



©2019 Lennox Industries Inc.
Dallas, Texas, USA

THIS MANUAL MUST BE LEFT WITH THE HOMEOWNER FOR FUTURE REFERENCE

⚠ 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 13.

INSTALLATION INSTRUCTIONS

Dave Lennox Signature® Collection CBA38MV Units

MULTI-POSITION AIR HANDLERS
507725-02
12/2019

Table of Contents

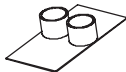
CBA38MV Upflow and Downflow Unit Dimensions	2
CBA38MV Horiz. LH/RH Discharge Unit Dimensions ...	3
General Information	4
Shipping and Packing List	4
Installation Clearances	4
Requirements	5
Installing the Unit	5
Brazing Connections	9
Installing the Condensate Drain	11
Inspecting and Replacing Filters	12
Sealing the Unit	12
Field Control Wiring	13
Air Handler Control Button, Display and Jumpers	25
Target CFM Tables	30
Unit Operating Sequences	32
Unit Operating Sequences	34
Heat Pump Operation (Heating and Cooling)	39
Cooling Operation	40
Error Code / Recall Mode	41
Indoor Blower Test	42
Operation	42
Repairing or Replacing Cabinet Insulation	43
Homeowner Maintenance	43
Professional Maintenance	43

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

IMPORTANT INFORMATION FOR INSTALLER

CHECK FOR AND REMOVE THE FOLLOWING ITEMS BEFORE OPERATING UNIT.

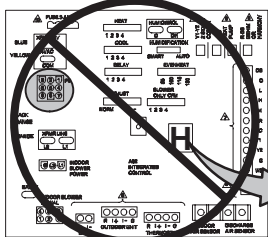
A BLOWER HOUSING SUPPORT PAD.



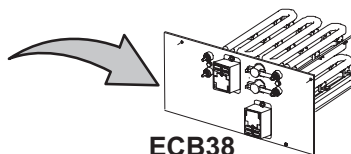
B HORIZONTAL DRAIN PAN (SEE UPFLOW APPLICATIONS ON PAGE 5 AND DOWNFLOW APPLICATIONS ON PAGE 8)

C REFRIGERANT LINE PLUGS (SEE BRAZING CONNECTION ON PAGE 9).

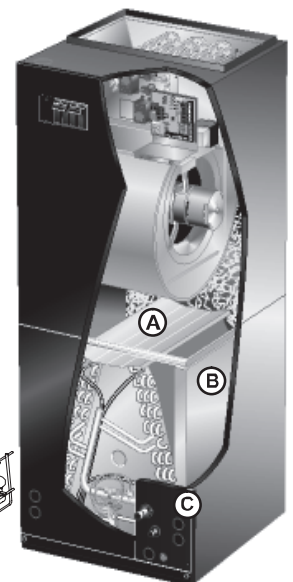
Important Update: The CBA38MV Air Handler Control (AHC) has been enhanced to automatically configure (set-up) the electric heat when the ECBA38 electric heat harness is connected to CBA38MV air handler. Manual Configuration of the electric heat using the push button is no longer required. See page 32.



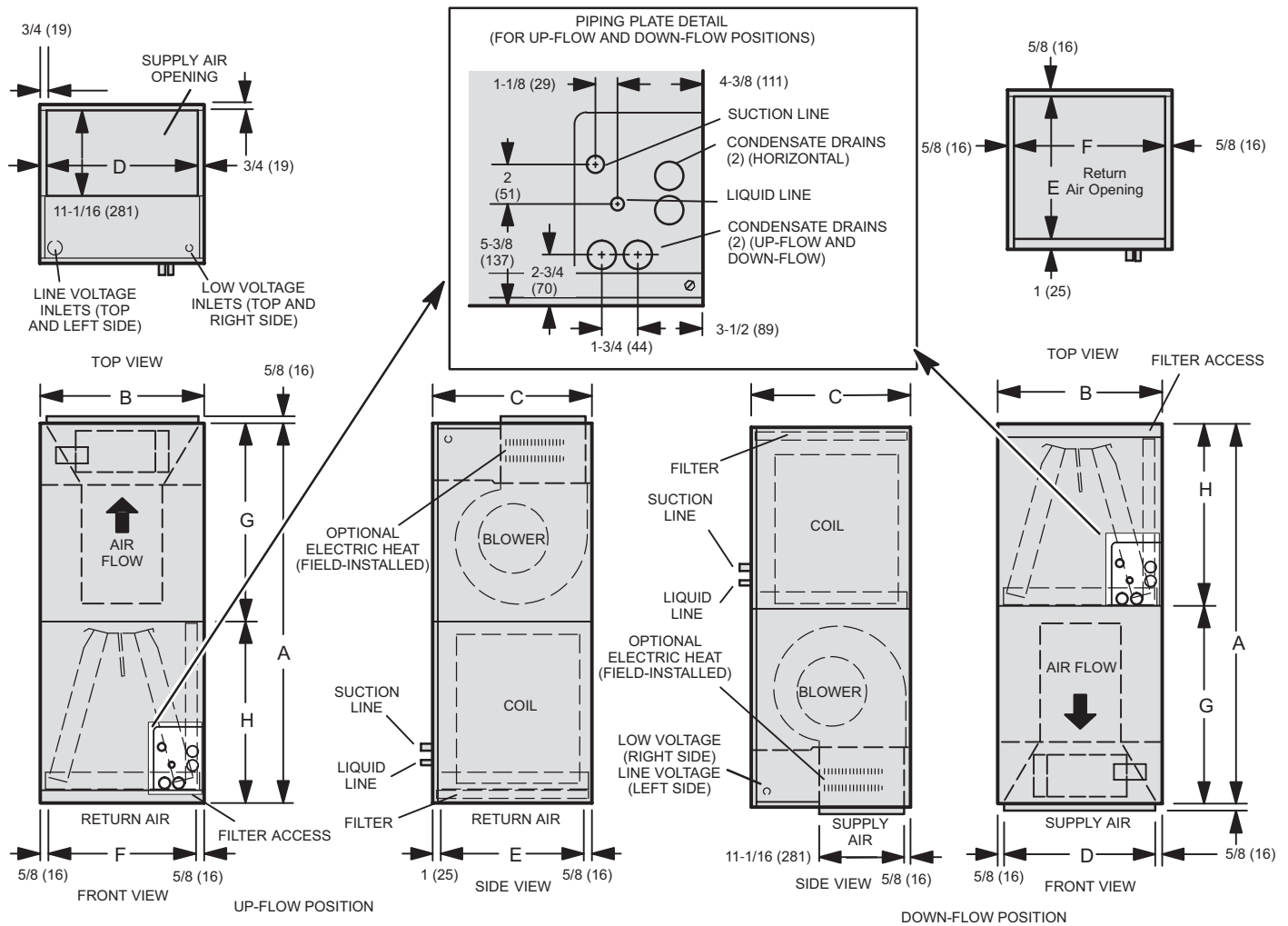
CONFIGURE ELECTRIC HEAT



ECB38



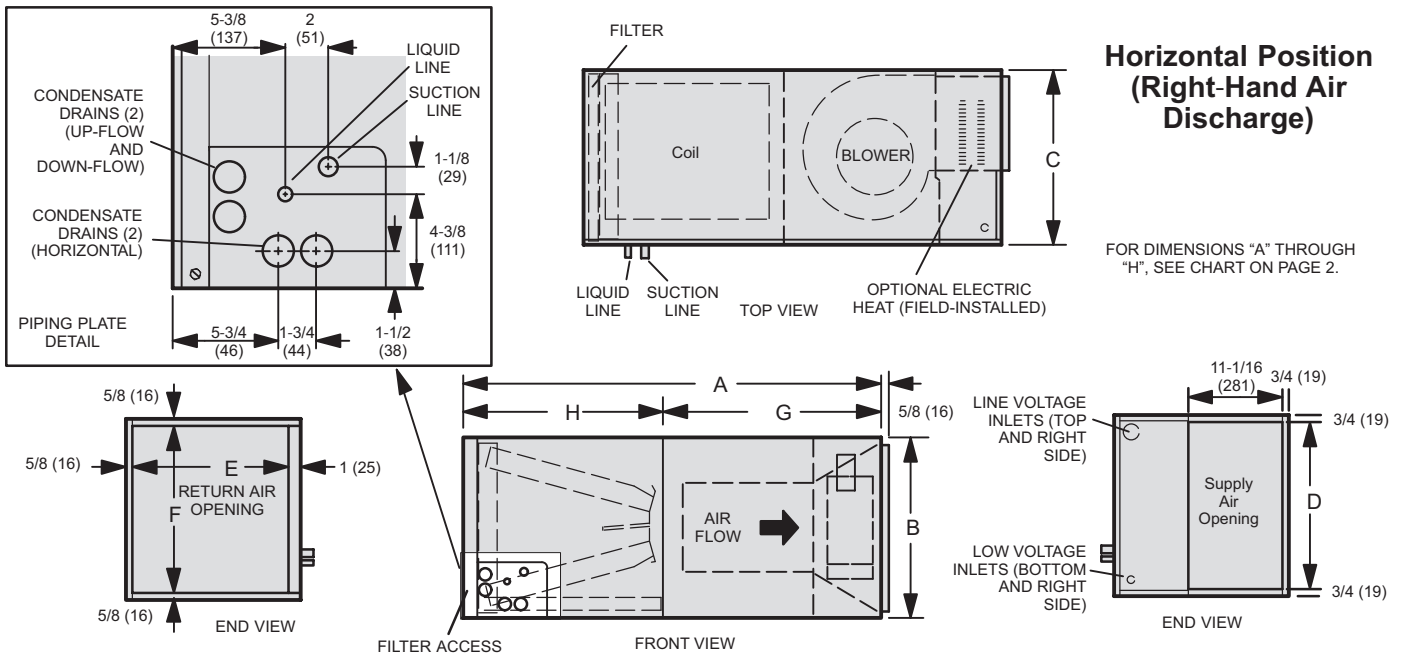
CBA38MV Upflow and Downflow Unit Dimensions – Inches (mm)



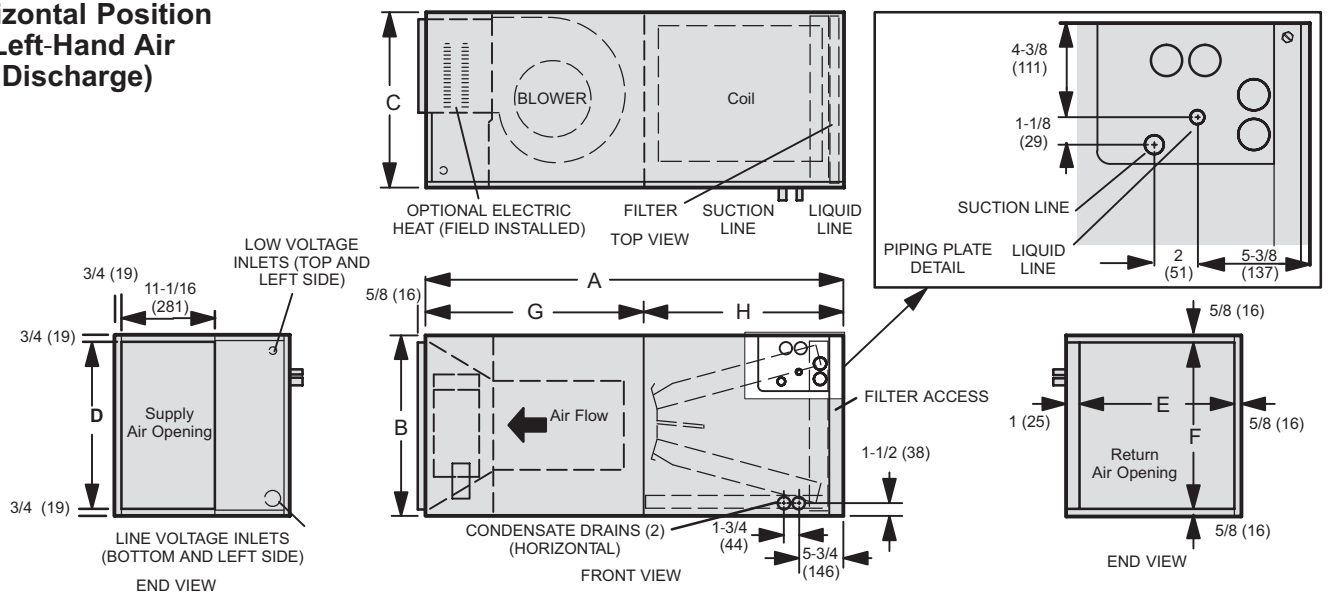
CBA38MV Common Dimensions - Inches (mm)

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

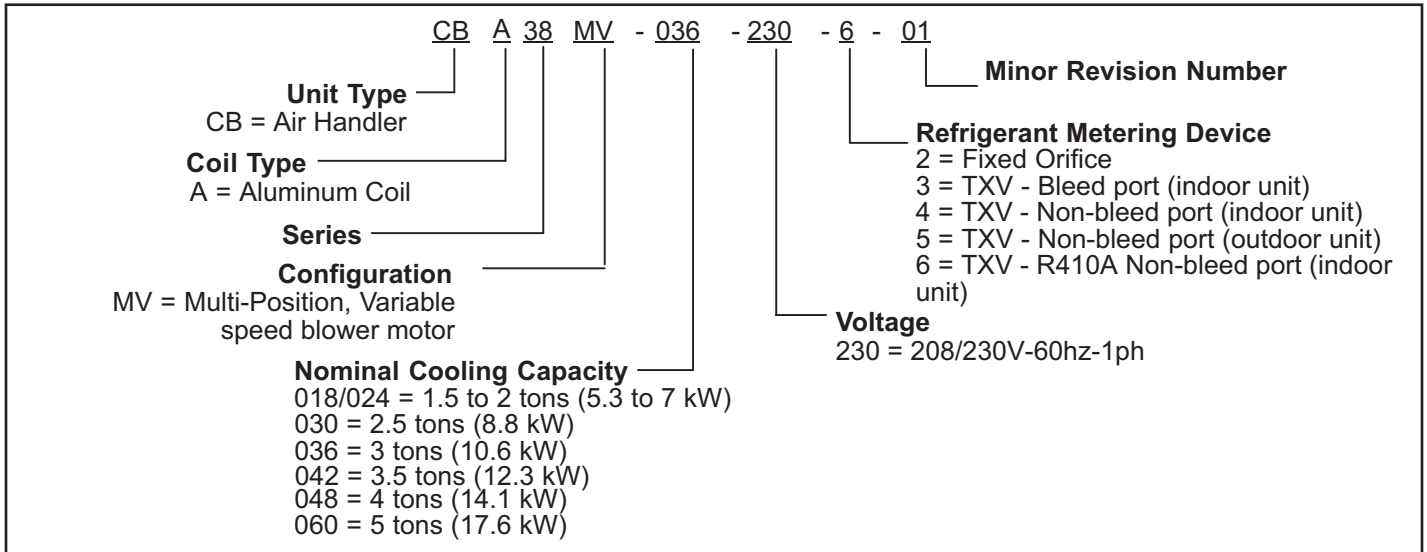
CBA38MV Horizontal Left- and Right-Hand Discharge Unit Dimensions – Inches (mm)



Horizontal Position (Left-Hand Air Discharge)



Model Number Identification



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.

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 HFC-410A 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 CBA38MV air handlers are equipped with a factory-installed, internally mounted check / expansion valve, which is suitable for use in HFC-410A 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 the 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.

These instructions are intended as a general guide and do not supersede local or national codes in any way. Consult authorities having jurisdiction before installation.

Shipping and Packing List

Package 1 of 1 contains:

- 1 – Assembled air handler unit
- 1 – Pipe nipple (Sch80, 3/4" I.D. x 5")
- 1 – Downflow shields and foam tapes (required for downflow configuration only)
- 1 – Horizontal drip shield (CBA38MV-060 only)
- 1 – Warranty card

Check the air handler for shipping damage; if found, immediately contact the last carrier.

Installation Clearances

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

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

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).

IMPORTANT

This unit must be matched with an indoor coil as specified in the Lennox Product Specifications (EHB). Coils previously charged with HCFC-22 must be flushed.

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), shall 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.

Installing the Unit

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.

DISASSEMBLE/REASSEMBLE AIR HANDLER UNITS

The air handler units consists of two factory-assembled sections. It may be necessary to disassemble the sections when positioning the unit for installation.

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 up-flow operations:

- 1 - Remove access panels.
- 2 - Remove and discard the horizontal drip shield (-060 model, used only on horizontal applications) and the corrugated padding between the blower and coil assembly.
- 3 - The horizontal drain pan must be removed when the coil blower is installed in the upflow position. Removing the horizontal drain pan will allow proper air flow and increased efficiency.
- 4 - After removing the horizontal drain pan, place the unit in the 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.
- 5 - 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.

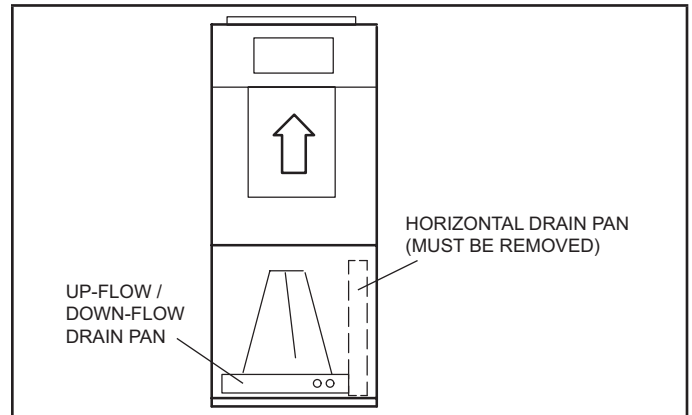


FIGURE 1. Upflow Configuration

TABLE 1. Optional Side-Return Unit Stand (Upflow Only)

Model	Kit Number
All unit sizes	45K32

HORIZONTAL RIGHT-HAND DISCHARGE APPLICATION

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.

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.

- 1 - No further adjustment is necessary. Set unit so that it is sloped 1/4" towards the drain pan end of the unit.
- 2 - 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" 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.

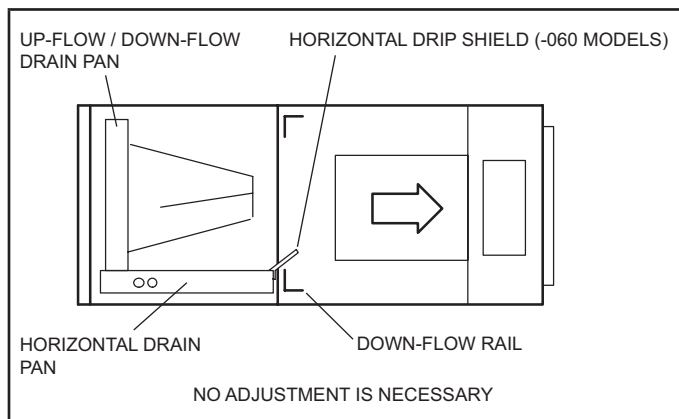


FIGURE 2. Right-Hand Discharge Configuration

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.

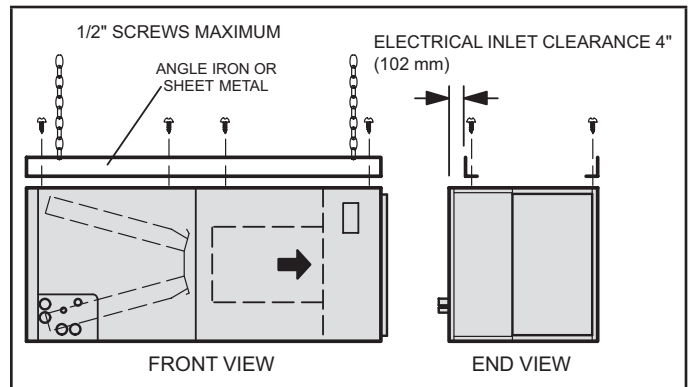


FIGURE 3. Suspending Horizontal Unit

! 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

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.)

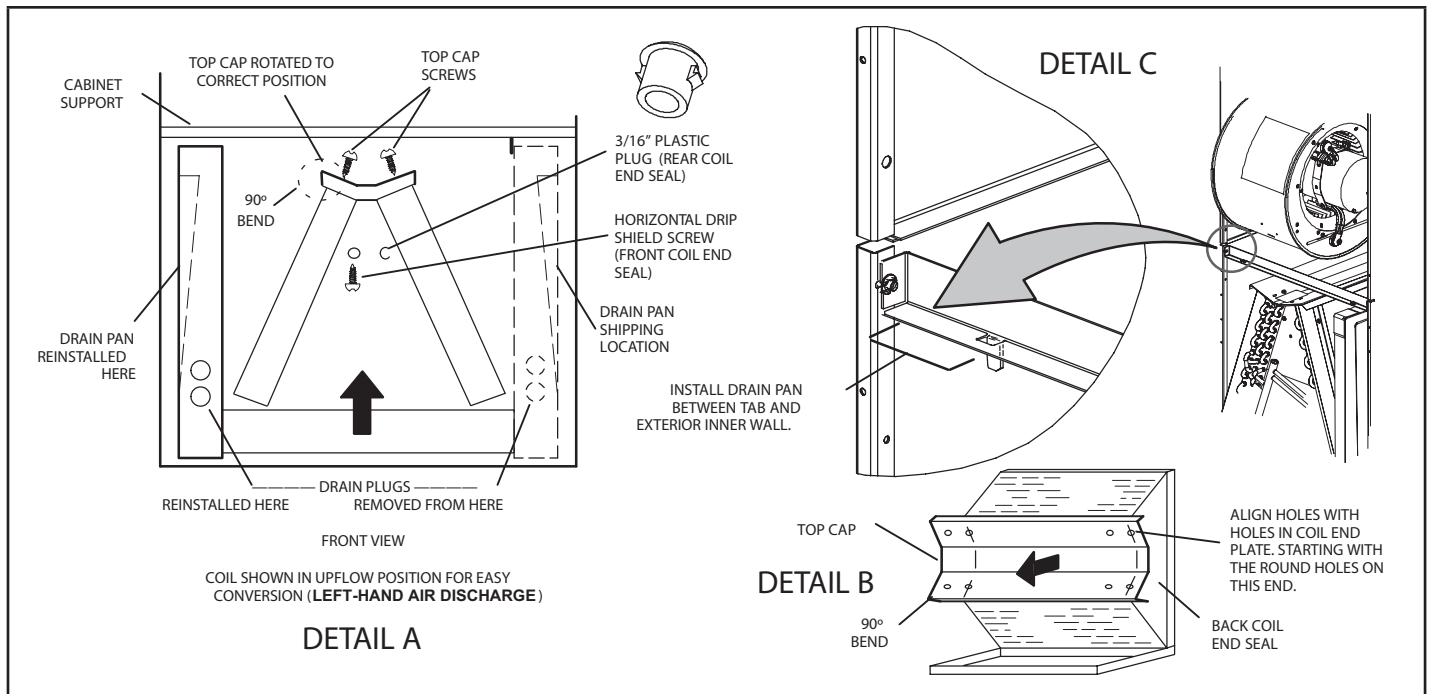


FIGURE 4. Field Modification for Left-Hand Discharge

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

- 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.

⚠ 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.

- 3 - Rotate drain pan 180° 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 on page 5.
- 5 - Rotate horizontal drip shield 180° 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.

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

- 7 - From the upflow position, flip cabinet 90° 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.

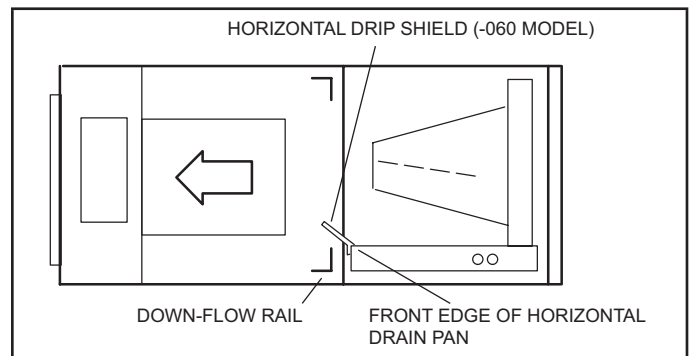


FIGURE 5. Left-Hand Discharge Configuration

- 8 - Install the horizontal shield (-060 model) on the front edge of the horizontal drain pan as illustrated in figure 5.

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.

- 9 - Knock out drain seal plate from access door. Secure plate to cabinet front flange with screw provided.
- 10 - Flip access door and replace it on the unit.
- 11 - 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.

12 - 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 on page 6. 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 CBA38MV 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 180° 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.

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"

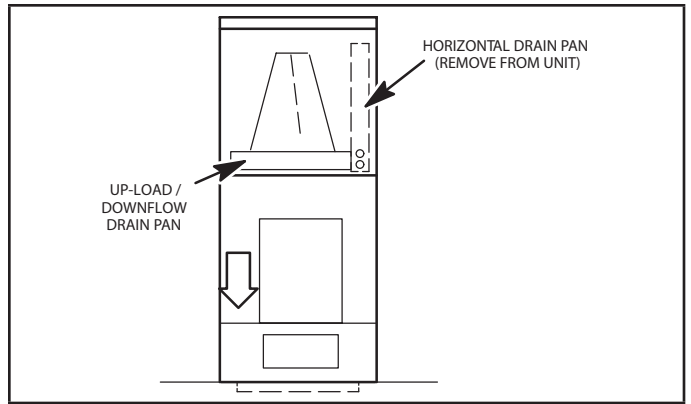


FIGURE 6. Downflow Discharge Position

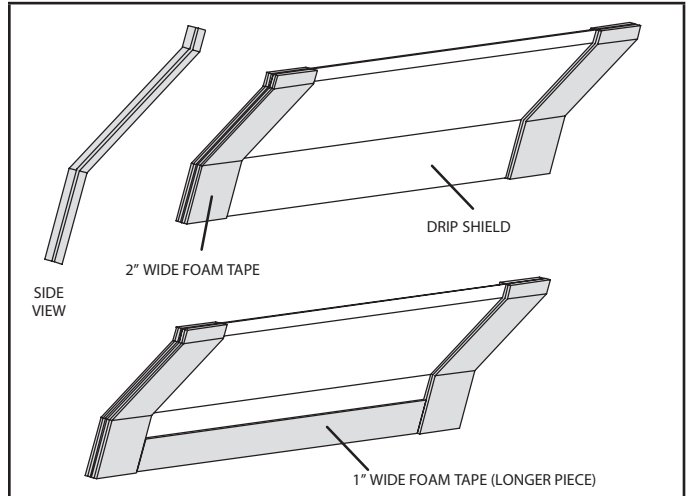


FIGURE 7. Applying Foam Tape to Drip Shield

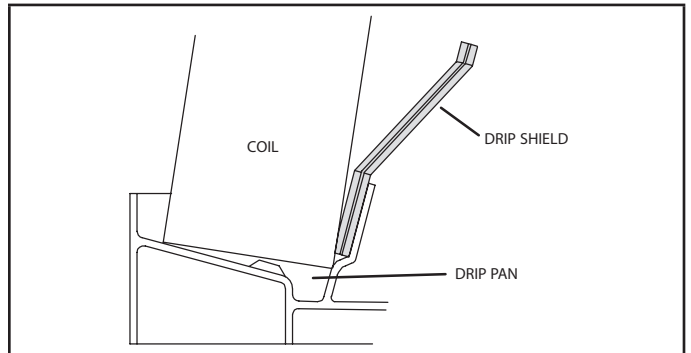


FIGURE 8. Downflow Drip Shields

- 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.

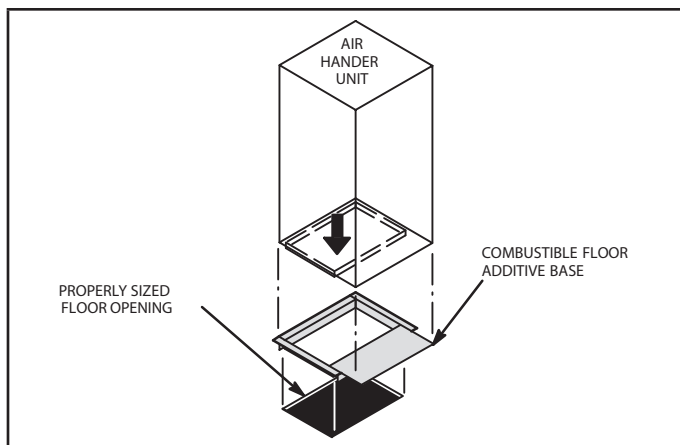


FIGURE 9. Downflow Combustable Flooring Base

- 8 - For downflow installation on combustable flooring, an additive base must be used as illustrated in figure 9 on page 9. See CBA38MV Product Specifications (EHB) for downflow combustable flooring base kits available for this air handler.
- 9 - Cut an opening appropriately sized for combustable 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.

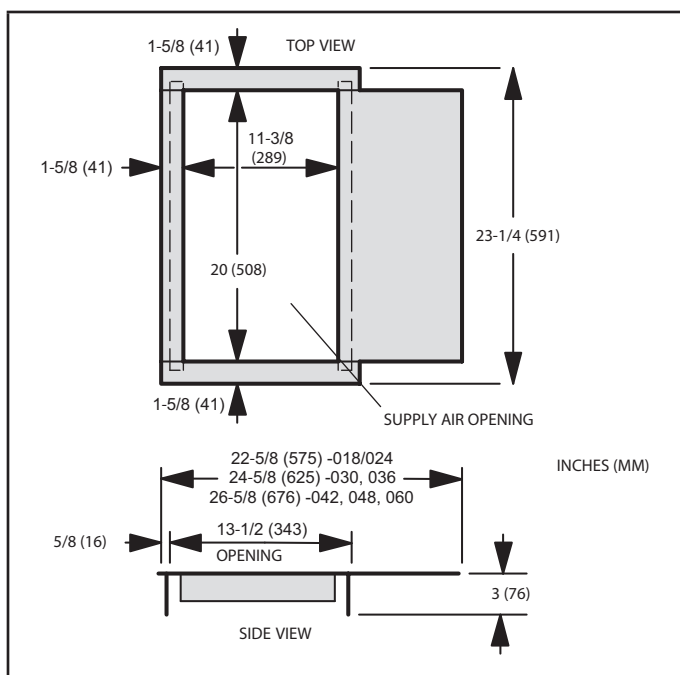


FIGURE 10. Downflow Combustable Base Dimensions

Brazing Connections

⚠ WARNING

Polyol ester (POE) oils used with HFC-410A 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.

⚠ 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).

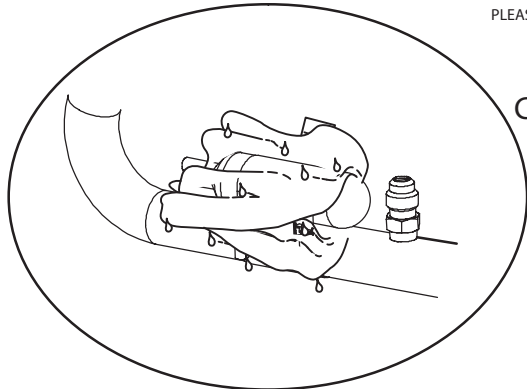
⚠ CAUTION

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.

⚠ 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.

PLEASE READ IMPORTANT ISSUES CONCERNING BRAZING OPERATIONS ON PAGE 10 BEFORE PROCEEDING.

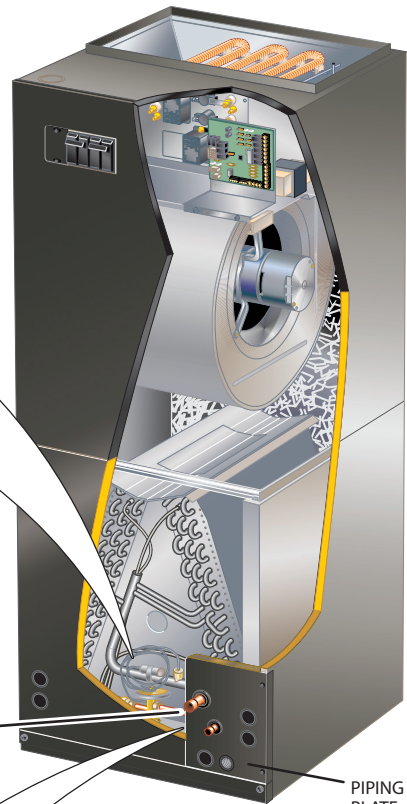
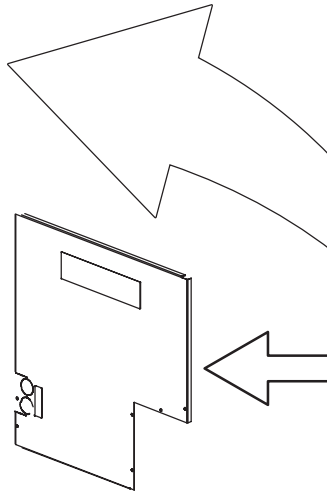


C USE A WET RAG TO PROTECT CTX SENSING BULB WHEN BRAZING SUCTION LINE CONNECTIONS.

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



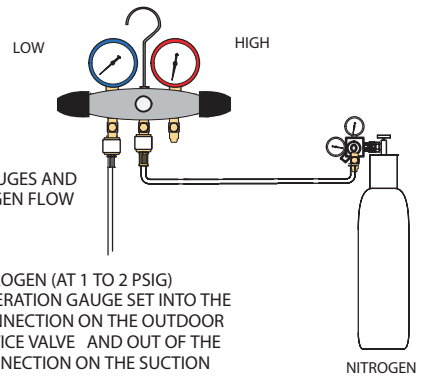
PIPING PLATE

B REMOVE RUBBER PLUG FROM BOTH LIQUID AND SUCTION LINES

NOTE — CBA38MV 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.

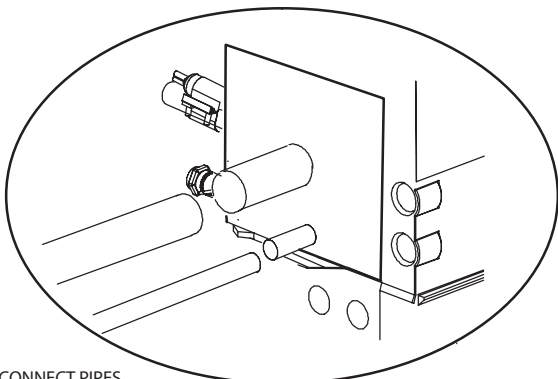
D EITHER REMOVE OR PUSH PIPE WRAPPING BACK THROUGH HOLE IN PIPING PLATE BEFORE LINE SET CONNECTION AND BRAZING.

F CONNECT GAUGES AND START NITROGEN FLOW



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

NITROGEN

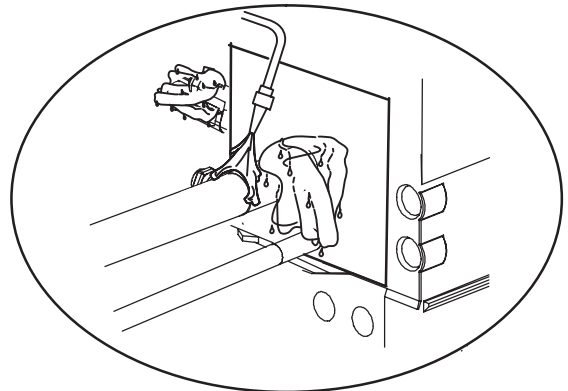


E CONNECT PIPES

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 CTX SENSING BULB AND PIPING PANEL AREA.



I REPEAT PREVIOUS PROCEDURE FOR LIQUID LINE.

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

FIGURE 11. Brazing Connections

TABLE 3. CBA38MV 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.

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 13 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 12 for main and overflow drain locations based on coil orientation.

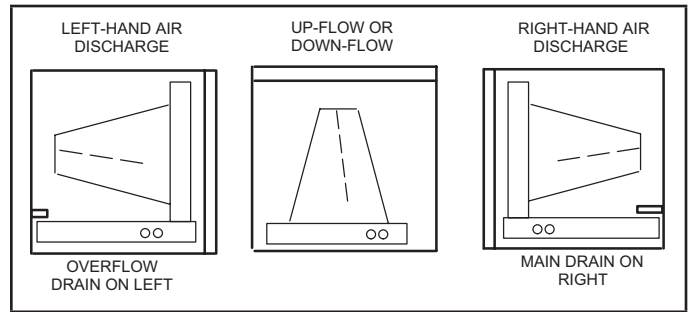


FIGURE 12. Main and Overflow Drain Locations Based on Coil Orientation

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.

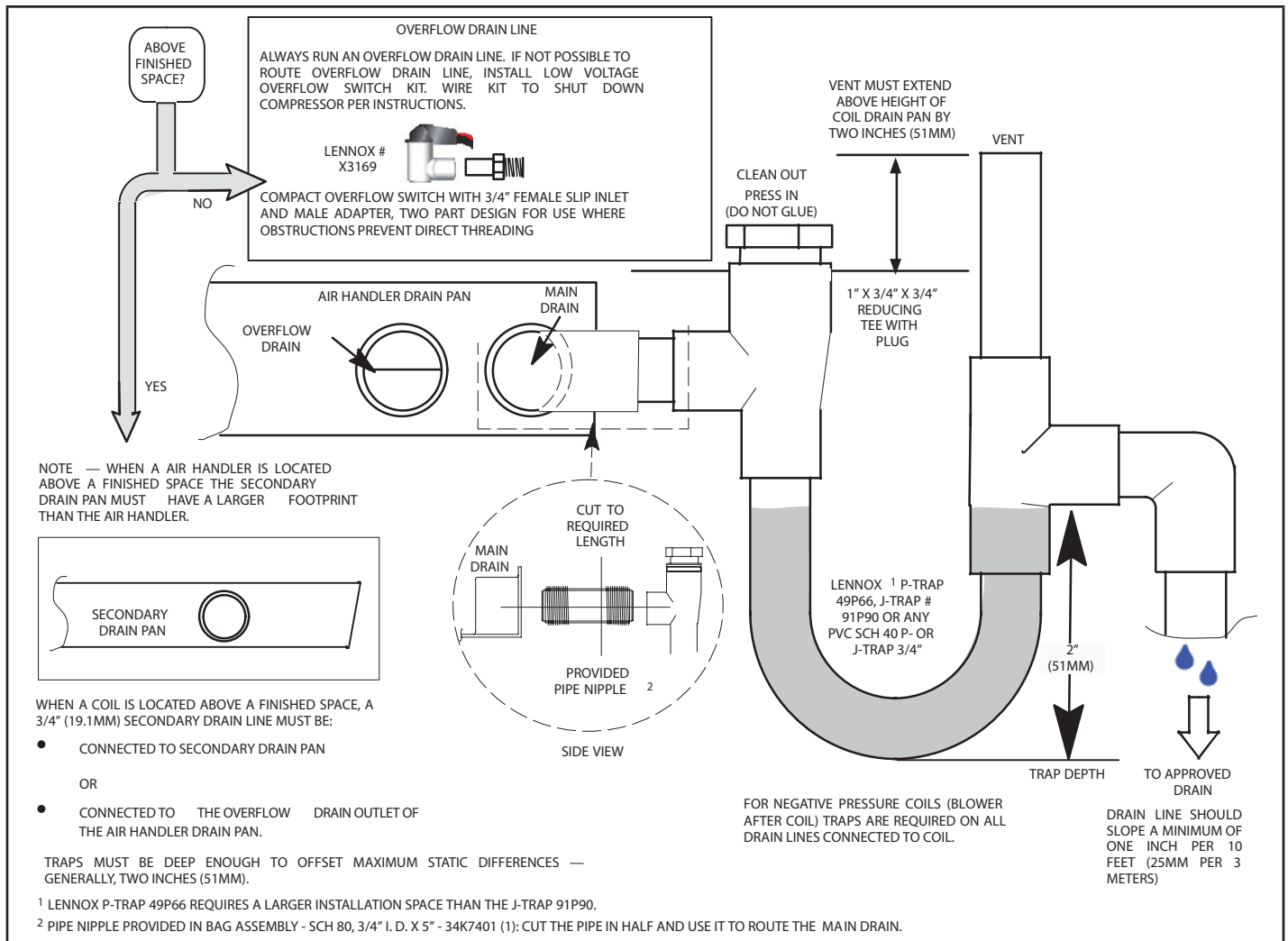


FIGURE 13. Typical Main and Overflow Drain Installations

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

CBA38MV	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, Permagem 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 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 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.

NOTE – For proper voltages, select thermostat wire gauge per the following chart:

CAUTION

ELECTROSTATIC DISCHARGE (ESD)

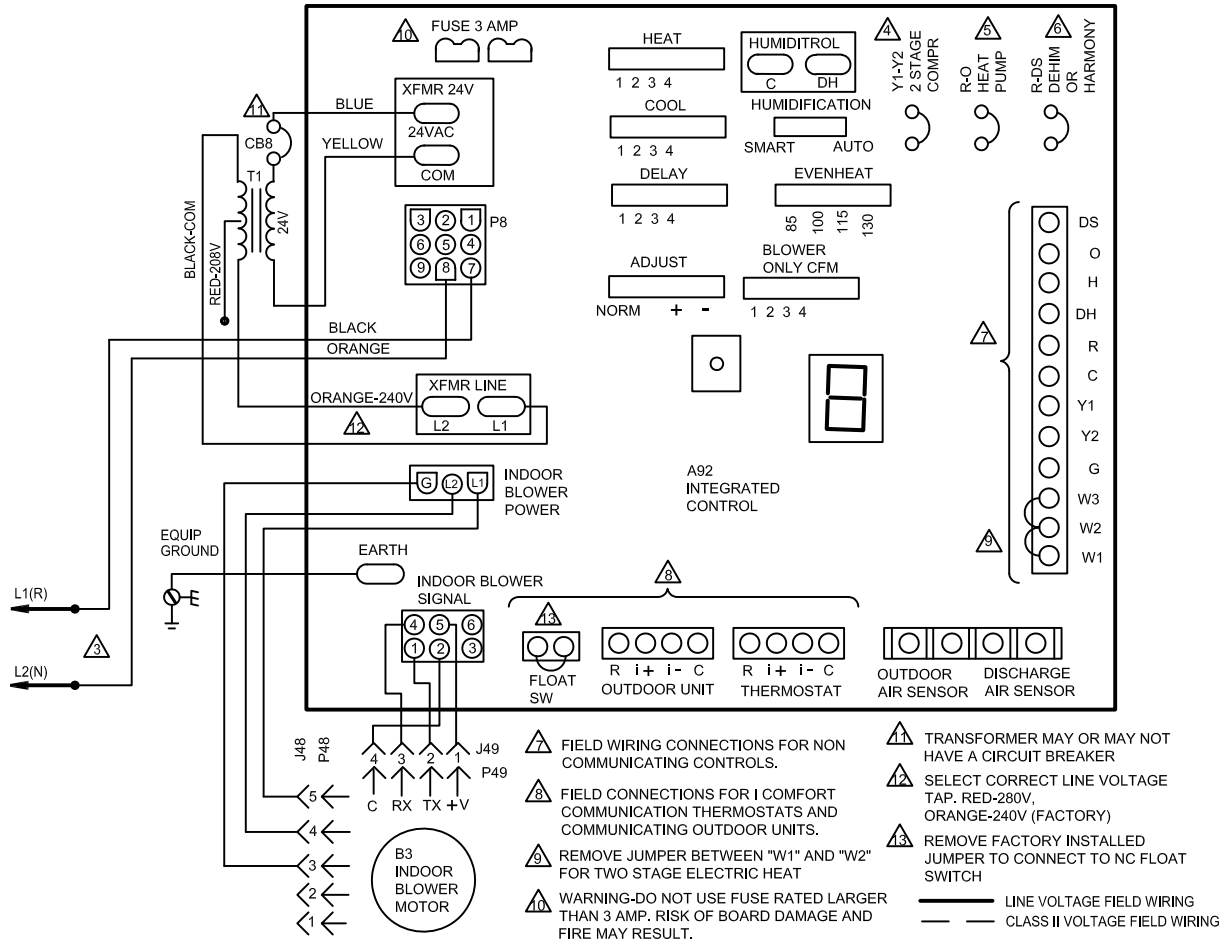
Precautions and Procedures

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.

RECOMMENDED BLOWER SPEED TAP SELECTION

KEY	DESCRIPTION
A92	CONTROL-INTEGRATED
B3	MOTOR-BLOWER
J48	JACK-MOTOR VARIABLE SPEED
J49	JACK-MOTOR VARIABLE SPEED
P8	PLUG-ELECTRIC HEAT
P48	PLUG-MOTOR VARIABLE SPEED
P49	PLUG-MOTOR VARIABLE SPEED
T1	TRANSFORMER-CONTROL

MODEL	BLOWER COIL	SPEED TAP SELECTION			
		COOL		HEAT	
		CONDENSING UNIT	HEAT PUMP	CONDENSING UNIT WITH ELECTRIC HEAT ONLY	HEAT PUMP WITH ELECTRIC HEAT
CBX40UHV/ CBX32MV	-018, -024 -030, -036	PIN #3	PIN #3	PIN #4	PIN #4
	-042	PIN #3	PIN #3	PIN #3	PIN #3
	-048	PIN #2	PIN #2	PIN #1	PIN #1
	-060	PIN #3	PIN #3	PIN #1	PIN #1
CBA38MV	-068	PIN #3	PIN #3	PIN #4	PIN #4
	-018	PIN #2	PIN #2	4 MINUS	4 MINUS
	-024				
	-030	PIN #3	PIN #3	PIN #3	PIN #3
	-036				
	-042	PIN #3	PIN #3	PIN #3	PIN #3
	-048	PIN #2	PIN #2	PIN #2	PIN #2
	-060	PIN #3	PIN #3	PIN #3	PIN #3



- 1 REFER TO FACTORY BLOWER SPEED TAP SELECTION CHART ON UNIT FOR BLOWER SPEED INFORMATION.
- 2 NEC/CEC CLASS 2 3VA
- 3 USE COPPER CONDUCTORS ONLY. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE
- 4 CLIP LINK "Y1" TO "Y2" FOR TWO STAGE UNIT
- 5 CLIP LINK "R" TO "O" WHEN HEAT PUMP IS USED
- 6 CLIP LINK BETWEEN "R" AND "DS" WHEN DEHUMIDIFICATION CONTROL IS USED

LENNOX COILS-BLOWER COIL UNITS

CBX32MV, CBX40UHV, CBA38MV

COIL SECTION-

Supersedes

Form No. 538057-01

08/19

FIGURE 14. CBA38MV Air Handler Unit Typical Wiring Diagram

DETAIL A

THE AIR HANDLER CONTROL (AHC) HAS TWO SCREW TERMINALS MARKED DISCHARGE AIR SENSOR. THE SENSOR IS REQUIRED FOR EVENHEAT OPERATION, IS FIELD-MOUNTED AND MUST BE ORDERED SEPARATELY (CATALOG # 88K38).

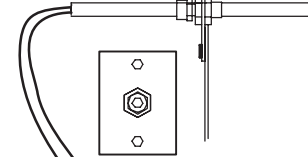
DISCHARGE SENSOR (DAT)

TEMPERATURE RESISTANCE CHART

TEMP °F	RESISTANCE (OHMS)
30	34,566
40	26,106
50	19,904
60	15,313
70	11,884
80	9,298
90	7,332
100	5,826

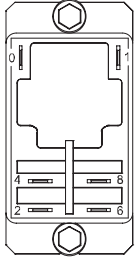
FASTEN THE PROBE BRACKET TO THE PLENUM WITH TWO SELF-TAPPING SHEET METAL SCREWS.

PLENUM

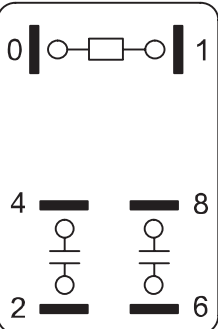


NOTE - Due to varying duct designs and air flow conditions, relocation of the discharge sensor may be required to insure accurate sensing.

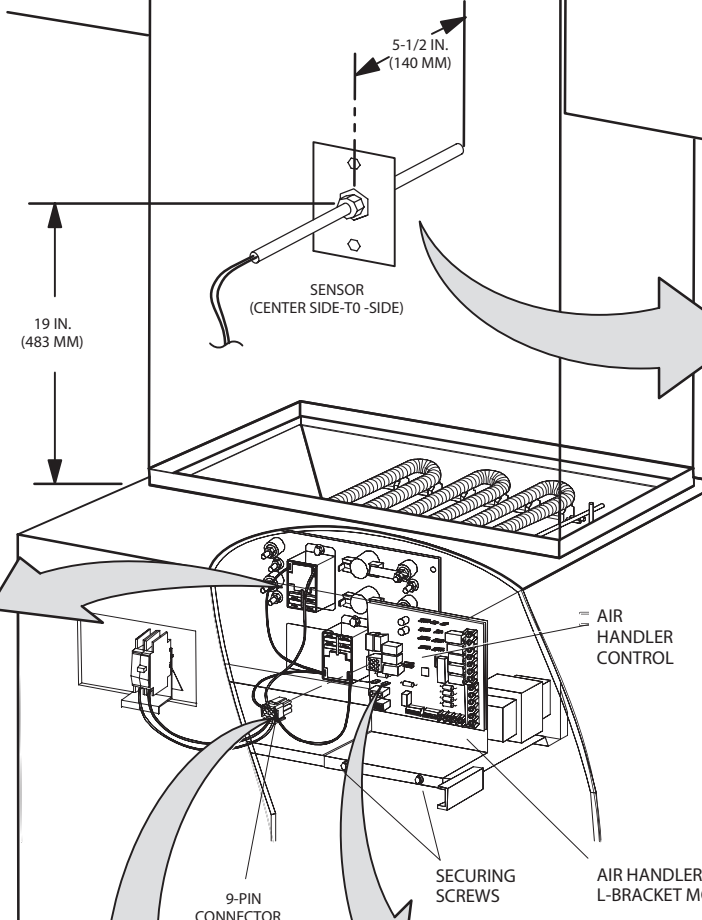
ELECTRIC HEAT RELAY PART NO. 49W91



22V DIRECT CURRENT COIL



30 AMP CONTACT RATING



5-1/2 IN. (140 MM)

19 IN. (483 MM)

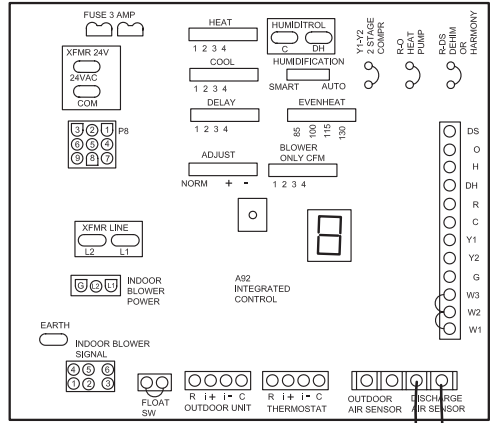
SENSOR (CENTER SIDE-TO-SIDE)

AIR HANDLER CONTROL

AIR HANDLER CONTROL L-BRACKET MOUNTING PLATE

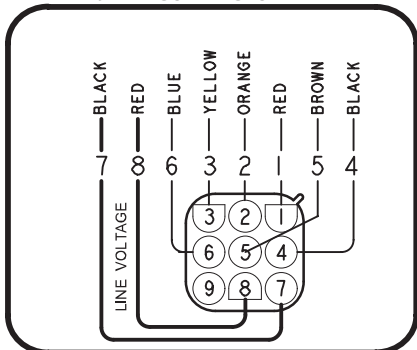
CBA38MV AIR HANDLER CONTROL PART NO. 16X40

9-PIN CONNECTOR



CONNECT WIRES TO DISCHARGE AIR SENSOR TERMINAL ON AIR HANDLER CONTROL.

9-PIN CONNECTOR



DETAIL B

NOTE — EVENHEAT MODE CANNOT BE ENABLED WITH HARMONY III DUE TO EACH CONTROL REQUIRING ITS OWN DISCHARGE AIR SENSOR.

FIGURE 15. Component Connections

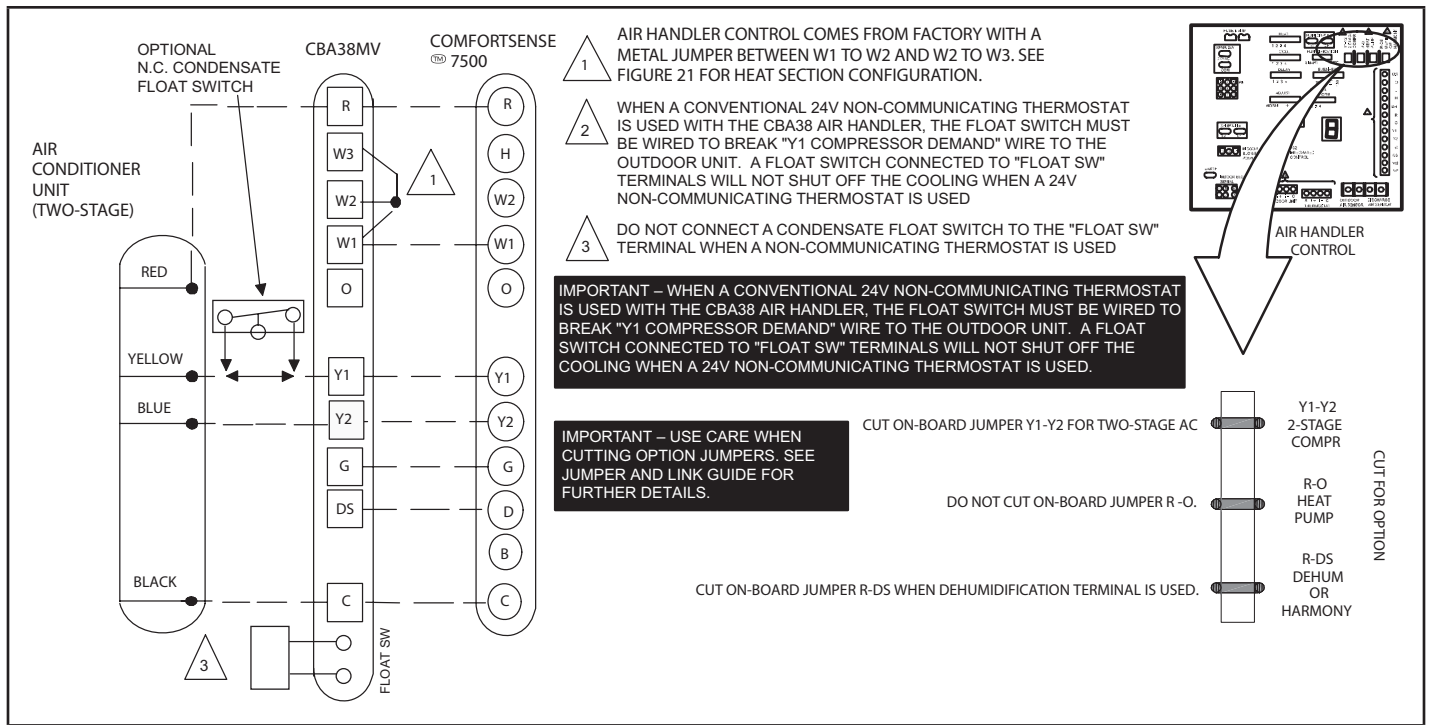


FIGURE 16. Control (Field Wiring) – Cooling Application (Non-Communicating)

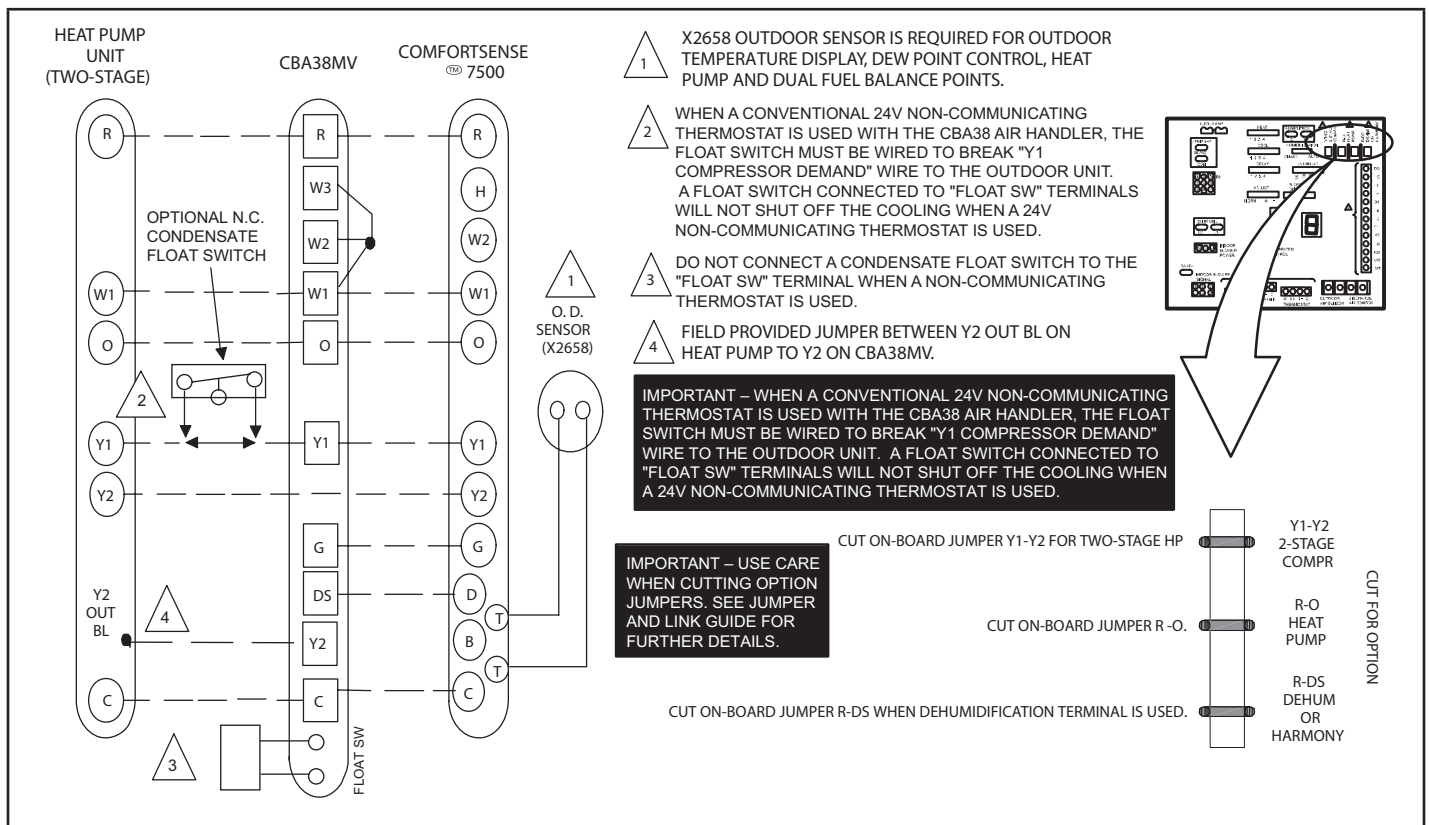


FIGURE 17. Control (Field Wiring) – Heat Pump (Non-Communicating)

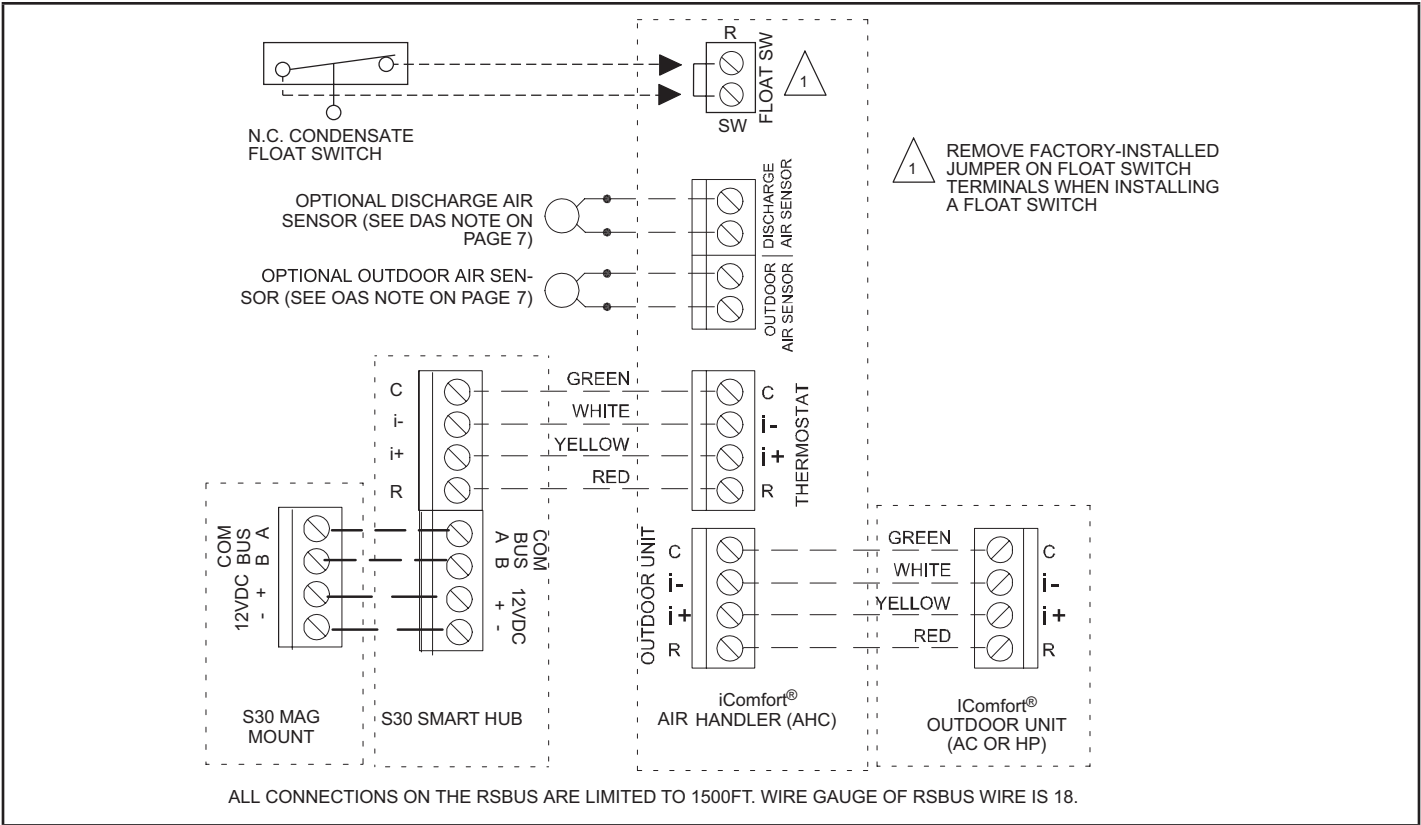


FIGURE 18. iComfort® Communicating System Wiring

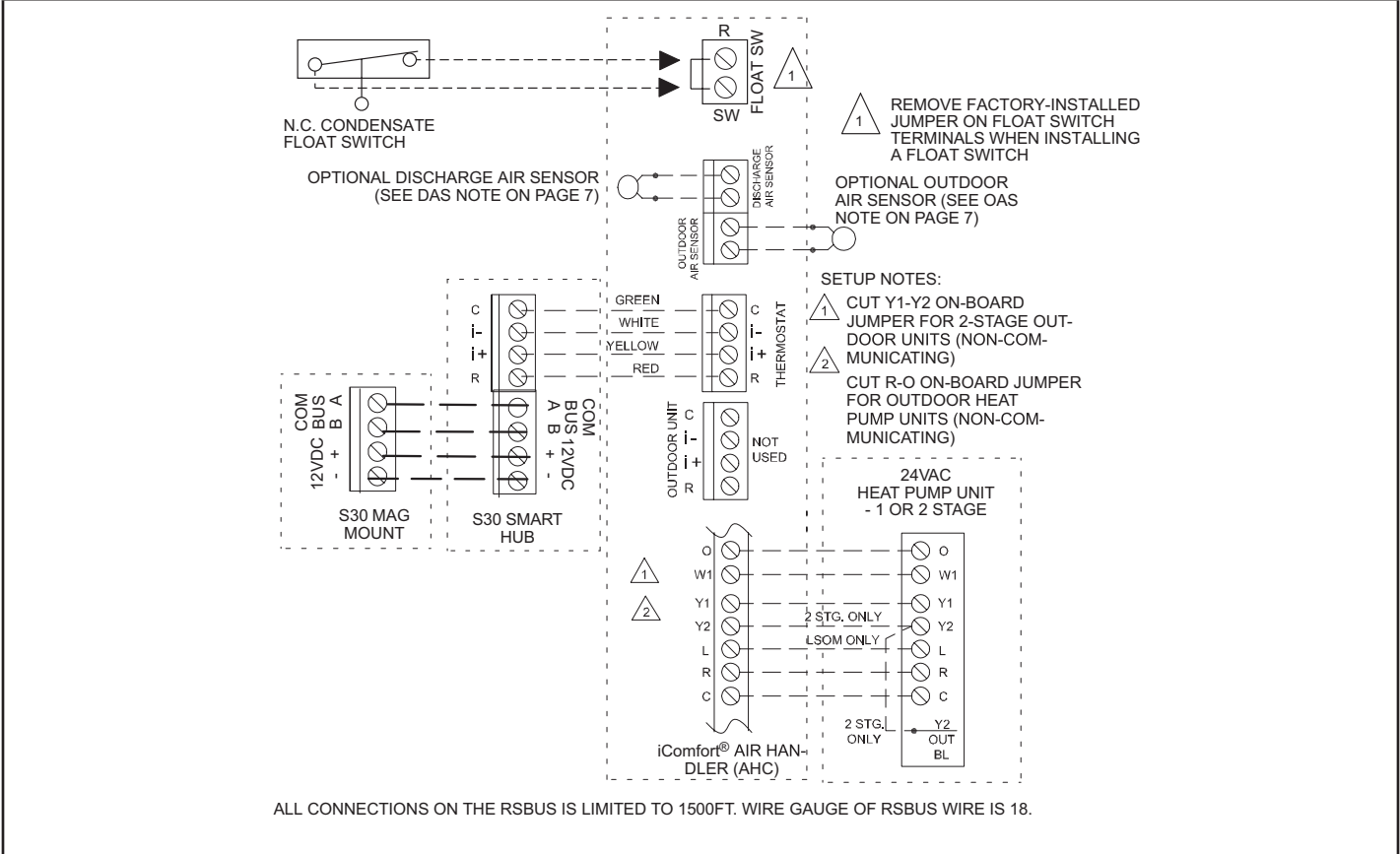
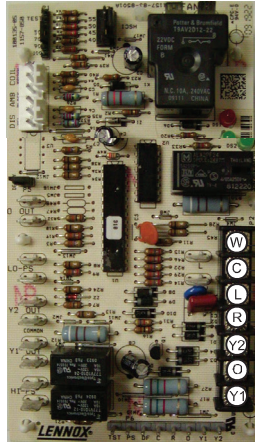


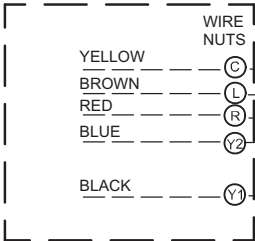
FIGURE 19. iComfort® Communicating Indoor / Non-Communicating Outdoor (HP) System Wiring

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

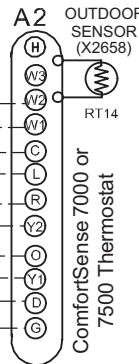
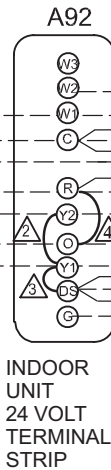
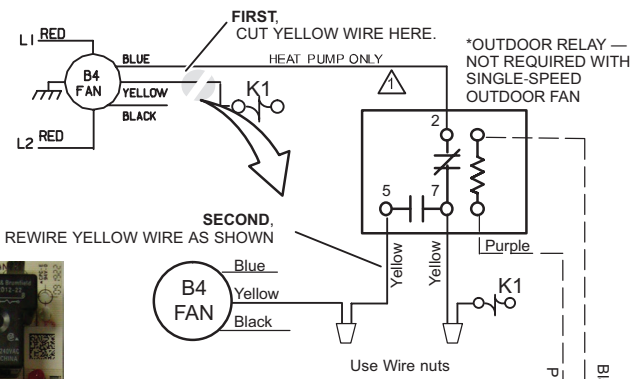
A108



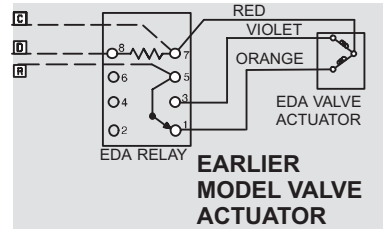
OUTDOOR UNIT DEFROST BOARD (HP)



OUTDOOR UNIT CONTROL WIRES (AC)

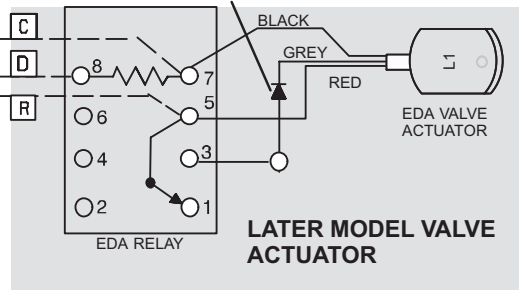


- ⚠ XP19-024 UNITS COME FACTORY WIRED FOR LOW OUTDOOR FAN SPEED ONLY. HIGH SPEED Y2 (BLUE WIRE) IS NOT CONNECTED. BE SURE TO CONNECT BLUE Y2 WIRE TO TERMINAL OF OUTDOOR RELAY.
- ⚠ Y1—Y2 JUMPER - ONLY REMOVE IF 2-STAGE COOLING
- ⚠ DS—Y1 JUMPER - MUST BE REMOVED FOR HUMIDITROL OPERATION
- ⚠ HEAT PUMP APPLICATIONS ONLY - REMOVE R—O JUMPER.



EDA

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



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

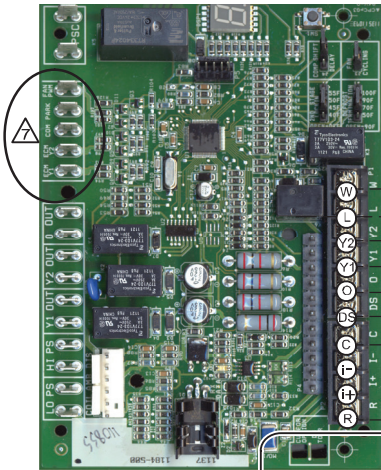
FIGURE 20. Field Wiring (Non-Communicating Systems)

Components	
Unit	Type
Thermostat	ComfortSense® 7000 or 7500
Indoor	Conventional 24V
Outdoor	iComfort®-enabled

Operation sequence for dehumidification

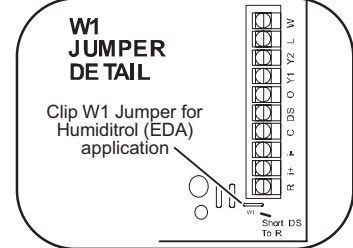
1. REMOVE 24 VOLTS FROM DH AND/OR DS
2. THERMOSTAT CYCLES OUTDOOR UNITS TO Y2
3. INDOOR AND OUTDOOR FAN SPEEDS REDUCED

OUTDOOR UNITS (A175)

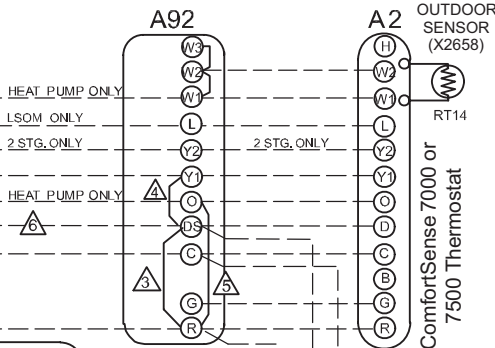
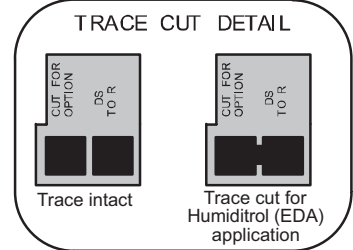


SEE W1 JUMPER DETAIL

⚠️ DS—R (W1) JUMPER - MUST BE CUT FOR HUMIDITROL OPERATION. SEE W1 JUMPER DETAIL.



⚠️ DS—R TRACE ON A175 - MUST BE CUT FOR HUMIDITROL OPERATION. SEE TRACE CUT DETAIL.



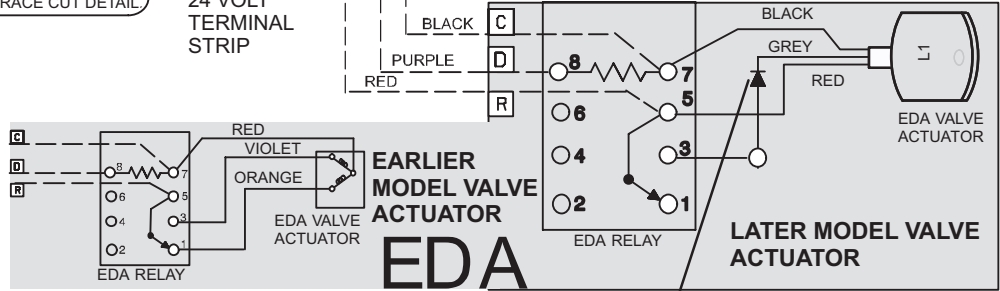
SEE TRACE CUT DETAIL

⚠️ DS TO R ON A92 - ON-BOARD LINK MUST BE CUT FOR DEHUMIDIFICATION.

⚠️ DS—Y1 JUMPER - MUST BE REMOVED FOR HUMIDITROL OPERATION

⚠️ HEAT PUMP APPLICATIONS ONLY - REMOVE R—O JUMPER.

⚠️ (2-STAGE ONLY) FOR HUMIDITROL OPERATION (EDA), CONNECT FIELD PROVIDED WIRE FROM DS ON A92 TO DS ON A175.



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

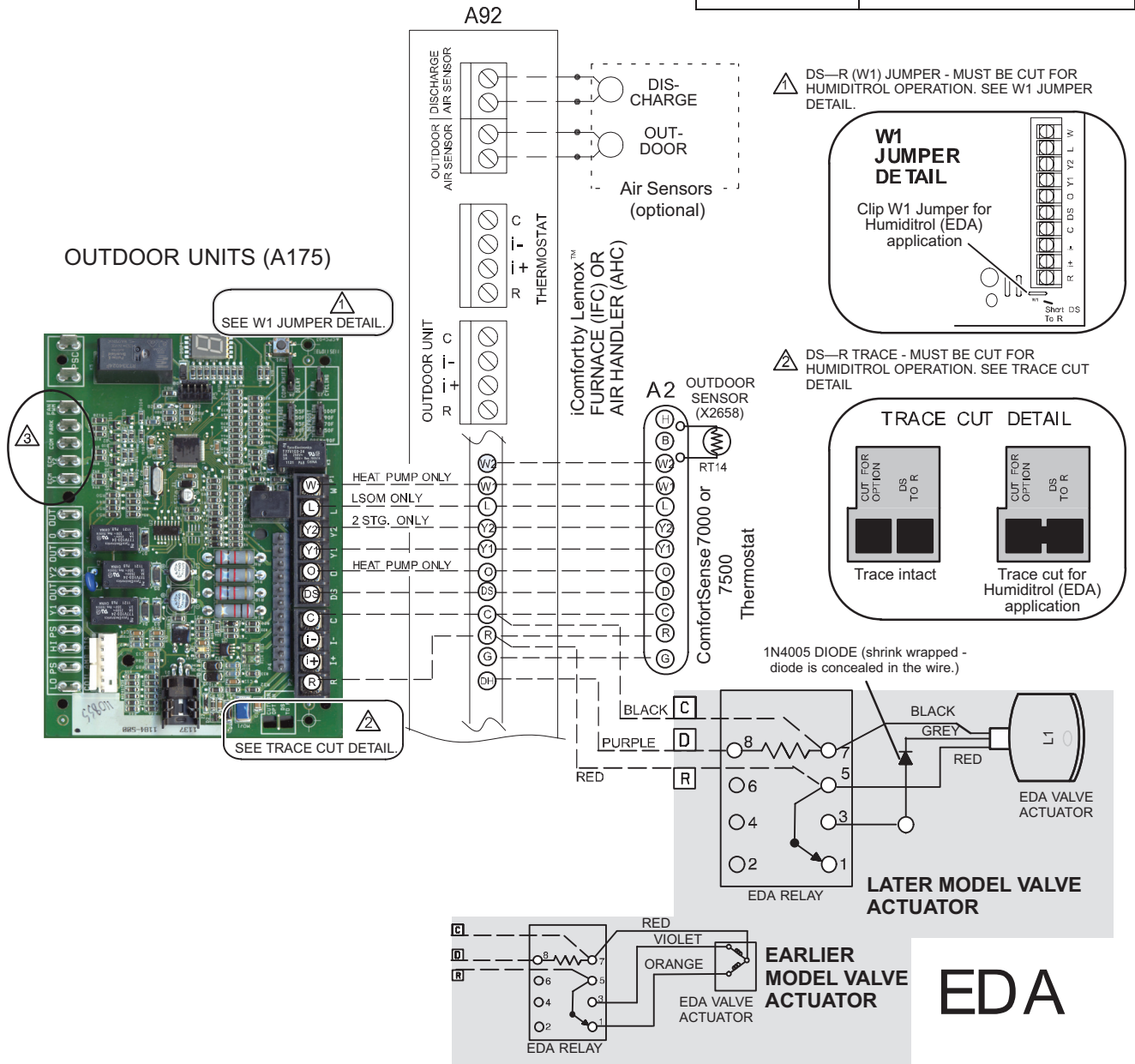
NUMBER OF WIRES REQUIRED—Indoor unit to:				Thermostat to:
System Type	Humiditrol® EDA	ComfortSense® 7000 or 7500 Thermostats	Outdoor Unit	Outdoor Air Sensor
1-stage AC	3	7	4	2
2-stage AC		8	5	
1-stage HP		9	6	
2-stage HP		10	7)	

FIGURE 21. 24V Field Wiring (Non-Communicating Systems)

Components	
Unit	Type
Thermostat	ComfortSense® 7000 or 7500
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



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 22. Field Wiring (Non-Communicating Systems)

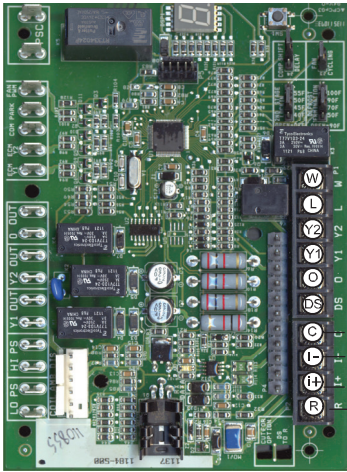
Components	
Unit	Type
Thermostat	iComfort®
Indoor	iComfort®-enabled
Outdoor	iComfort®-enabled

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

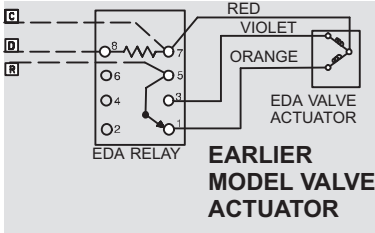
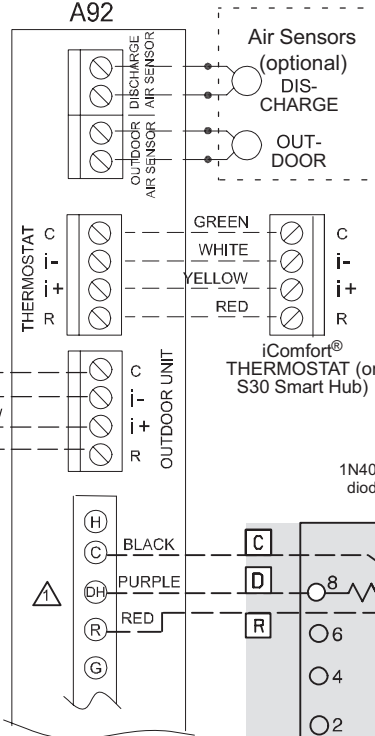
MAXIMUM TOTAL LENGTH OF ALL CONNECTIONS ON THE RSBUS IS LIMITED TO 1500FT. WIRE GAUGE OF RSBUS WIRE IS 18.

OUTDOOR UNITS (A175)

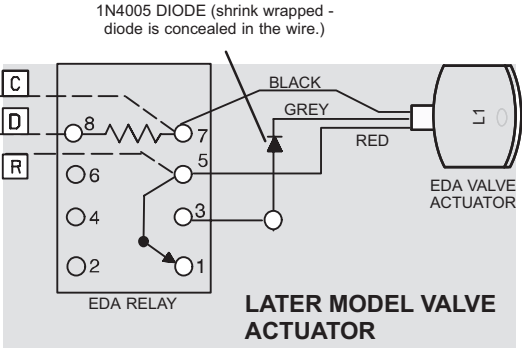


⚠ IN COMMUNICATING SYSTEM, THERMOSTAT DS INPUT IS NOT USED AND DEHUMIDIFICATION IS CONTROLLED VIA DEHUMIDIFICATION RELAY THAT CONTROLS 24VAC OUTPUT ON DH TERMINAL.

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



EDA



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 23. 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: -40°F (-40°C)
- Maximum temperature: 70°F (158°C)

Float Switch

IMPORTANT – The float switch connection to monitor the condensate float switch and shut down cooling when an open float switch is detected, only applies to systems with iComfort communicating thermostats. Air handlers controlled by a conventional 24VAC thermostat must have the float switched wired in series with the the "Y" wire to the outdoor unit.

The air handler control has two screw connections for connection to a normally closed (N.C.) condensate drain float switch. When the N.C. condensate float switch contacts open, the cooling will be disabled for systems controlled by an iComfort thermostat. Alert Code E371 "Float switch Sensed open" will be displayed indicating Maintenance is required on condensate drain line. After 10 minutes, the homeowner will be alerted with a critical alert message on thermostat home screen. The alert will automatically clear when the float switch contacts close.

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 15, detail B for wire colors.

TABLE 5. 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 6. 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)
Float SW	R	N.C. condensate float switch connections (Systems with iComfort communicating thermostats only)
	SW	

TABLE 7. 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 8. 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 9. 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 LVCS, 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 control. 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.		

JUMPER & OPTION JUMPER GUIDE

COOLING MODE BLOWER SPEED

(COOLING & HP MODE)

HIGH SPEED

* MEDIUM-HIGH SPEED

MEDIUM-LOW SPEED

LOW SPEED

HEATING MODE BLOWER SPEED

(ELECTRIC HT MODE)

* HIGH SPEED

MEDIUM-HIGH SPEED

MEDIUM-LOW SPEED

LOW SPEED

PUSH BUTTON

ON-BOARD JUMPER OPTION SELECTION

2-STAGE COMPRESSOR JUMPER (JUMPERS Y1 to Y2)

HEAT PUMP JUMPER (JUMPERS R to O)

DEHUMIDIFICATION-HARMONY JUMPER (JUMPERS R to DS)

* 1-STG COMPRESSOR Y1-Y2 2 STAGE COMP. DO NOT CUT

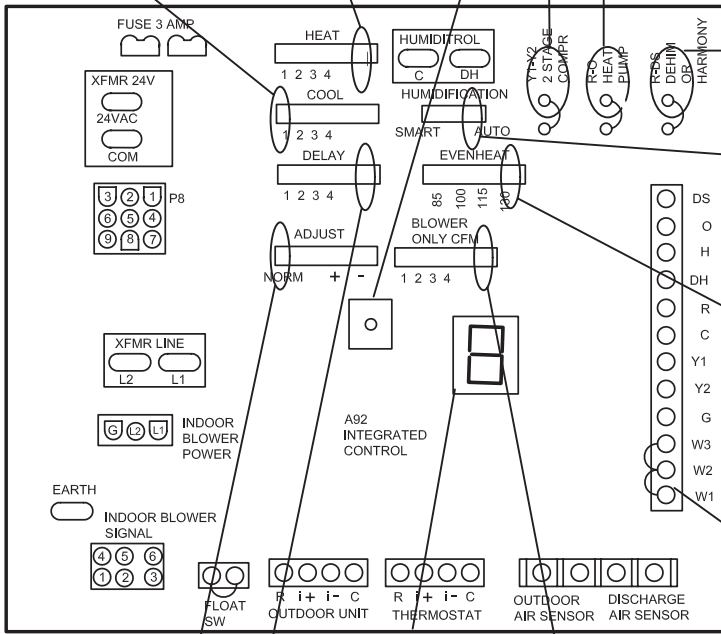
2-STG COMPRESSOR Y1-Y2 2 STAGE COMP. CUT JUMPER

* A/C UNIT DO NOT CUT R-O HEAT PUMP

HEAT PUMP UNIT CUT JUMPER R-O HEAT PUMP

* NO HARMONY ZONING OR NO COMFORTSENSE 7000 W/ DS CONNECTION DO NOT CUT R-DS DEHUM or HARMONY

HARMONY ZONING OR COMFORTSENSE 7000 W/ DS CONNECTION CUT JUMPER R-DS DEHUM or HARMONY



-CUT ON-BOARD OPTION JUMPER (WIRE LOOP)

STANDARD HEAT MODE (DEFAULT)

STANDARD HEAT MODE (STAGED BY TSTAT)

EVENHEATER MODE

-ENABLED WITH OPTIONAL DISCHARGE AIR SENSOR

* 85 DEGREE TARGET DISCHARGE TEMPERATURE

100 DEGREE TARGET

115 DEGREE TARGET

130 DEGREE TARGET

HUMIDIFICATION MODE

HUMIDIFICATION MODE 24VAC OUTPUT ON "H" FOR HUMIDIFIER OR ACCESSORY INTERLOCK

* SMART MODE - "H" ENABLED WHEN HEAT ACTIVE (HP or ELECT. HT)

AUTO MODE - "H" ENABLED WHEN BLOWER ACTIVE & NO CLG OR DEHUM

BLOWER ADJUST SELECTION

* NORMAL

NORM + -

(+10%) SETTING

NORM+

(-10%) SETTING

NORM-

COOLING BLOWER RAMPING

(COOLING MODE UNLESS NOTED)

DELAY PROFILE #4

OFF-50%-82%-100%-50%-OFF

DELAY PROFILE #3

OFF-82%-100%-OFF

DELAY PROFILE #2

CLG OFF - 100% - DEMAND SATISFIED - 100% FOR 45 SECONDS - OFF

HP OFF - 30 SECOND DELAY - 100% - DEMAND SATISFIED - 100% FOR 45 SECOND - OFF

DELAYPROFILE #1

OFF-100%-OFF

CONTINUOUS FAN BLOWER SPEED

HIGH SPEED (100%)

MEDIUM-HIGH SPEED (70%)

* MEDIUM-LOW SPEED (38%)

LOW SPEED (28%)

* INDICATES FACTORY DEFAULT SETTING

FIGURE 24. Air Handler Configuration

Air Handler Control Button, Display and Jumpers

Use figure 24 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 10, and the Air Handler Control will automatically use the **factory default** setting shown in figure 24.

⚠ 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 three 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: Display will cycle through Error Codes and will automatically exit Error Code recall once the last error code has been reached; 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. Cycling power to AHC will clear stored error codes.
- 3 - When the solid "-" is displayed, the control enters the applicable mode. Field configuration mode menu options: "H" electric heat stages detected; the AHC automatically detects the electric heat when power is applied and does not require "manual electric heat detection" using the push button, "A" Blower Test Mode or "P" programming or configuring unit size code. Releasing the button when solid "-" is displayed 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 posi-

tion, **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 30.
- 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 30.
- 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.

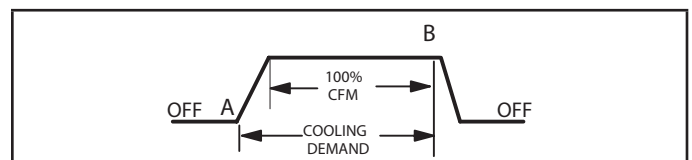
If the jumper is missing, the Air Handler Control will activate the *Configuration Jumper is Missing* alarm in and will automatically use the default factory setting in table 10. See figure 24 for jumper configurations. Actual CFM values for different air handler sizes are shown in Targeted CFM tables starting on page 26.

- 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.

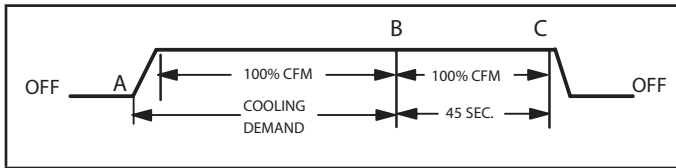
If the jumper is missing, the Air Handler Control will activate the *Configuration Jumper is Missing* alarm and will automatically use the default factory setting in table 10. See figure 24 for jumper configurations.

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.

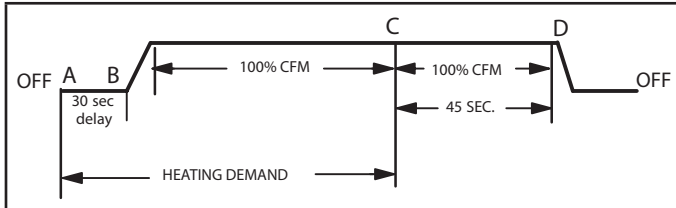


Delay Profile 2
Cooling – Air Conditioner and Heat Pump



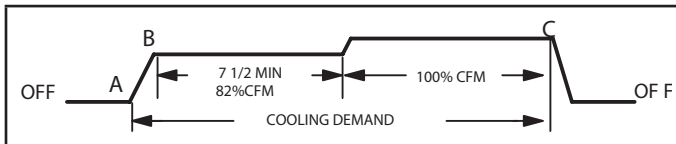
- A - When cool demand is initiated, motor ramps up to 100% and runs at 100% until demand is satisfied.
- B - Once demand is met, motor runs at 100% for 45 seconds.
- C - Motor ramps down to stop.

Heating – Heat Pump Only



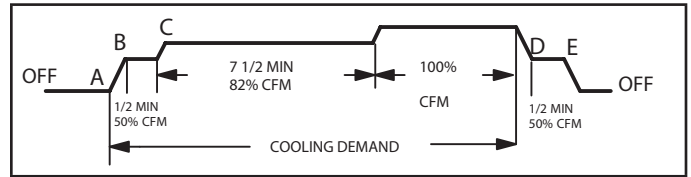
- A - When heat demand is initiated, 30 seconds **motor on** delay starts.
- B - After the **motor on** delay expires, motor ramps up to 100% and runs at 100% until demand is satisfied.
- C - Once demand is met, motor runs at 100% for 45 seconds.
- D - Motor ramps down to stop.

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 10. AHC System Status Codes

AHC Single Character Display	Action
Letter or Number	Unit Size Code displayed represents air handler model size and capacity . See <i>Configuring Unit Size Codes</i> in figure 22.
≡	If three horizontal bars are displayed, AHC does not recognize air handler model size and capacity. See <i>Configuring Unit Size Codes</i> in Figure 22.
.	Idle mode (decimal point / no unit operation)
R	Cubic feet per minute (cfm) setting for indoor blower (1 second ON, 0.5 second OFF) / cfm setting for current mode displayed . Example: R 1200
C	Cooling Compressor Capacity (1 second ON, 0.5 second OFF) / % of input rate displayed/Pause/cfm setting displayed/Pause/Repeat codes on systems with iComfort communicating outdoor unit. C1 or C2 displayed /Pause/cfm setting displayed/Pause/Repeat when installed with a non-communicating outdoor unit. Example C70 or C100 with communicating outdoor unit or C1 or C2 with non-communicating outdoor units
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	Electric Heat Stage (1 second ON, 0.5 second OFF) / 1 or 2 displayed / Pause / cfm setting displayed / Pause / Repeat codes. Example: H0 or H 1 or H2 or H3
h	Compressor Heating Capacity (1 second ON, 0.5 second OFF) / % of input rate displayed/Pause/cfm setting displayed/Pause/Repeat codes on systems with iComfort communicating outdoor unit. h1 or h2 displayed /Pause/cfm setting displayed/Pause/Repeat when installed with a non-communicating outdoor unit. Example h10 or h 100 with communicating outdoor unit or h 1 or h2 with non-communicating outdoor units
U	Discharge air sensor temperature (indoor blower must be operating) U 105

TABLE 11. 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.
Solid	-	Press and hold Solid "-" until required symbol displays . H A or P
CONFIGURING ELECTRIC HEAT SECTIONS – AHC will automatically configure electric heat when 240V power is applied.		
Solid	H	Air Handler Control has been enhanced to automatically configure electric heat when the electric heat harness in connected to the air handler and 240 volt power is applied. The air handler will not energize the blower and heat stages during the automatic electric heat detection process. Releasing the push button when "H" is displayed will display the stages of electric heat that were automatically detected upon power up. Example HO, H1, H2, H3, H4, H5. H2 indicates 2 stage of electric heat were detected.
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. IMPORTANT — All field replacement controls may be manually configured to confirm air handler model size and capacity.
Blinking	P	<ol style="list-style-type: none"> 1. When the correct Unit Size 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. <p>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.</p>
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	≡	Error Code Recall will automatically exit after the last stored code is displayed. To exit Error Code Recall Mode — PUSH and HOLD button until solid three horizontal bars appear, then RELEASE button. <i>NOTE - Error codes are not cleared</i>
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. Error codes are automatically cleared when 240V power is cycled off and then back on.
Blinking	C	Push and hold for one (1) second, release button. Seven-segment will display 0000 and exit error recall mode.

TABLE 12. 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 180	Critical	The iComfort™ thermostat has found a problem with the air-handler outdoor sensor.	In normal operation after control recognizes sensors, the alarm will be sent if valid temperature reading is lost. Compare outdoor sensor resistance to temperature/resistance charts in unit installation instructions. Replace sensor pack if necessary. At the beginning of (any) configuration, the air-handler control will detect the presence of the sensor(s). If detected (reading in range), appropriate feature will be set as installed and shown in the 'About' screen. The alarm / fault will clear upon configuration, or sensing normal values.
E201	Critical	The system has lost communication with the air-handler indoor blower motor.	Lost communication with indoor blower motor. Possible causes include power outage, brown-out, motor not powered, loose wiring, condensation on air handler control without cover on breaker. Problem may be on control or motor side. Cleared after communication is restored.
E202	Critical	The unit size code for the air-handler and the size of blower motor do not match.	Incorrect appliance unit size code selected. Check for proper configuring under unit size codes for air handler on configuration guide or in installation instructions. The alarm / fault clears after the correct match is detected following a reset. Remove the thermostat from the system while applying power and reprogramming.
E203	Critical	The unit size code for the air-handler has not been selected.	No appliance unit size code selected. Check for proper configuring under: Unit size codes for air handler on configuration guide or in installation instructions. Critical Alert. The alarm / fault clears after the correct match is detected following a reset. Remove the thermostat from the system while applying power and reprogramming.
E292	Critical	The air-handler's blower motor will not start.	The system will go into watchguard mode. Indoor blower motor unable to start. This could be due to seized bearing, stuck wheel, obstruction etc. Replace motor or wheel if assembly does not operate or meet performance standards. The alarm / fault clears after the indoor blower motor starts successfully.
E295	Minor	The indoor blower motor is over heating.	Indoor blower motor over temperature (motor tripped on internal protector). Check motor bearings and amps. Replace if necessary. The alarm / fault clears after blower demand is satisfied.
E310	Critical	There is a problem with air-handler discharge air sensor.	Compare outdoor sensor resistance to temperature/resistance charts in installation instructions. Replace sensor if necessary. The alarm/fault is cleared 30 seconds after fault is detected as recovered.
E312	Minor	The blower cannot provide the requested CFM due to high static.	Warning Only. Restricted airflow - Indoor blower is running at a reduced CFM (cutback mode). The variable-speed motor has pre-set speed and torque limiters to protect the motor from damage caused by operating outside of design parameters (0 to 0.8" e.g., total external static pressure). Check filter and duct system. To clear, replace filter if needed or repair/add duct. The alarm/fault is cleared after the current service demand is satisfied.
E313	Minor	The indoor and outdoor unit capacities do not match.	Check for proper configuring in installation instructions. Alarm is just a warning. The system will operate, but might not meet efficiency and capacity parameters. The alarm will clear after commissioning is complete.

TABLE 13. 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 stage 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.
E371	Moderate/ Critical	Float switch sensed open. The cooling is disabled when installed with an iComfort communicating thermostat. The condensate drain line needs maintenance. The condensate drain pan float safety switch is open.	The float switch terminals on the AHC control sensed an open float switch and will shut off cooling when installed with an iComfort Communicating thermostat. After 10 minutes the Alert Code will escalate from a moderate code to a Critical code and will be displayed on the thermostat home screen. Alert clears when float switch contacts close.
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.

Target CFM Tables

BLOWER DATA

CBA38MV-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.

BLOWER DATA

CBA38MV-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.

BLOWER DATA

CBA38MV-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 cfm	2 cfm	3 cfm	4 cfm	1 cfm	2 cfm	3 cfm	4 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.

Target CFM Tables (cont'd)

BLOWER DATA

CBA38MV-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.

BLOWER DATA

CBA38MV-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.

BLOWER DATA

CBA38MV-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.

Unit Operating Sequences

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

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

TABLE 14. CBA38MV 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. <i>NOTE - No over cooling.</i>
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 reached in order to maintain room humidity setpoint. <i>NOTE - Allow to over cool 2°F from cooling set point.</i>

TABLE 15. CBA38MV with ComfortSense™ 7500 Thermostat and Two-Stage Outdoor Unit Operating Sequence

Operating Sequence		System Demand							System Response			
System Condition	Step	Thermostat Demand					Relative Humidity		Compressor	Air Handler CFM (COOL)	Comments	
		Y1	Y2	O	G	W1	W2	Status				D
No Call for Dehumidification												
Normal Operation - Y1	1	On		On	On			Acceptable	24 VAC	Low	70%	Compressor and indoor air handler follow thermostat demand
Normal Operation - Y2	2	On	On	On	On			Acceptable	24 VAC	High	100%	
Room Thermostat Calls for First-Stage Cooling												
BASIC MODE (Only active on a Y1 thermostat demand)												
Normal Operation	1	On		On	On			Acceptable	24 VAC	Low	70%	ComfortSense™ 7500 thermostat energizes Y2 and de-energizes D on a call for dehumidification <i>NOTE - No over cooling.</i>
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. <i>NOTE — Allow to over cool 2°F from cooling set point.</i>
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 <i>NOTE — No over cooling.</i>
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. <i>NOTE — Allow to over cool 2°F from cooling set point.</i>

Unit Operating Sequences

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

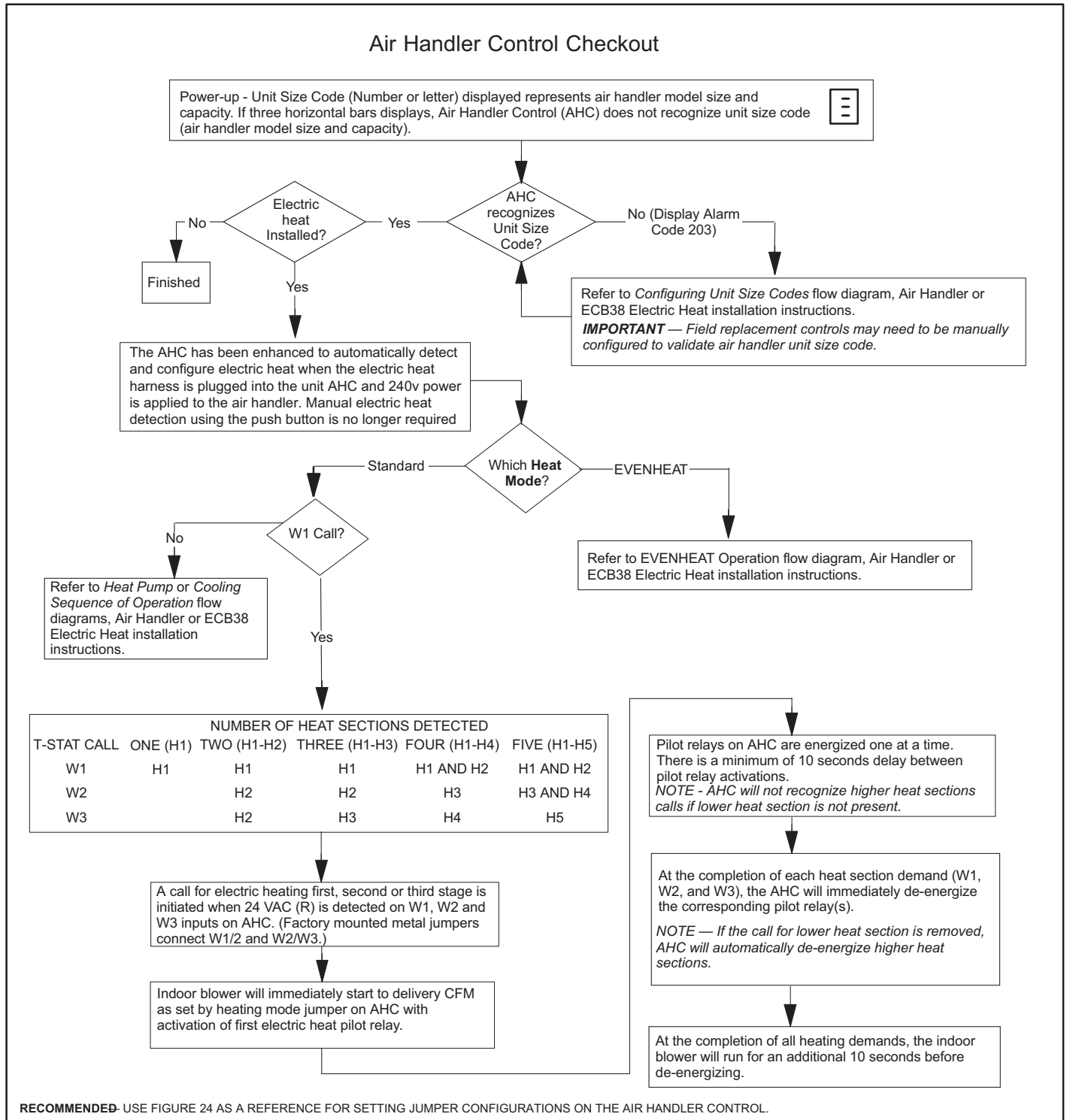


FIGURE 25. Air Handler Control Checkout

Configuring Unit Size Codes (Model Number)

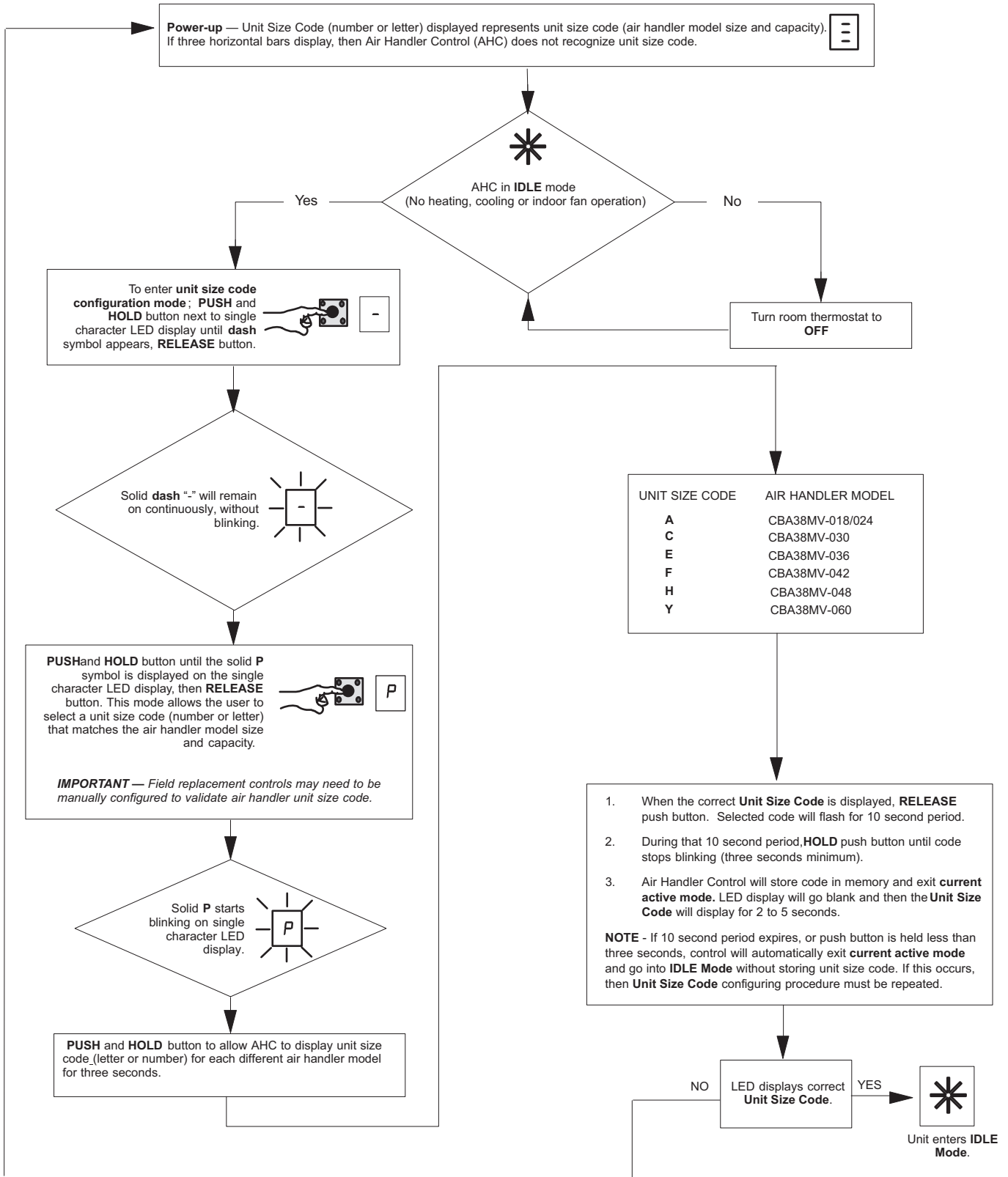
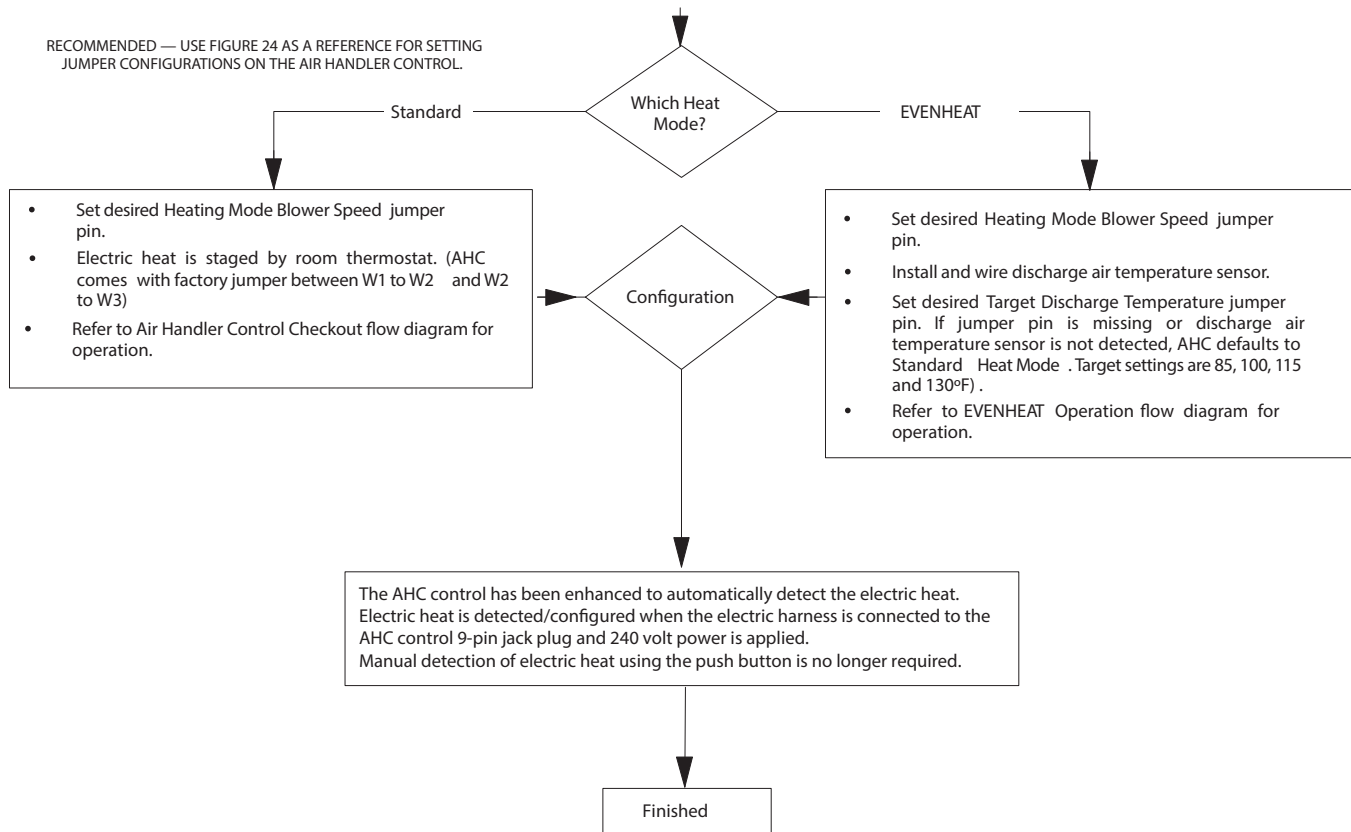


FIGURE 26. Configure Unit Size Codes

Configuring/Detecting Electric Heat Sections

The AHC control in the air handler has been enhanced to automatically detect and configure the electric heat when the electric heat harness is connected to the AHC control and 240 Volt power is applied. The air handler no longer requires manual detection using the push button on the AHC Control.

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



Automatic Electric Heat Detection/Configuration Notes

1. The AHC has been enhanced to automatically detect/configure the electric heat. Automatic electric heat detection occurs when the electric heat harness is connected to the AHC 9-pin jack plug and 240V power is applied to the air handler.
2. During automatic electric heat detection/configuration process, the AHC will NOT bring on the blower or electric heat relays.
3. Manual electric heat detection using the push button is no longer required.
4. The number of electric heat stages automatically detected can be verified by pressing the push button until "H" is displayed and then releasing the button. The display will show H0, H1, H2, H3, H4 or H5 which is the number of electric heat stages detected. Example H2 indicates 2-stages of electric heat were detected. The electric heat stages automatically detected can also be verified using iComfort thermostat>advanced settings,>dealer control center>equipment>air handler>about>Number of heating stages
5. On iComfort systems, if the air handler was installed and connected to an iComfort thermostat prior to electric heat installation, the system may need to be reconfigured using the icomfort thermostat to recognize the change in the electric heat installation.

FIGURE 27. Heat Mode Selection

EVENHEAT OPERATION

INPUTS	OUTPUTS		
Room Thermostat Demand	Target Discharge Air Temperature Set at 85°F	Target Discharge Air Temperature Set at 100°F	Target Discharge Air Temperature Set at 115°F/130°F
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.

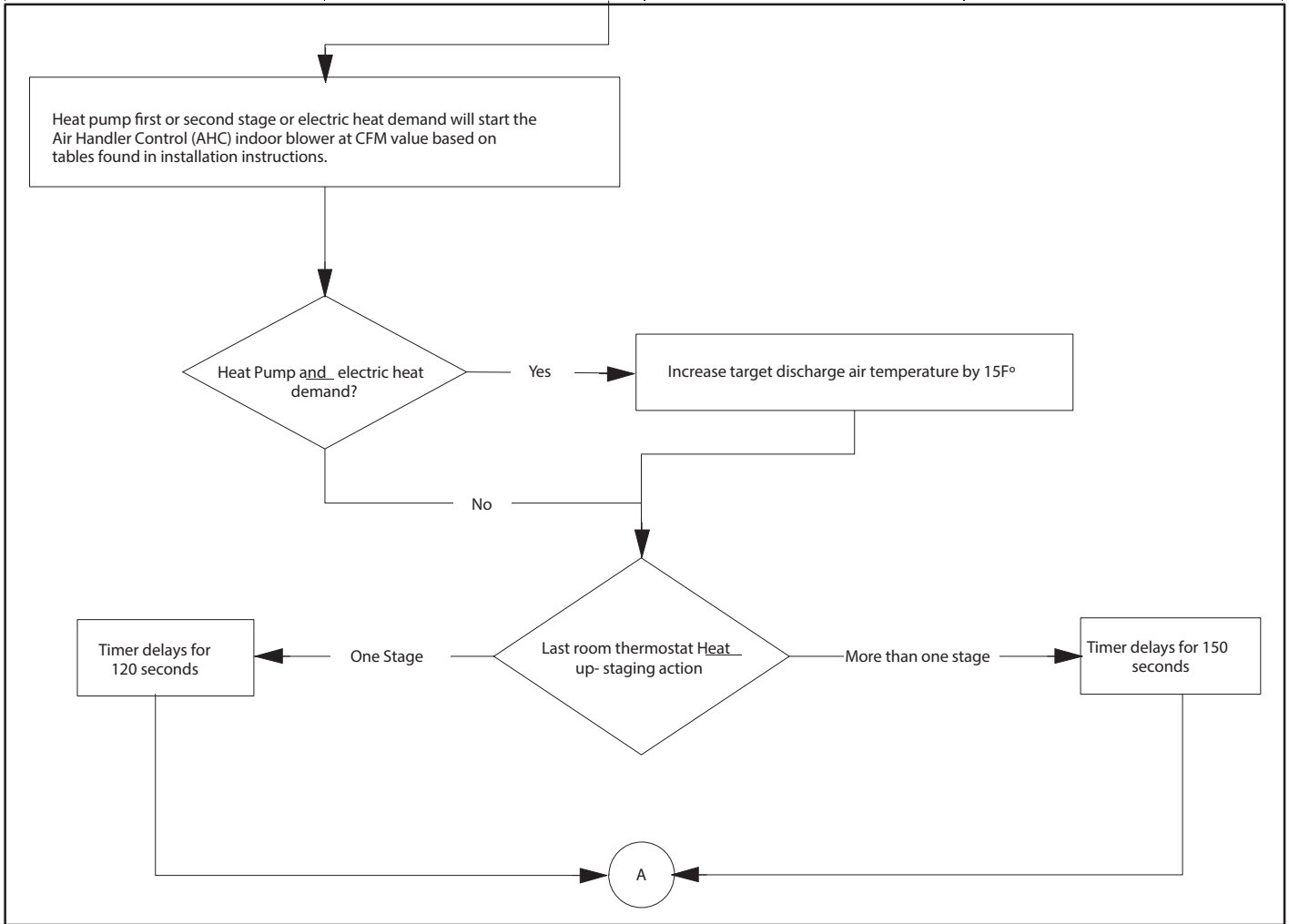


FIGURE 28. EVENHEAT Operation (1 of 2)

Note 1 Activation delay

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

EVENHEAT Operation

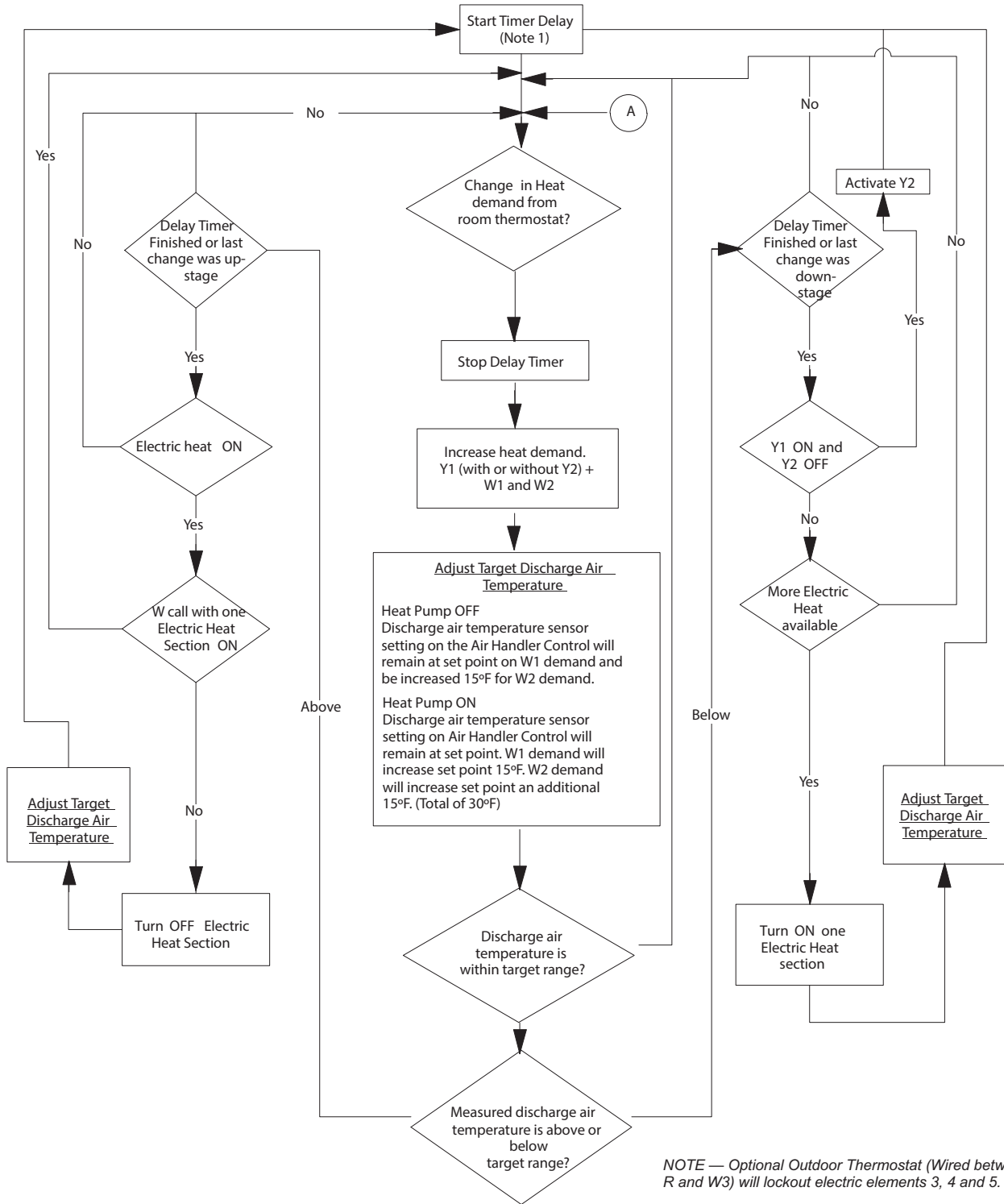


FIGURE 29. EVENHEAT Operation ((2 of 2))

Heat Pump Operation (Heating and Cooling)

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

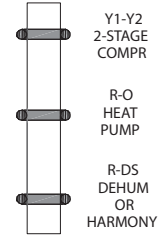
- Set Cooling Mode Blower Speed jumper pin. (Low and high indoor blower CFM settings are identical for cooling and heat pump)
- Set Blower Adjust Selection jumper pin.
- Set Cooling Mode Blower Ramping jumper pin (Cooling calls - All ramping profiles are active) (Heating calls - Only ramping profiles 1 and 2 are active. If profiles 3 or 4 are selected, AHC will default to profile 1)
 - Profile 1 does not provide any ramping profiles.
 - 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)
- 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

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

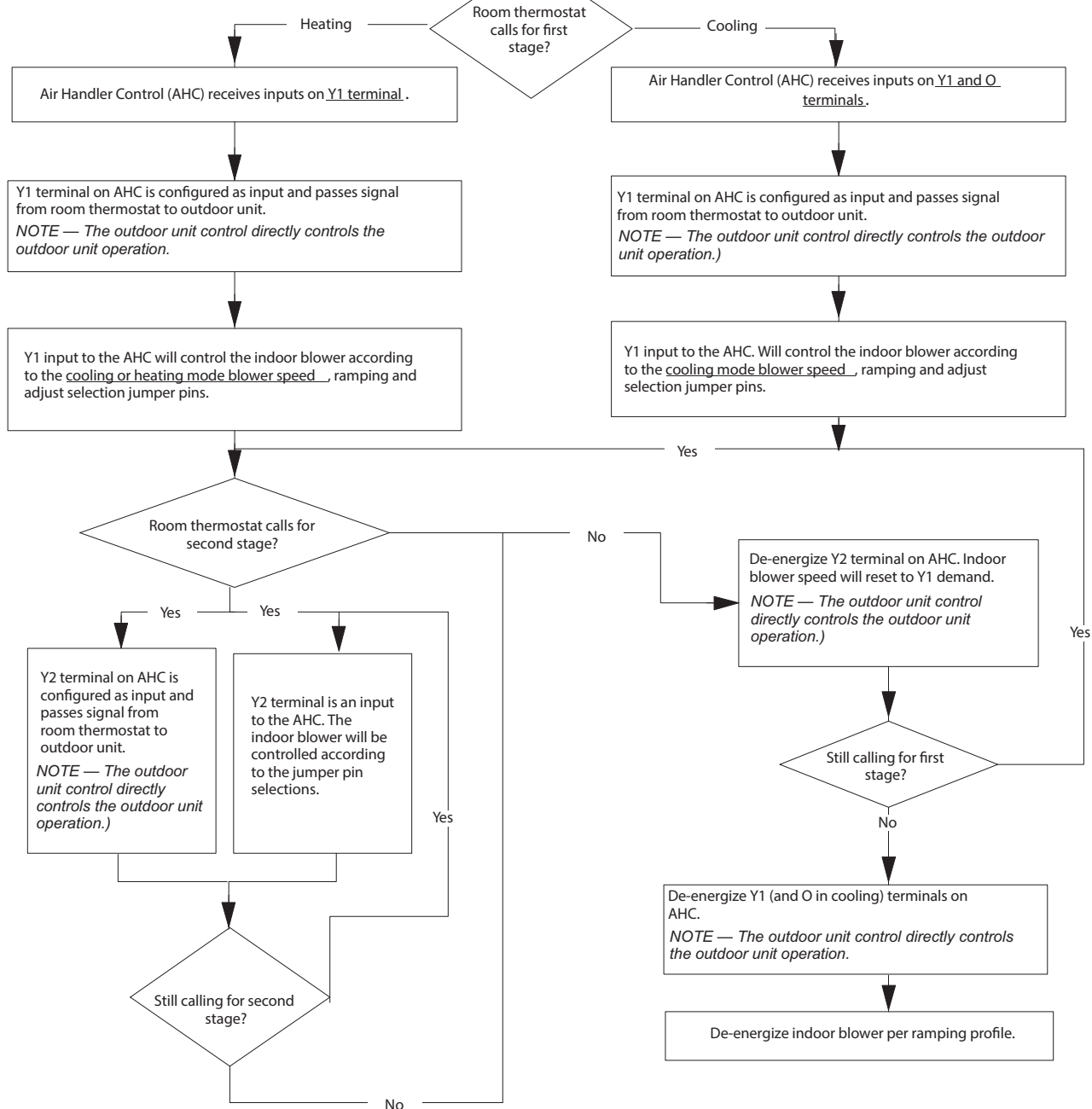
CUT ON-BOARD JUMPER Y1-Y2 FOR TWO-STAGE A/C

CUT ON-BOARD JUMPER R-O.



IMPORTANT — USE CARE WHEN CUTTING JUMPERS TO PREVENT DAMAGE TO CONTROL. SEE FIGURE 24, CBA38MV JUMPER AND OPTION JUMPER GUIDE FOR FURTHER DETAILS.

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



Cooling Operation

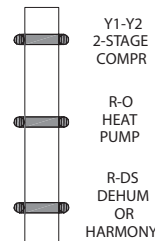
Air Handler Control (AHC) Indoor Blower Mode Speed and Profiles settings

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

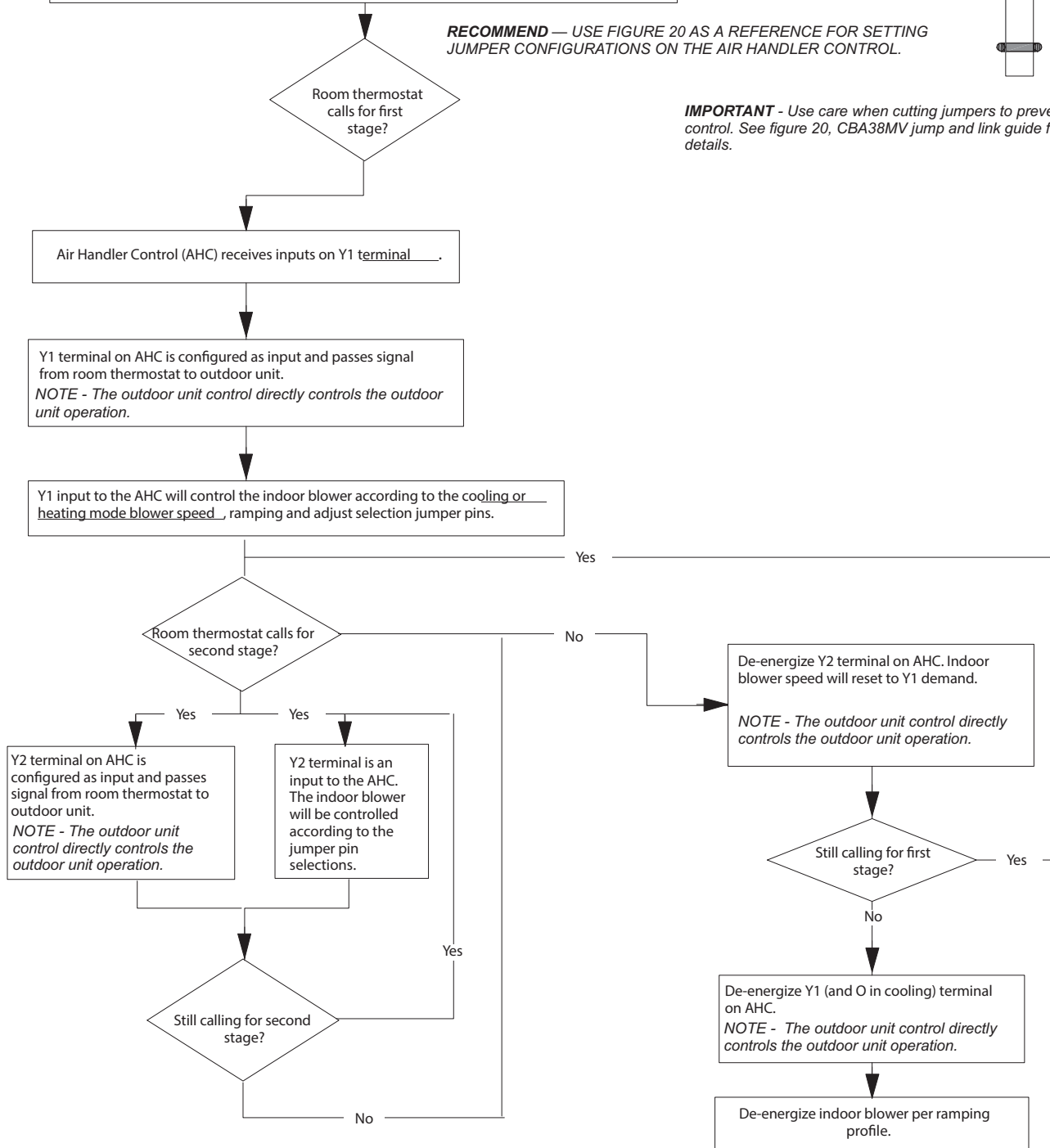
AHC on-board jumper must be cut between Y1 and Y2 to allow 2 stage cooling operation.

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

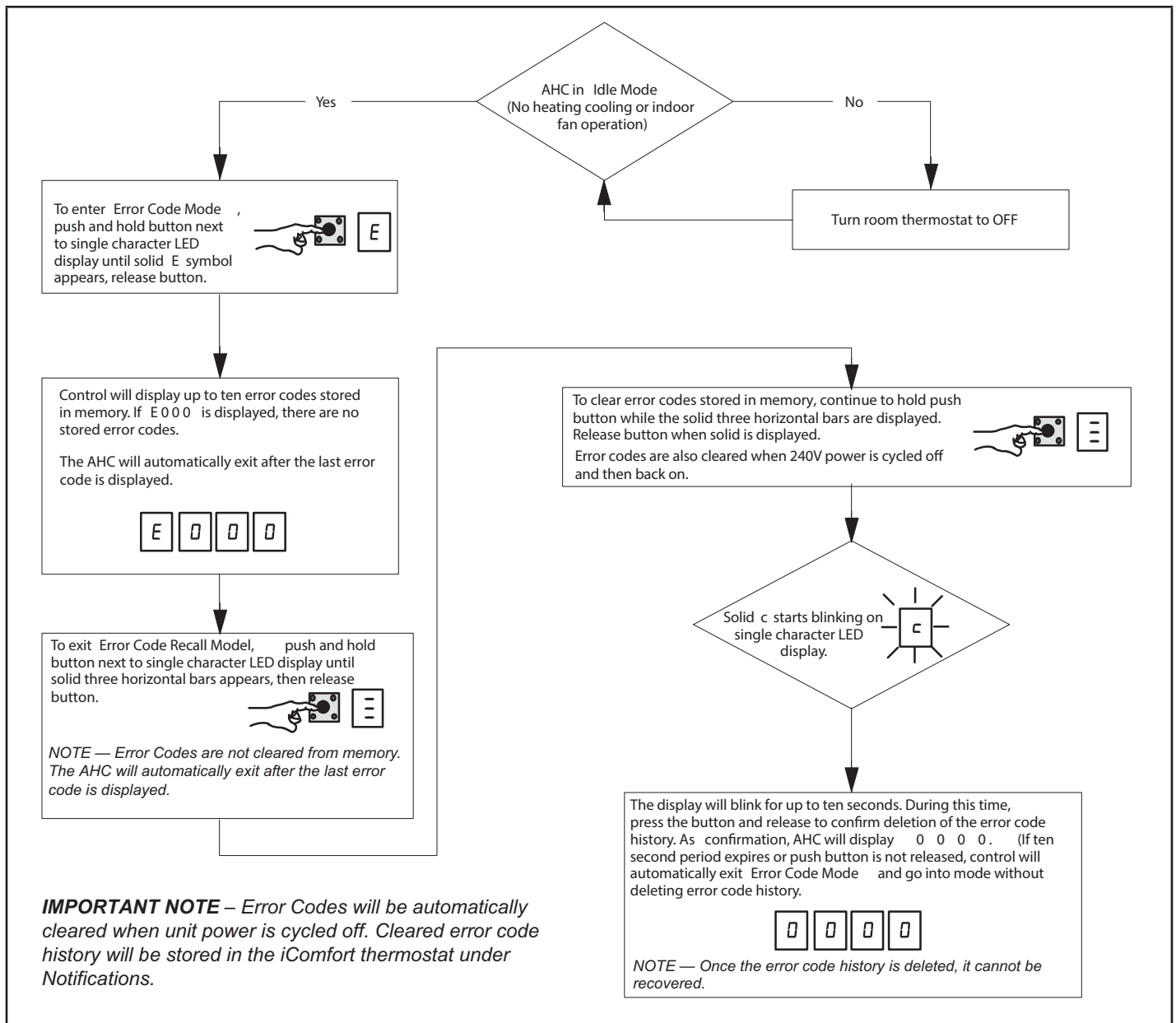


RECOMMEND — USE FIGURE 20 AS A REFERENCE FOR SETTING JUMPER CONFIGURATIONS ON THE AIR HANDLER CONTROL.

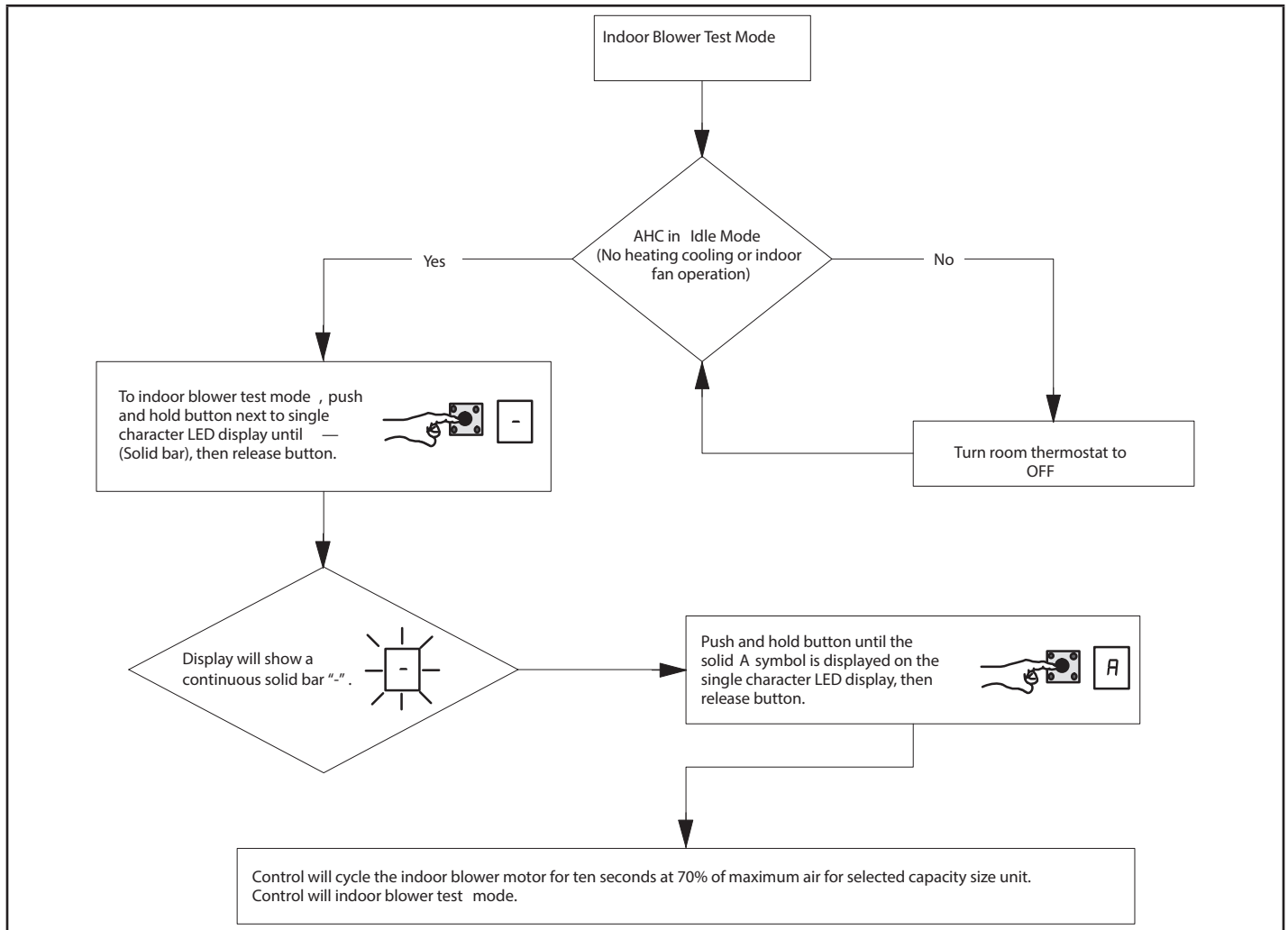
IMPORTANT - Use care when cutting jumpers to prevent damage to control. See figure 20, CBA38MV jump and link guide for further details.



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.

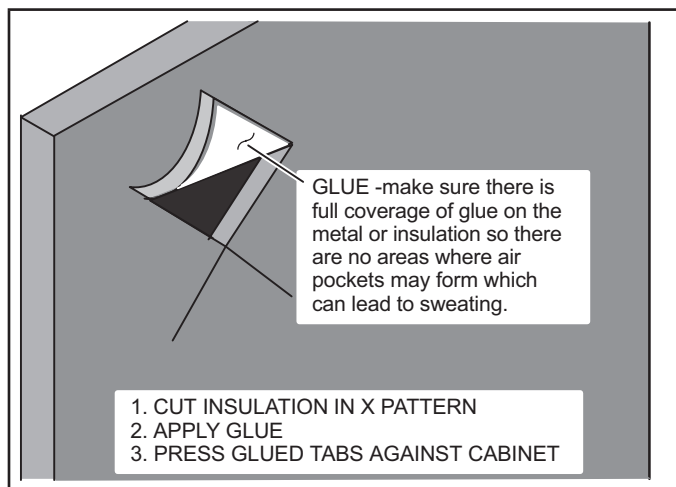


FIGURE 30. Repairing Insulation

! 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).

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 5°F 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 5°F higher than the indoor temperature. The indoor blower and outdoor unit should cycle off.

CHECK ELECTRIC HEAT (IF USED)

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

Use of Air Handler During Construction

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

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

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

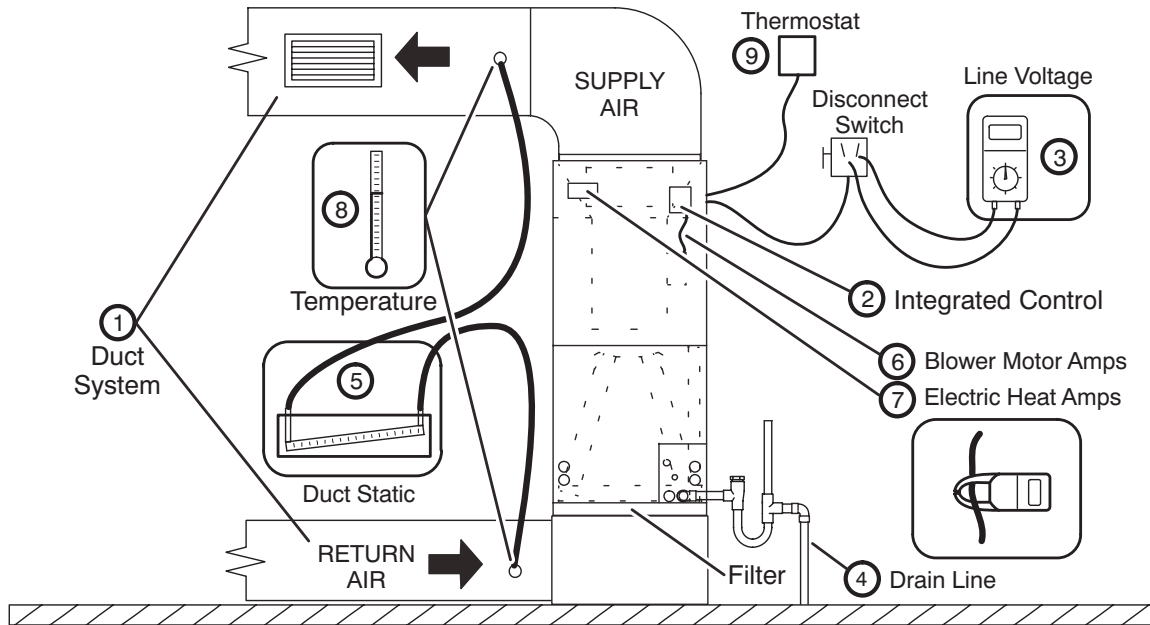
Installing Contractor's Name _____

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 _____
 - Electrical Connections Tight
- ④ DRAIN LINE
 - Leak Free
- Explained Operation of System to Homeowner
- 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

Technician's Name: _____ Date Start-Up & Performance Check Completed _____

FIGURE 31. Start-up and Performance Checklist (Upflow Configuration)

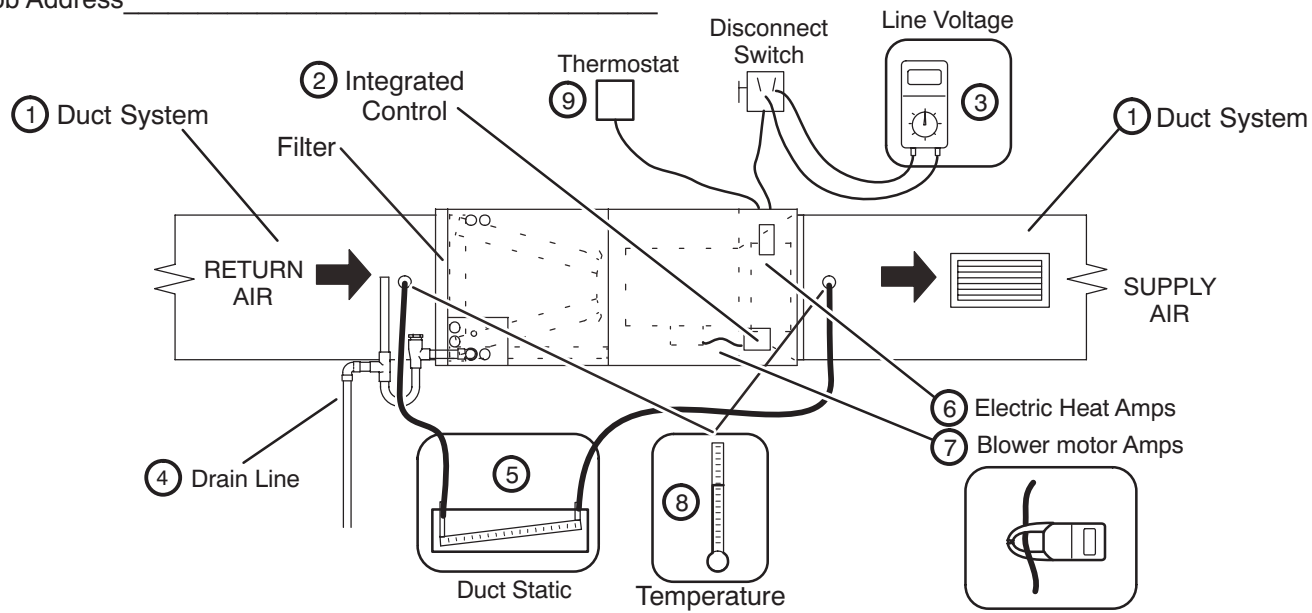
Installing Contractor's Name _____

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 _____
- Electrical Connections Tight

④ DRAIN LINE

- Leak Free

Explained Operation of System to Homeowner

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

Technician's Name: _____ Date Start-Up & Performance Check Completed _____

FIGURE 32. Start-Up and Performance Checklist (Horizontal Configuration)