHEN CUTTING LINKS TO PREVENT DAMAGE TO CONTROL. SEE FIGURE 24, CBA38MV JUMP AND LINK GUIDE FOR FURTHER DETAILS.

RECOMMENDED — USE FIGURE 20 AS A REFERENCE FOR SETTING JUMPER CONFIGURATIONS ON THE AIR HANDLER CONTROL.

Room thermostat calls for first stage?

Heating

Air Handler Control (AHC) receives inputs on Y1 terminal .

Y1 terminal on AHC is configured as input and passes signal from room thermostat to outdoor unit.

NOTE — The outdoor unit control directly controls the outdoor unit operation.

Y1 input to the AHC will control the indoor blower according to the cooling or heating mode blower speed , ramping and adjust selection jumper pins.

Cooling

Air Handler Control (AHC) receives inputs on Y1 and O terminals .

Y1 terminal on AHC is configured as input and passes signal from room thermostat to outdoor unit.

NOTE — The outdoor unit control directly controls the outdoor unit operation.)

Y1 input to the AHC. Will control the indoor blower according to the cooling mode blower speed , ramping and adjust selection jumper pins.

Yes

Room thermostat calls for second stage?

No

De-energize Y2 terminal on AHC. Indoor blower speed will reset to Y1 demand.

NOTE — The outdoor unit control directly controls the outdoor unit operation.)

Yes

Yes

Y2 terminal on AHC is configured as input and passes signal from room thermostat to outdoor unit.

NOTE — The outdoor unit control directly controls the outdoor unit operation.)

Y2 terminal is an input to the AHC. The indoor blower will be controlled according to the jumper pin selections.

Yes

Still calling for first stage?

Yes

No

Still calling for second stage?

No

De-energize Y1 (and O in cooling) terminals on AHC.

NOTE — The outdoor unit control directly controls the outdoor unit operation.

De-energize indoor blower per ramping profile.

Cooling Operation

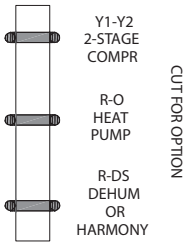
Air Handler Control AHC) Indoor Blower Mode Speed and Profiles settings

1. Set Cooling Mode Blower Speed jumper pin.
2. Set Cooling Mode Blower Ramping jumper pin.
3. Set Blower Adjust Selection jumper pin.

Single or Two-Stage Unit

AHC on-board link must be cut between Y1 and Y2 to allow 2 stage cooling operation.

CUT ON-BOARD LINK Y1-Y2 FOR TWO-STAGE A/C



RECOMMEND *— USE FIGURE 20 AS A REFERENCE FOR SETTING JUMPER CONFIGURATIONS ON THE AIR HANDLER CONTROL.*

IMPORTANT *- Use care when cutting links to prevent damage to control. See figure 20, CBA38MV jump and link guide for further details.*

Room thermostat calls for first stage?

Air Handler Control (AHC) receives inputs on Y1 terminal.

Y1 terminal on AHC is configured as input and passes signal from room thermostat to outdoor unit.

NOTE - The outdoor unit control directly controls the outdoor unit operation.

Y1 input to the AHC will control the indoor blower according to the cooling or heating mode blower speed, ramping and adjust selection jumper pins.

Yes

Room thermostat calls for second stage?

No

De-energize Y2 terminal on AHC. Indoor blower speed will reset to Y1 demand.

NOTE - The outdoor unit control directly controls the outdoor unit operation.

Still calling for first stage?

Yes

No

De-energize Y1 (and O in cooling) terminal on AHC.

NOTE - The outdoor unit control directly controls the outdoor unit operation.

De-energize indoor blower per ramping profile.

Yes

Yes

Y2 terminal on AHC is configured as input and passes signal from room thermostat to outdoor unit.

NOTE - The outdoor unit control directly controls the outdoor unit operation.

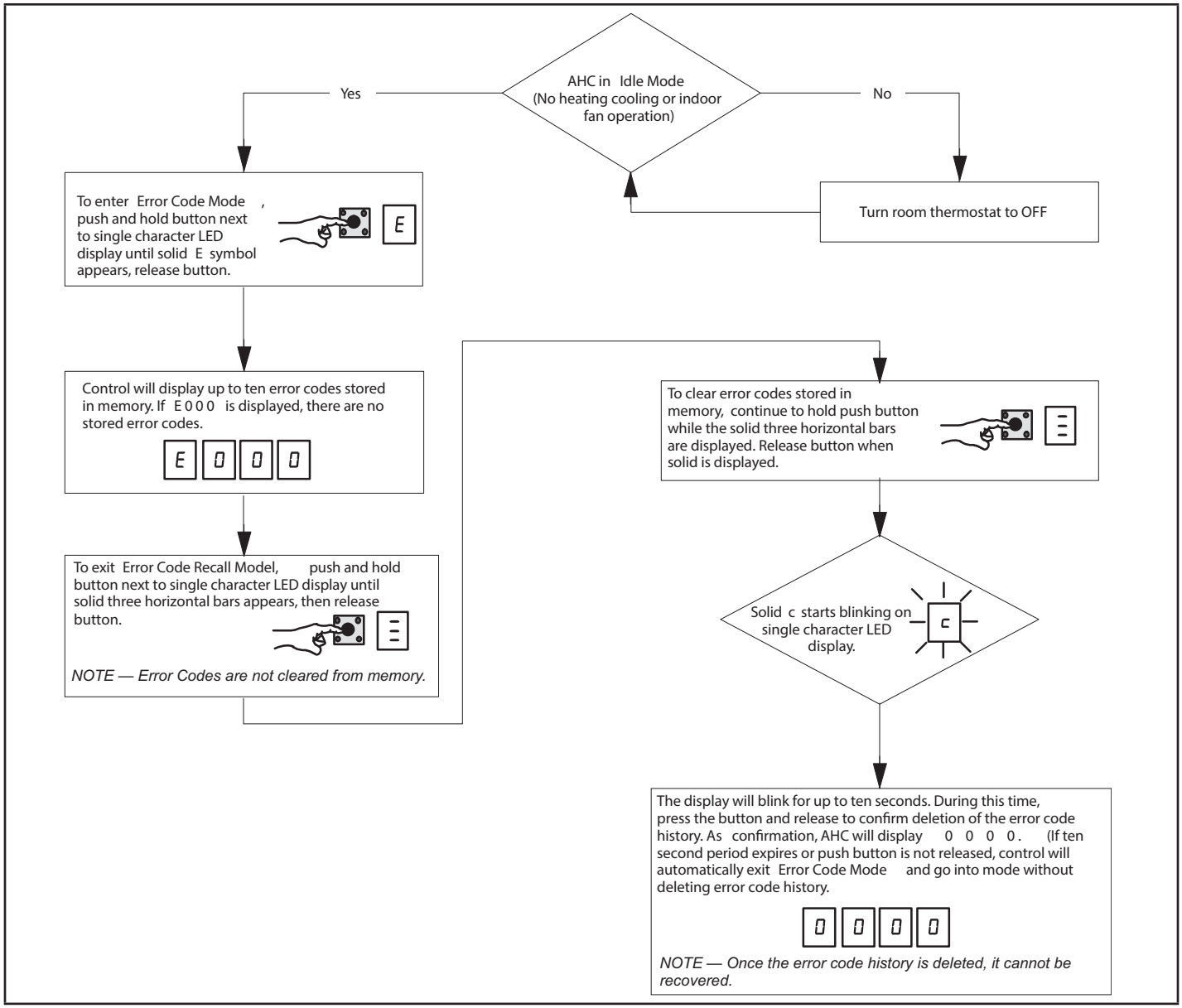
Y2 terminal is an input to the AHC. The indoor blower will be controlled according to the jumper pin selections.

Yes

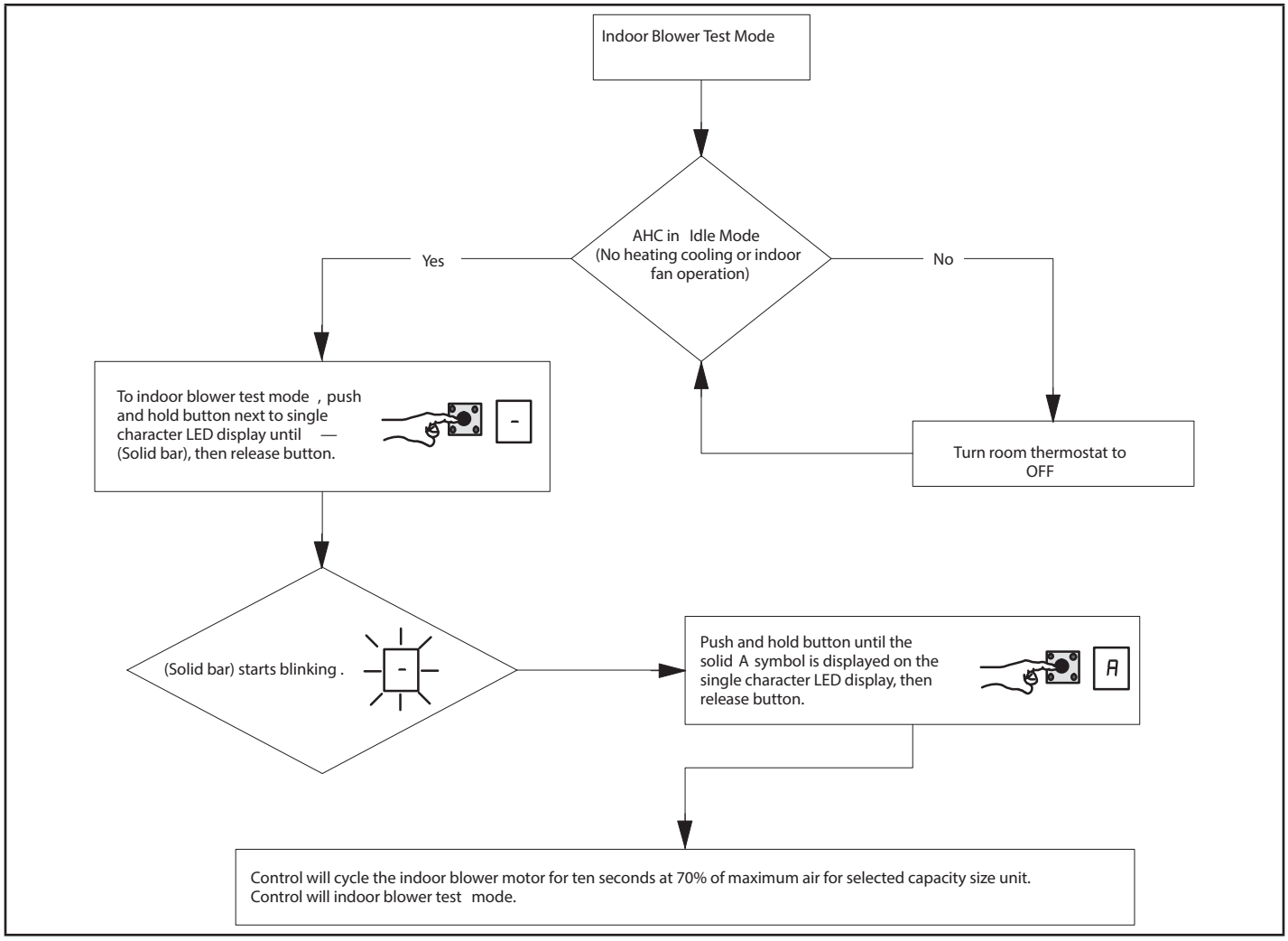
Still calling for second stage?

No

Error Code / Recall Mode



Indoor Blower Test



Operation

COOLING (COOLING ONLY OR HEAT PUMP)

When the thermostat calls for cooling, 24 volts is applied to the blower time-delay relay coil. After a delay, 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 and after the relay's time-delay, the compressor and outdoor fan will cycle 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 applied to the blower time-delay relay coil. After a delay, 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. Circuit R and G energizes the blower relay, starting the indoor blower motor.

If the room temperature continues to decrease, 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.

Repairing or Replacing Cabinet Insulation

⚠ IMPORTANT

DAMAGED INSULATION MUST BE REPAIRED OR REPLACED before the unit is put back into operation. Insulation loses its insulating value when wet, damaged, separated or torn.

Matte- or foil-faced insulation is installed in indoor equipment to provide a barrier between outside air conditions (surrounding ambient temperature and humidity) and the varying conditions inside the unit. If the insulation barrier is damaged (wet, ripped, torn or separated from the cabinet walls), the surrounding ambient air will affect the inside surface temperature of the cabinet. The temperature/humidity difference between the inside and outside of the cabinet can cause condensation on the inside or outside of the cabinet which leads to sheet metal corrosion and subsequently, component failure.

REPAIRING DAMAGED INSULATION

Areas of condensation on the cabinet surface are an indication that the insulation is in need of repair.

If the insulation in need of repair is otherwise in good condition, the insulation should be cut in an X pattern, peeled open, glued with an appropriate all-purpose glue and placed back against the cabinet surface, being careful to not overly compress the insulation so the insulation can retain its original thickness. If such repair is not possible, replace the insulation. If using foil-faced insulation, any cut, tear, or separations in the insulation surface must be taped with a similar foil-faced tape.

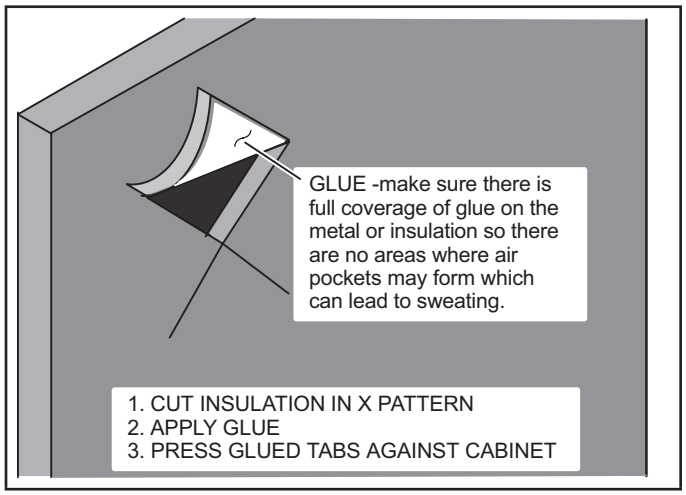


FIGURE 32. Repairing Insulation

⚠ 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 1/2" 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 electrical shock hazard that could cause personal injury or death.

Homeowner Maintenance

⚠ IMPORTANT

Do not operate system without a filter. A filter is required to protect the coil, blower, and internal parts from excessive dirt and dust. The filter is placed in the return duct by the installer.

- Inspect air filters at least once a month and replace or clean as required. Dirty filters are the most common cause of inadequate heating or cooling performance.
- Replace disposable filters. Cleanable filters can be cleaned by soaking in mild detergent and rinsing with cold water.
- Install new/clean filters with the arrows on the side pointing in the direction of airflow. Do not replace a cleanable (high velocity) filter with a disposable (low velocity) filter unless return air system is properly sized for it.
- If water should start coming from the secondary drain line, a problem exists which should be investigated and corrected. Contact a qualified service technician.

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.

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.

RDS Verification Test

The RDS Communicating Blower Control Board is equipped with a RDS Control Test/Reset button, see “RDS Control Button Functionality” on page 66. When power is applied to the Air Handler Control Board, 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 Communicating Blower Control Board. The system then executes a leak detection response.

3 - Observe the following sequence:

a. The blower powers up.

b. The outdoor compressor powers down.

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

Heating Demand

1 - Prompt a heating demand at the thermostat.

2 - Press the RDS Control button on the RDS Communicating Blower Control Board. The system then executes a leak detection response.

3 - Observe the following sequence:
   a. The blower powers up.
   b. The electric heat powers down.
   c. The outdoor compressor powers down.

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

RDS Control Button Functionality

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

Table 5 lists the functions of the Test button during each mode of operation.

TABLE 5. RDS Control Button Function

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

RDS Control Button – Additional Functions

Table 6 lists the additional functions of the RDS Control Button while the RDS Communicating Blower Control Board is functioning within the states of Initializing, Monitoring, Leak Detection, Servicing and Fault.

TABLE 6. Additional Button Functions

State	Press	Action
Initializing	Short	Skips remaining pre-purge after sensors are recognized by the RDS Communicating Blower Control Board
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

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.

FIGURE 33. Example of Clear, Unobstructed Sensor Inlet

Decommissioning

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

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

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure, ensure that:

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

d) Pump down refrigerant system, if possible.

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

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

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

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

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

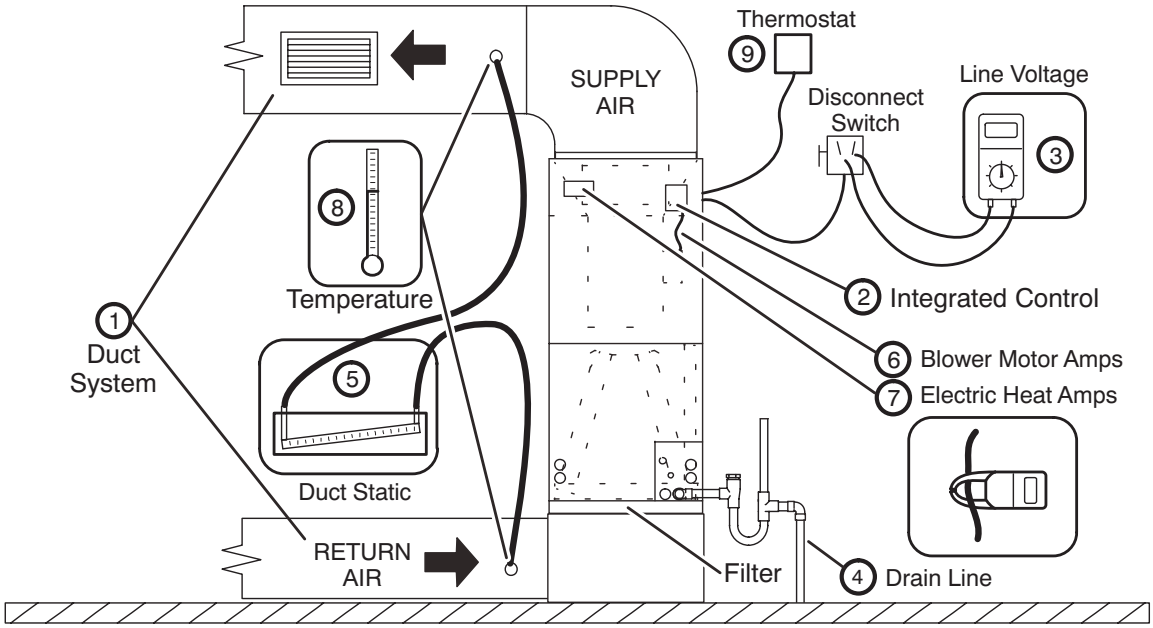
j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

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

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

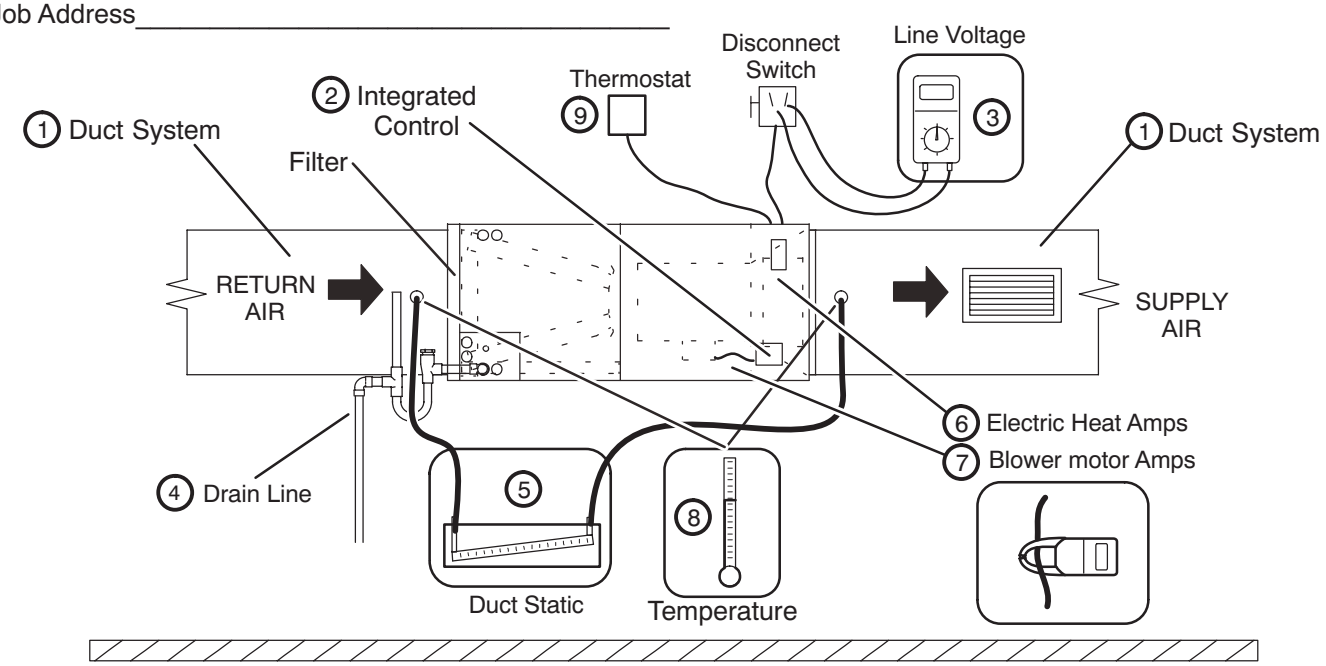
Technician's Name:_____Date Start–Up & Performance Check Completed_____

FIGURE 34. 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 35. Start-Up and Performance Checklist (Horizontal Configuration)