



CONTROLS KITS AND ACCESSORIES

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AIR HANDLER CONTROL FIELD REPLACEMENT KIT

Guidelines for Air Handler Control Field Replacement (16B27)

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.

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.

WARNING



Electric Shock Hazard! – Disconnect all power supplies before servicing.
Replace all parts and panels before operating.
Failure to do so can result in death or electrical shock.

WARNING

ELECTROSTATIC
DISCHARGE
(ESD)
Precautions and
Procedures

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

Table of Contents

Shipping and Packing List	2
General	2
Air Handler Control Removal and Installation	2
<i>For All Applications</i>	2
<i>For Non-Communicating Applications Only</i>	2
Field Control Wiring	5
<i>Control and Sensor Connection Requirements</i>	7
<i>Discharge Sensor (DAT)</i>	7
<i>Outdoor Air Sensor (OAS)</i>	7
<i>Indoor Blower Signal 6-Pin Connector (P7)</i>	7
<i>Air Handler Control 9-Pin Connector (P8)</i>	7
Air Handler Control Button and Display	8
<i>Push Button</i>	8
<i>Seven-Segment Display</i>	8
Air Handler Jumpers	11
<i>Delay Profile 1</i>	12
<i>Delay Profile 2</i>	12
<i>Delay Profile 3</i>	12
<i>Delay Profile 4</i>	12
<i>Seven-Segment Display</i>	12
Target CFM Tables	13
Unit Operating Sequences	17
Configuring Unit	19
<i>Checkout</i>	19
<i>Unit Size Code</i>	20
<i>Electric Heat</i>	21
<i>EvenHeat Operation</i>	22

Shipping and Packing List

Check package contents for shipping damage. Consult last carrier immediately if damage is found.

- 1 – Control
- 1 – Wiring diagram (537202-02)
- 1 – Jumper, Link Guide and Diagnostic Code Sheet

General

This document provides general guidelines on field replacement of air handler control and unit configuration.

This kit replaces Kit # 65W70 and #13Y22 and is backwards compatible.

Air Handler Control Removal and Installation

FOR ALL APPLICATIONS

1. Disconnect power to the unit.
2. Remove unit access panel. See unit installation instruction for access panel removal procedure.
3. Recommend removing each wire connected to the control individually and connecting to the new control. Alternate method recommended is to mark each wire as it is removed from control.
4. Once all connections have been transferred to the new control. Remove the old control by removing the two screws securing the control mounting bracket to the control box (see “Figure 1. Air Handler Control Removal and Installation”). Also see “Air Handler Control Button and Display” on page 8.
5. Remove the four plastic standoffs that secure the control to mounting bracket
6. Secure the new indoor control to the mounting bracket using existing four plastic standoffs.
7. Secure control mounting bracket to control box using existing two screws.

FOR NON-COMMUNICATING APPLICATIONS ONLY

1. Note position of all jumpers on the existing air handler control and relocate same jumpers to those positions on the new air handler control. Also see “Air Handler Control Button and Display” on page 8.
2. Configure new Control for non-communicating systems using the procedures outline in “Configuring Unit” on page 19. For communicating systems, refer to the iComfort® thermostat installation instructions for system configuration.

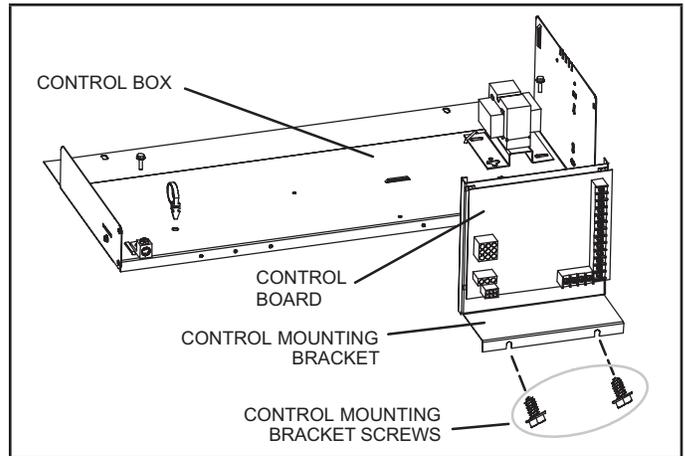


Figure 1. Air Handler Control Removal and Installation

⚠ IMPORTANT

Control board must be installed in proper orientation for all wiring to reconnect to the control board. Please refer to Figure 1 diagram above for control board orientation. Same orientation whether unit is configured for up-flow, down-flow, horizontal right or horizontal left.

⚠ 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.

(Non-Communicating)
**CBA38MV, CBX32MV &
 CBX40UHV**
JUMPER & LINK GUIDE

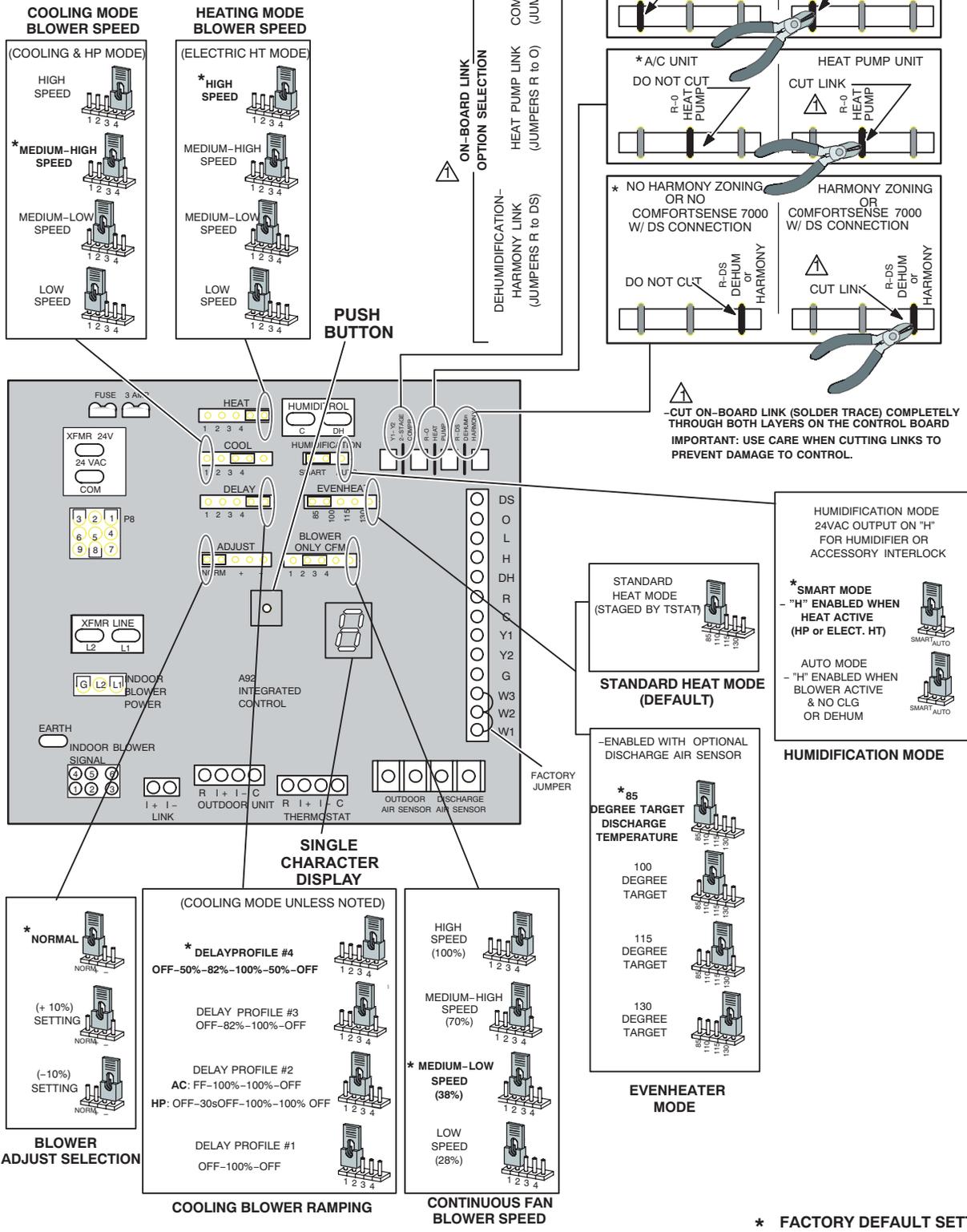


Figure 3. Air Handler Configuration (Non-Communicating)

Field Control Wiring

KEY	COMPONENT
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

RECOMMENDED BLOWER SPEED TAP SELECTION

MODEL	SPEED TAP SELECTION				
	BLOWER COIL	COOL	HEAT	HEAT	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
	-066	PIN #3	PIN #3	PIN #4	PIN #4
CBA38MV	-018	PIN #2	PIN #2	PIN #2	PIN #2
	-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	

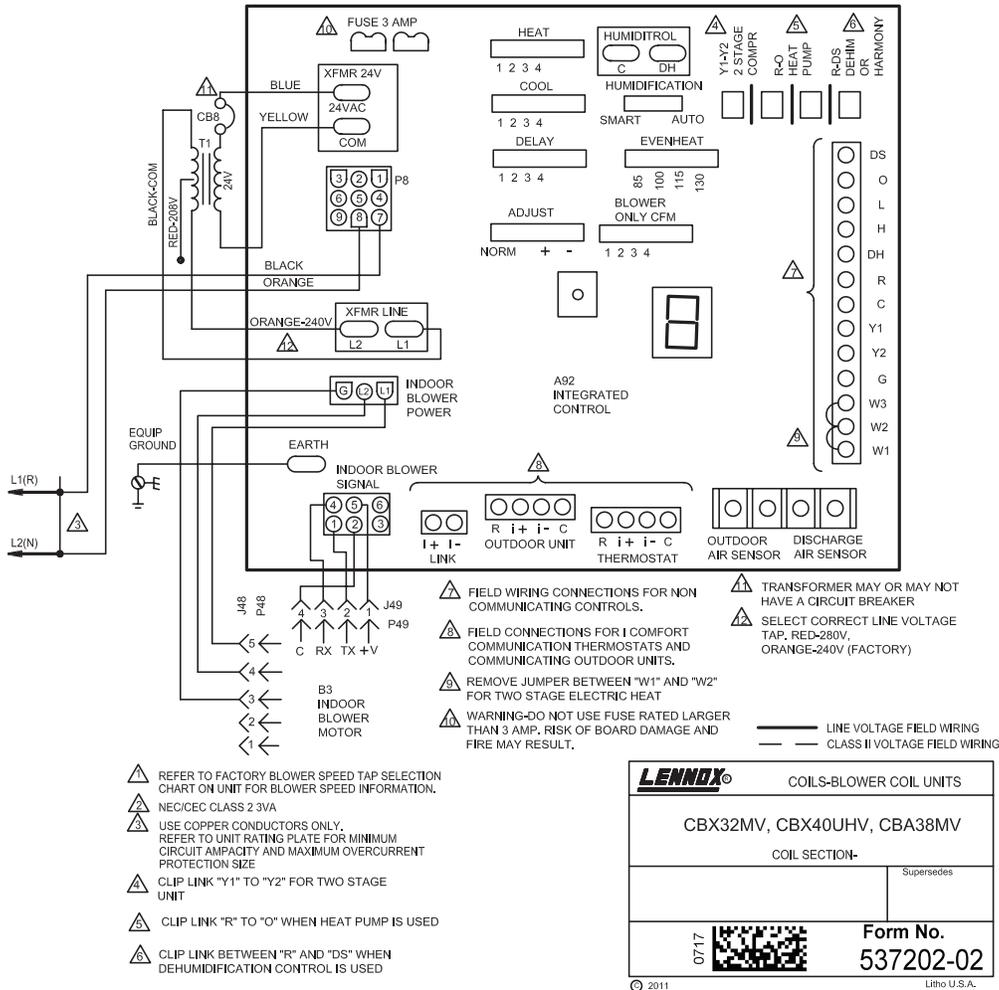


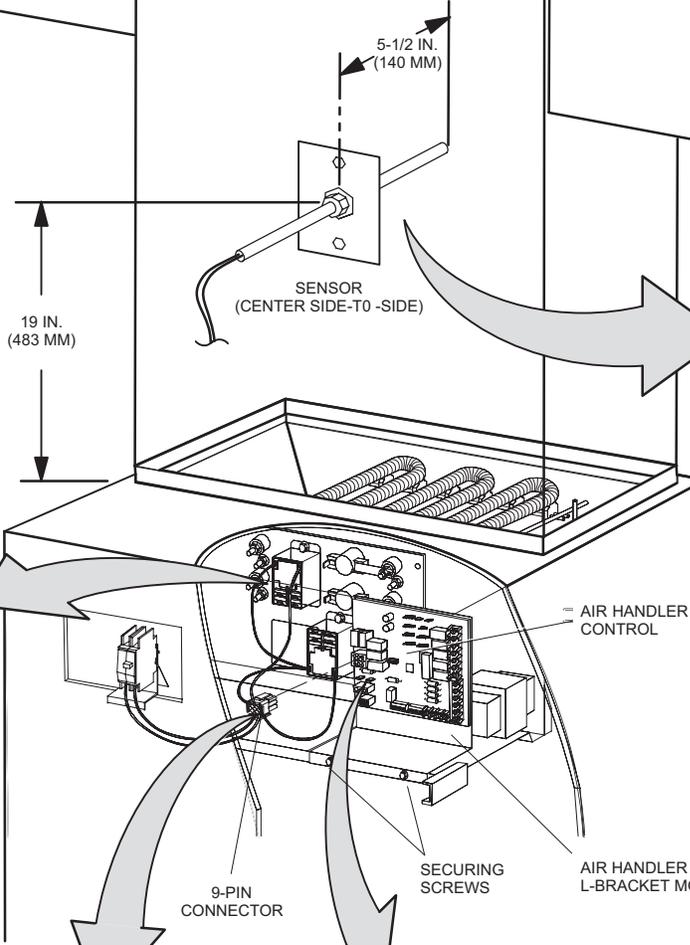
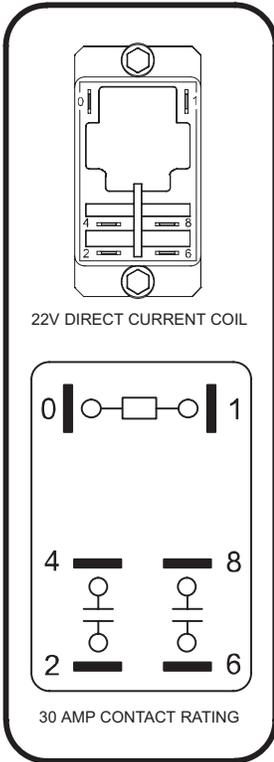
Figure 4. CBA38MV, CBX32 and CBX40 Air Handler Unit Typical Wiring Diagram

DETAIL A

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

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).

ELECTRIC HEAT RELAY PART NO. 49W91

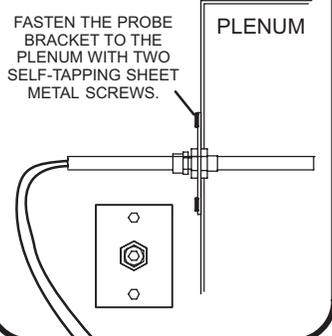


DISCHARGE SENSOR (DAT)

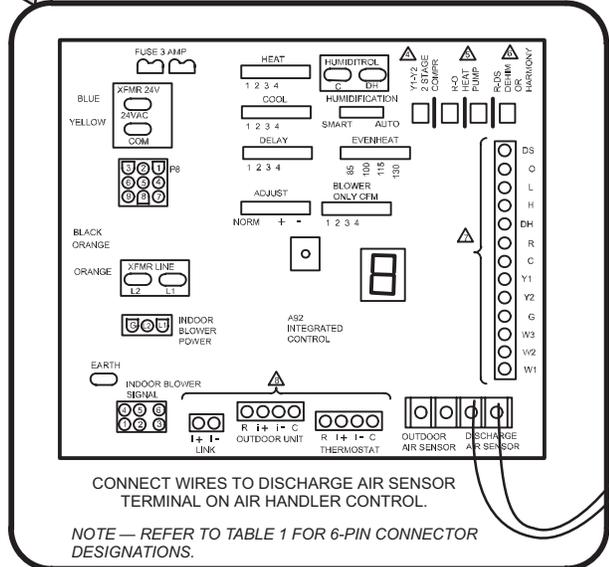
TEMPERATURE RESISTANCE CHART

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

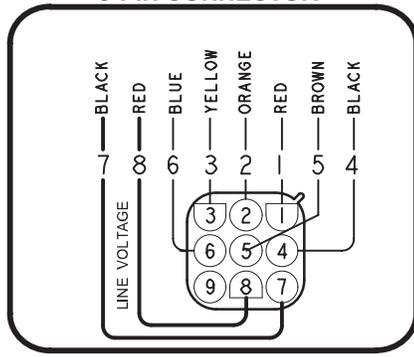
FASTEN THE PROBE BRACKET TO THE PLENUM WITH TWO SELF-TAPPING SHEET METAL SCREWS.



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 5. Component Connections

CONTROL AND SENSOR CONNECTION 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.

OUTDOOR AIR SENSOR (OAS)

This is a two screw terminal for connection to a Lennox X2658 outdoor temperature sensor.

INDOOR BLOWER SIGNAL 6-PIN CONNECTOR (P7)

This is the connection between the air handler control and the B3 Indoor Blower Motor.

Table 1. . Indoor Blower Signal (P7)

Position	Function / Description
1	TX
2	C
3	Not used
4	RX
5	+V
6	Not used

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 2).

NOTE – See figure 4, Detail B for wire colors.

Table 2. . 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

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

Table 3. . Air Handler Control Connections – Communicating

Item	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)

Table 4. . Air Handler Control Connections – Non-Communicating

Label	Function
W1	First-stage heating demand
W2	Second-stage heating demand. W1 input must be active to recognize second stage heat demand.
W3	Third-stage heating demand. W1 and W2 inputs must be active to recognize third stage heat demand.
G	Indoor blower demand
Y1 and Y2	First- and second-stage cooling demands
C	24VAC common
R	24VAC power
DH	24VAC output for dehumidification for communicating systems.
H	24VAC output for humidification
O	Reversing valve demand. (Energized by thermostat in cooling mode.)
DS	Blower speed control input for non-communicating Harmony zoning or thermostat dehumidification control.

WARNING



Electric Shock Hazard. Can cause injury or death. Unit must be properly grounded in accordance with national and local codes. Line voltage is present at all components when unit is not in operation on units with single-pole contactors. Disconnect all remote electric power supplies before opening access panel. Unit may have multiple power supplies.

Air Handler Control Button and Display

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).

SEVEN-SEGMENT DISPLAY

Table 5. AHC Single-Character Display

AHC Single-Character Display	Action
Letter or Number	Unit size code (number or letter) displayed represents air handler model size and capacity. See Configuring Unit Size Codes in figure 6.
≡	If three horizontal bars are displayed, board does not recognize air handler model size and capacity. See Configuring Unit Size Codes in figure 6.
•	Idle mode (decimal point / no unit operation)
<i>R</i>	Requested CFM. Example: <i>R 1200</i>
[Stage Cooling (shows active cooling stages) <i>[1</i> or <i>[2</i>
<i>d</i>	Dehumidification mode (unit in dehumidification mode only)
<i>d F</i>	Shown only while in active defrost (Y, W and O call)
<i>H</i>	Stage heating (shows number of active electric heat pilot relays) <i>H 1</i> or <i>H 2</i> or <i>H 3</i>
<i>h</i>	Stage heat pump (shows active heat pump stages) <i>h 1</i> or <i>h 2</i>
<i>U</i>	Discharge air sensor temperature (indoor blower must be operating) <i>U 105</i>

Table 6. AHC Configuration, Test and Error Recall (Fault and Lockout) Function

NOTE – AHC MUST BE IN IDLE MODE		
Single Character LED Display	Action	
Solid	–	Push and hold button until solid appears, release button. Display will blink.
Blinking	–	Push and hold button until required symbol displays. <i>H R</i> or <i>P</i>
CONFIGURING ELECTRIC HEAT SECTIONS		
Solid	<i>H</i>	Release push button - control will cycle the indoor blower motor on to the selected heat speed and stage the electric heat relays on and off to automatically detect number of electric heat sections. AHC has the ability to detect the number of field-installed electric heat stages present in application. Detection is utilized by sensing current through external relay coils controlling heat stages. Control will store the number of electric heat sections. Control will automatically exit current active mode
INDOOR BLOWER TEST		
Solid	<i>R</i>	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	<i>P</i>	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 MUST be manually configured to confirm air handler model size and capacity.
Blinking	<i>P</i>	<ol style="list-style-type: none"> When the correct Unit Size Code is displayed, RELEASE push button. Selected code will flash for 10 second period. During ten second period, HOLD push button until code stops blinking (three seconds minimum). 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>

Table 7. Seven-Segment Status Display

Operation	Description
Idle Mode: Decimal point blinks at 1 Hz	Decimal point blinks at 1 Hz (0.5 second on, 0.5 second off). Display OFF.
Soft Disabled Top & Bottom horizontal line and decimal point blink at 1 Hz	Top & Bottom horizontal line and decimal point blink at 1 Hz (0.5 second on, 0.5 second off). See additional information below this table.
OEM Test Mode	All segments flashing at 2 Hz (unless error is detected)
Electrical Heating stage Shows number of currently active electric heat pilot relays.	Following string is repeated if one stage Heat is active with 850 CFM: H 1 pause A 8 5 0 pause
Cooling Stage Shows what stage of cooling is currently operating.	Following string is repeated if second stage cooling is active with 1235 CFM: C 2 pause A 1 2 3 5 pause
Heat Pump Stage Shows what stage of heat pump is currently operating.	Following string is repeated if first stage heat pump is active with 925 CFM and no Electrical Heat: h 1 pause H 0 pause A 9 2 5 pause
Heat pump & electrical heating stage Shows current heat pump operating stage and number of active electric heat pilot relays.	Following string is repeated if one stage electrical heat and second stage heat pump is active with 600 CFM: h 1 pause H 1 pause A 1 6 5 0 pause
Defrost Mode Shown only while in an active defrost. (Simultaneous Y, W, and O)	Following string is repeated if defrost is active with two electrical heat stages active and 975 CFM: d f pause H 2 pause A 9 7 5 pause
Dehumidification mode Shows that the unit is providing dehumidification in stead of straight cooling.	Following string is repeated if dehumidification is active with 685 CFM: d pause A 6 8 5 pause
Indoor Blower only (G demand) Shows the current CFM delivery of the main blower in actual CFM.	If indoor blower is providing 1600 CFM: following string is repeated: A 1 6 0 0 pause
Diagnostic recall Shows the last 10 stored diagnostic error codes. Initiated by a 2-second button press. Button press interrupts the current display pattern. After all codes are displayed, current display status will resume operation.	If first error is 250, second 231: E pause 2 5 0 pause E pause 2 3 1 Next codes (up to 10) are show using same method. If there is no error codes stored: E pause 0 0 0
Fault Memory clear	After the fault memory is cleared following string is displayed with 0.5 seconds character on/off time: 0 0 0 0 pause
Active Error in AHC Idle mode Shown all active error(s) codes	Following string is repeated if Error E125 and E201 are present: E1 2 5 pause E 2 0 1
Active Error in Run Mode Shown current status and all active error(s) codes	Following string is repeated if Error E311 is present while blower aped at 880CFM: A 8 8 0 pause E 3 1 1
Discharge Air Temperature Sensor (DATS) Any time DAT is sensed in operating range value is displayed if indoor blower is running.	Following string is repeated if three stage el. heat is active with 850 CFM & DAT is 104° F: H 3 pause A 8 5 0 pause U 1 0 4 pause
Soft Disable	Steps to follow if the damper control module is displaying the soft disable code: <ol style="list-style-type: none"> 1. Confirm proper wiring between all devices (Thermostat, damper control module, indoor and outdoor) 2. Cycle power to the control that is displaying the soft disable code. 3. Put the room thermostat through Set Up. 4. Go to setup / system devices / thermostat / edit / push reset. 5. Go to setup / system devices / thermostat / edit / push resetAll.

Table 8. AHC Configuration, Test and Error Recall (Fault and Lockout) Function

ERROR CODE RECALL MODE (NOTE — CONTROL MUST BE IN IDLE MODE)		
Solid	E	To enter Error Code Recall function — PUSH and HOLD button until solid E appears, then RELEASE button. Control will display up to ten error codes stored in memory. If E000 is displayed, there are no stored error codes.
Solid	— — —	To exit Error Code Recall function — PUSH and HOLD button until solid three horizontal bars appear, then RELEASE button. NOTE - Error codes are not cleared
Solid	c	To clear error codes stored in memory, continue to HOLD push button while the three horizontal bars are displayed. Release push button when solid c is displayed. Display will blink.
Blinking	c	Push button to confirm command to delete codes. Error codes are cleared.

Table 9. AHC Single Character Display — Error Codes (Communicating and Non-Communicating)

Error Codes	Status of Air Handler
E 105	Device communication problem - No other devices on BUS (Communication system).
E 114	No 60 hertz power (Check voltage and frequency)
E 115	Low 24 volts (18 or less volts) - Control will restart if the error recovers.
E 120	Unresponsive Device2 - Indicates a device on the RSbus is not responding to a message sent to it by another device. Error code is applicable to all communicating devices on the RSbus (thermostat, indoor and outdoor units). Normally indicates a malfunctioning device.
E 124	Active Subnet Controller Missing for > 180 seconds. This indicates a data connection has been lost between a communicating device and the communicating thermostat. Device (indoor or outdoor unit) sends the alarm if no communication is established between device and thermostat within three minutes.
E 130	Configuration jumper(s) is missing on board.
E 131	Non-volatile data corruption.
E 132	Internal hardware failure.
E 160	Outdoor air temperature sensor (OAS) out of range.
E 201	Indoor Blower communication failure - (includes indoor blower power outage)
E 202	Incorrect air handler model size and capacity selected or wrong motor. Check for proper configuring under Configuring Unit Size Codes.
E 203	No air handler model size and capacity selected. Check for proper configuring under Configuring Unit Size Codes.
E 292	Indoor blower motor unable to start (seized bearing, stuck wheel, etc.).
E 295	Indoor blower motor over temperature (motor trip on internal protector)
E 310	Discharge air temperature sensor (DATS) out of range.
E 312	Restricted airflow — Indoor blower motor is running at a reduced CFM (cutback mode **)
E 313	Indoor and outdoor unit capacity mismatch.
E 331	Global network connection error. This usually indicates there is a short or overladed resistance is too low condition between thermostat and indoor or outdoor units.
E 345	Jumper for second-stage cooling not removed.
E 346	Jumper for heat pump operation not removed.
E 347	Relay Y1 failure.

Table 9. AHC Single Character Display — Error Codes (Communicating and Non-Communicating)

Error Codes	Status of Air Handler
E 348	Relay Y2 failure.
E 350	Heat call with non-configured or mis-configured electric heat. Check for proper configuring under Configuring Electric Heat Stages.
E 351	Heat section / Stage 1 failed (Pilot relay contacts did not close or the relay coil in electric heat did not energize)
E 352	Heat section / Stage 2 failed.
E 353	Heat section / Stage 3 failed.
E 354	Heat section / Stage 4 failed.
E 355	Heat section / Stage 5 failed.
Error codes 401 through 409 are only displayed when the Control's L terminal is connected to a non-communicating outdoor unit's LSOM device.	
E 401	Compressor ran more than 18 hours in air conditioning mode.
E 402	Compressor system pressure trip.
E 403	Compressor short-cycling - running less than four minutes.
E 404	Compressor rotor locked.
E 405	Compressor open circuit.
E 406	Compressor open start circuit.
E 407	Compressor open run circuit.
E 408	Compressor contactor is welded.
E 409	Compressor low voltage.
E 420	Defrost cycle lasts longer than 20 minutes. Check heat pump operation. Cleared when W1 signal is removed. Applicable only in communicating mode with non-communicating heat pump.
** Cutback Mode — The variable speed motor has pre-set speed and torque limiters to protect the motor from damage caused by operating out of its designed parameters (0 through 0.80 in. w.g. total external static pressure).	

Air Handler Jumpers

Jumpers are used for non-communicating mode only. Use figure 2 as reference for jumper settings. If any of the reference jumpers are missing, the air handler control will display Error code **130** and the air handler control will automatically use the **factory default** setting.

- Humidification** – Controls the status of **H** terminal on the thermostat block. Configurations are as follows:
 - If jumper is installed in **SMART** Humidification position (Default), **H** terminal is active if heat demand is present and indoor blower is running.
 - If jumper is installed in **AUTO** Humidification position, **H** terminal is energized whenever indoor blower is running.

- 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.*

- Blower Only CFM** – Used to select Indoor blower CFM for continuous operation.
- Heat** – Used to select Indoor blower CFM for electric heat by placing the jumper in proper position. Actual CFM values for different air handler sizes are shown in *Targeted CFM Tables*.
- 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.

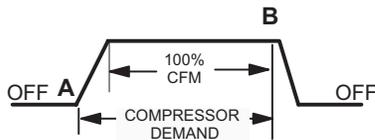
4. **Adjust** - Used to select the indoor blower CFM adjustment value by placing the jumper in appropriate position.

- 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 and will automatically use the default factory setting. Actual CFM values for different air handler sizes are shown in Targeted CFM Tables.
- **Delay** – Indoor blower cooling profile, delay for cooling and heat pump operations.
- When operating a heat pump, delay profiles 1 and 2 are only applicable.
- When operating a heat pump, and profiles 3 and 4 are selected, the air handler control will default to profile 1.

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.

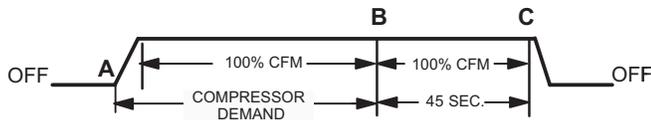
DELAY PROFILE 1

- 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.



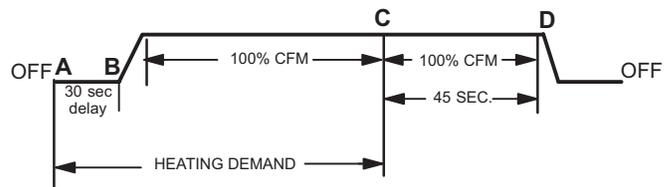
DELAY PROFILE 2

Cooling – Air Conditioner and Heat Pump:



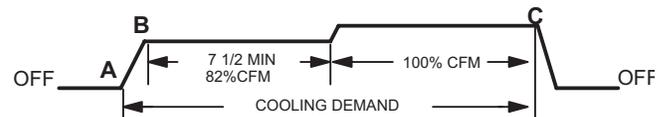
- A - When cool demand is initiated, motor ramps up to 100% and runs at 100% until demand is satisfied.
- B - Once demand is met, motor runs at 100% for 45 seconds.
- C - C Motor ramps down to stop.

Heating – Heat Pump only:



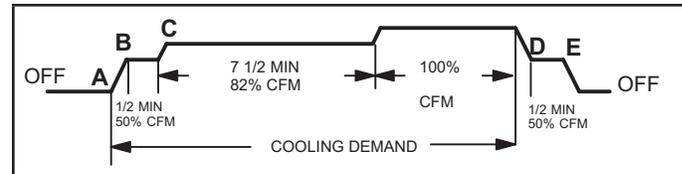
- A - When heat demand is initiated, 30 seconds motor-on delay starts
- B - After the motor-on delay expires, motor ramps up to 100% and runs at 100% until demand is satisfied.
- C - Once demand is met, motor runs at 100% for 45 seconds.
- D - Motor ramps down to stop.

DELAY PROFILE 3



- A - When cool 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 cool 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

SEVEN-SEGMENT DISPLAY

An on-board single character display (see figure 2 for 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.

Target CFM Tables

CBX32MV-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
+	715	855	1000	1130	465	690	900	1050
NORM	670	770	900	1035	425	620	825	950
-	580	700	800	930	385	560	735	850

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.

CBX32MV-024/030 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
+	800	935	1070	1210	660	880	1100	1320
NORM	725	850	975	1100	600	800	1000	1200
-	655	765	880	990	540	720	900	1080

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.

CBX32MV-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
+	1230	1335	1445	1545	900	1225	1380	1545
NORM	1120	1215	1315	1400	810	1125	1275	1400
-	1010	1185	1200	1265	730	1000	1135	1265

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.

CBX32MV-048 and cbx32MV-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 cfm	2 cfm	3 cfm	4 cfm	1 cfm	2 cfm	3 cfm	4 cfm
+	1850	1960	2090	2150	1625	1820	2055	2145
NORM	1705	1800	1900	2005	1425	1625	1805	2005
-	1560	1625	1720	1770	1205	1375	1555	1725

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.

CBX32MV-068 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
+	1875	1975	2090	2150	1640	1840	2075	2150
NORM	1760	1825	1920	2030	1465	1625	1800	2000
-	1550	1650	1725	1800	1250	1390	1560	1720

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.

CBX40UHV-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
+	715	855	1000	1130	465	690	900	1050
NORM	670	770	900	1035	425	620	825	950
-	580	700	800	930	385	560	735	850

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.

CBX40UHV-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
+	800	935	1070	1210	660	880	1100	1320
NORM	725	850	975	1100	600	800	1000	1200
-	655	765	880	990	540	720	900	1080

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.

CBX40UHV-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
+	1230	1335	1445	1545	900	1225	1380	1545
NORM	1120	1215	1315	1400	810	1125	1275	1400
-	1010	1185	1200	1265	730	1000	1135	1265

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 380 cfm.

Lennox iHarmony® Zoning System applications - minimum blower speed is 380 cfm.

CBX40UHV-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 cfm	2 cfm	3 cfm	4 cfm	1 cfm	2 cfm	3 cfm	4 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.

CBX40UHV-048 AND CBX40UHV-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 cfm	2 cfm	3 cfm	4 cfm	1 cfm	2 cfm	3 cfm	4 cfm
+	1850	1960	2090	2150	1625	1820	2055	2145
NORM	1705	1800	1900	2005	1425	1625	1805	2005
-	1560	1625	1720	1770	1205	1375	1555	1725

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.

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
+	465	690	900	1050	465	690	900	1050
NORM	425	620	825	950	425	620	825	950
-	385	560	735	850	385	560	735	850

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.

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
+	660	880	1100	1320	660	880	1100	1320
NORM	600	800	1000	1200	600	800	1000	1200
-	540	720	900	1080	540	720	900	1080

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.

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
+	900	1225	1380	1545	900	1225	1380	1545
NORM	810	1125	1275	1400	810	1125	1275	1400
-	730	1000	1135	1265	730	1000	1135	1265

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.

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 cfm	2 cfm	3 cfm	4 cfm	1 cfm	2 cfm	3 cfm	4 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.

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 cfm	2 cfm	3 cfm	4 cfm	1 cfm	2 cfm	3 cfm	4 cfm
+	1625	1820	2055	2145	1625	1820	2055	2145
NORM	1425	1625	1805	2005	1425	1625	1805	2005
-	1205	1375	1555	1725	1205	1375	1555	1725

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.

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 cfm	2 cfm	3 cfm	4 cfm	1 cfm	2 cfm	3 cfm	4 cfm
+	1640	1840	2075	2150	1640	1840	2075	2150
NORM	1465	1625	1800	2000	1465	1625	1800	2000
-	1250	1390	1560	1720	1250	1390	1560	1720

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. For communicating systems, see the iComfort® thermostat installation instruction.

Table 10. Air Handler with ComfortSense 7500 Thermostat and Single-Stage Outdoor Unit Operating Sequence

Operating Sequence		System Demand						System Response				
System Condition	Step	Thermostat Demand						Relative Humidity		Comp	Air Handler CFM (COOL)	Comments
		Y1	Y2	O	G	W1	W2	Status	D			
NO CALL FOR DEHUMIDIFICATION												
Normal Operation	1	On		On	On			Acceptable	24 VAC	High	100%	Compressor and indoor air handler follow thermostat demand
BASIC MODE (Only active on a Y1 thermostat demand)												
Normal Operation	1	On		On	On			Acceptable	24 VAC	High	100%	ComfortSense 7500 thermostat energizes Y1 and de-energizes D on a call for dehumidification. NOTE: No over cooling.
Dehumidification Call	2	On		On	On			Demand	0 VAC	High	70%	
PRECISION MODE (Operates independent of a Y1 thermostat demand)												
Normal Operation	1	On		On	On			Acceptable	24 VAC	High	100%	Dehumidification mode begins when humidity is greater than set point
Dehumidification call	2	On		On	On			Demand	0 VAC	High	70%	
Dehumidification call ONLY	1	On		On	On			Demand	0 VAC	High	70%	ComfortSense 7500 will keep outdoor unit energized after cooling temperature setpoint has been reach in order to maintain room humidity setpoint. NOTE: Allow to over cool 20F from cooling set point.

Table 11. Air Handler 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 NOTE: No over cooling.
Dehumidification Call	2	On	On	On	On			Demand	0 VAC	High	70%	
PRECISION MODE (Operates independent of a Y1 thermostat demand)												
Normal Operation	1	On		On	On			Acceptable	24 VAC	Low	70%	Dehumidification mode begins when humidity is greater than set point
Dehumidification call	2	On	On	On	On			Demand	0 VAC	High	70%	
Dehumidification call ONLY	1	On	On	On	On			Demand	0 VAC	High	70%	ComfortSense 7500 thermostat will keep outdoor unit energized after cooling temperature setpoint has been reached in order to maintain room humidity setpoint. NOTE: Allow to over cool 20F from cooling set point.
Room Thermostat Calls for First- and Second-Stage Cooling												
BASIC MODE (Only active on a Y1 thermostat demand)												
Normal Operation	1	On	On	On	On			Acceptable	24 VAC	High	100%	ComfortSense 7500 thermostat energizes Y2 and de-energizes D on a call for dehumidification NOTE: No over cooling.
Dehumidification Call	2	On	On	On	On			Demand	0 VAC	High	70%	
PRECISION MODE (Operates independent of a Y1 thermostat demand)												
Normal Operation	1	On	On	On	On			Acceptable	24 VAC	High	100%	Dehumidification mode begins when humidity is greater than set point
Dehumidification call	2	On	On	On	On			Demand	0 VAC	High	70%	
Dehumidification call ONLY	1	On	On	On	On			Demand	0 VAC	High	70%	ComfortSense 7500 thermostat will keep outdoor unit energized after cooling temperature setpoint has been reached in order to maintain room humidity setpoint. NOTE: Allow to over cool 20°F from cooling set point.

UNIT SIZE CODE

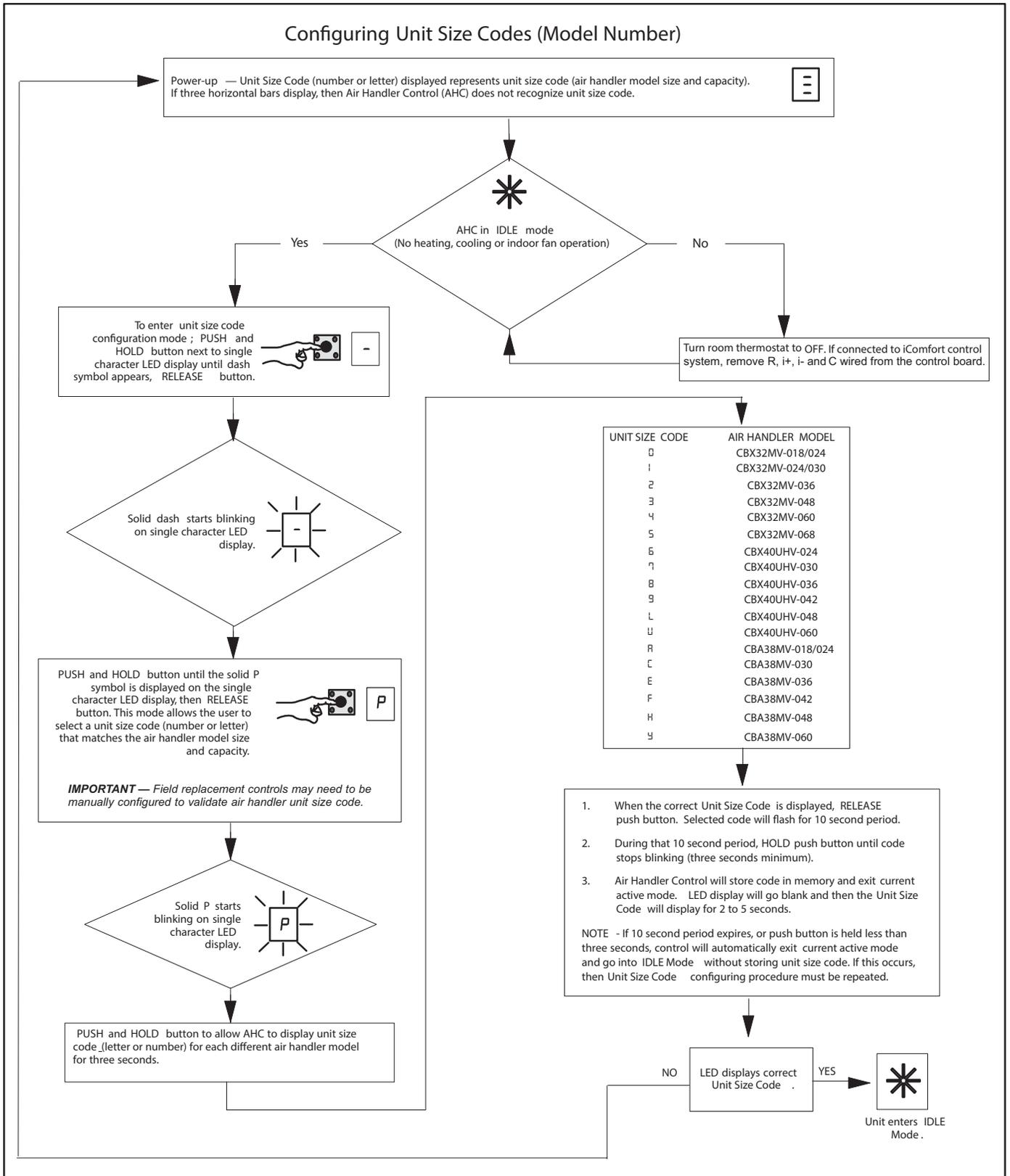


Figure 7. Configure Unit Size Codes

ELECTRIC HEAT

Configuring/Detecting Electric Heat Sections

IMPORTANT — When connected to an iComfort thermostat, all jumper settings can be made during configuration of the system in the thermostat. After all electric heat installations, the Auto Detect function in the control will detect how much electric heat is available. That information will be sent to the Smart Hub, along with all the other air handler parameters.
NOTE — Electric heat can still be configured manually using the push button, if Auto Detect is unavailable.
NOTE — Make sure power to control board is off before setting any jumpers. Once all jumpers are set, restore power to control board.

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

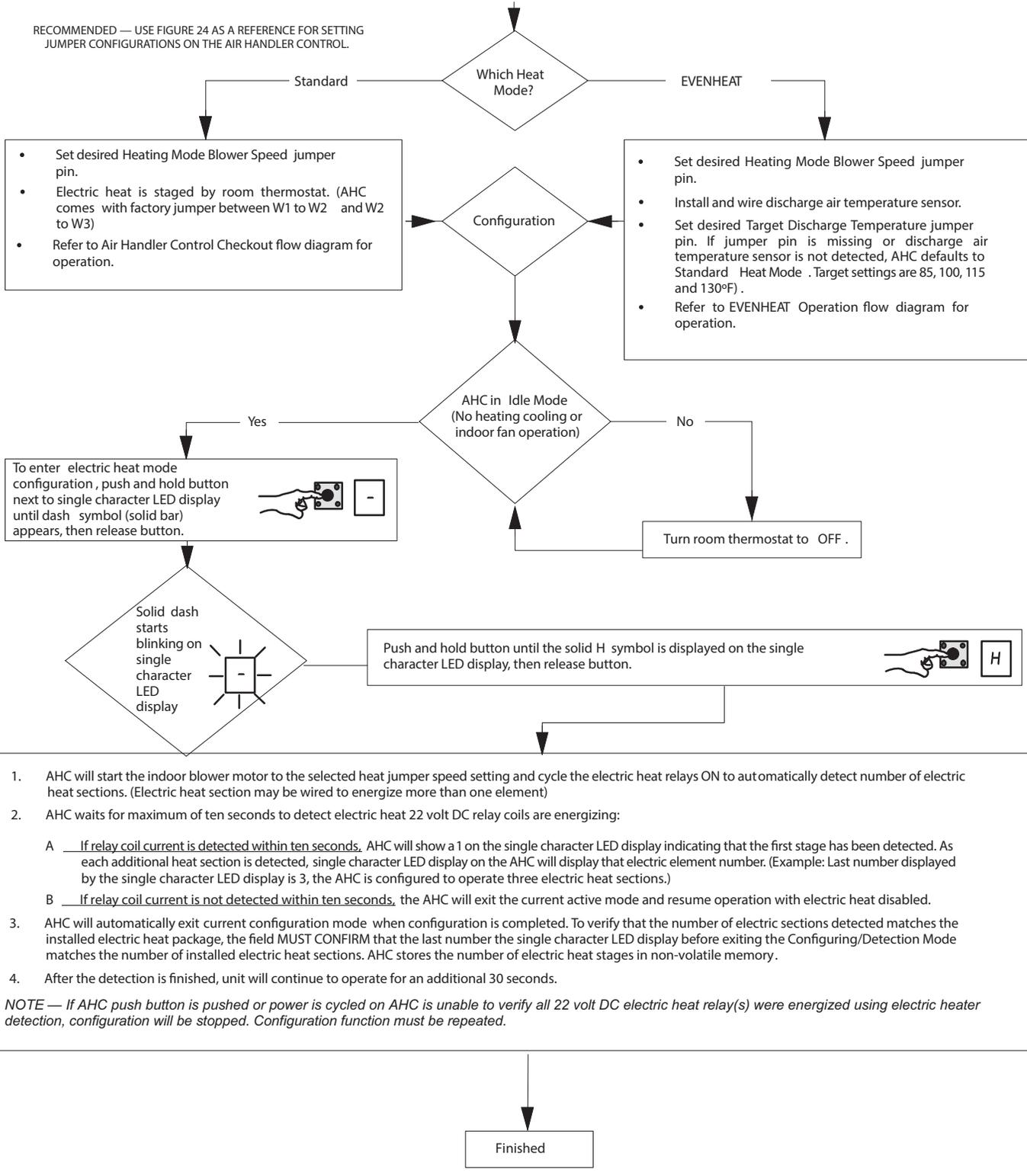


Figure 8. Heat Mode Selection

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.

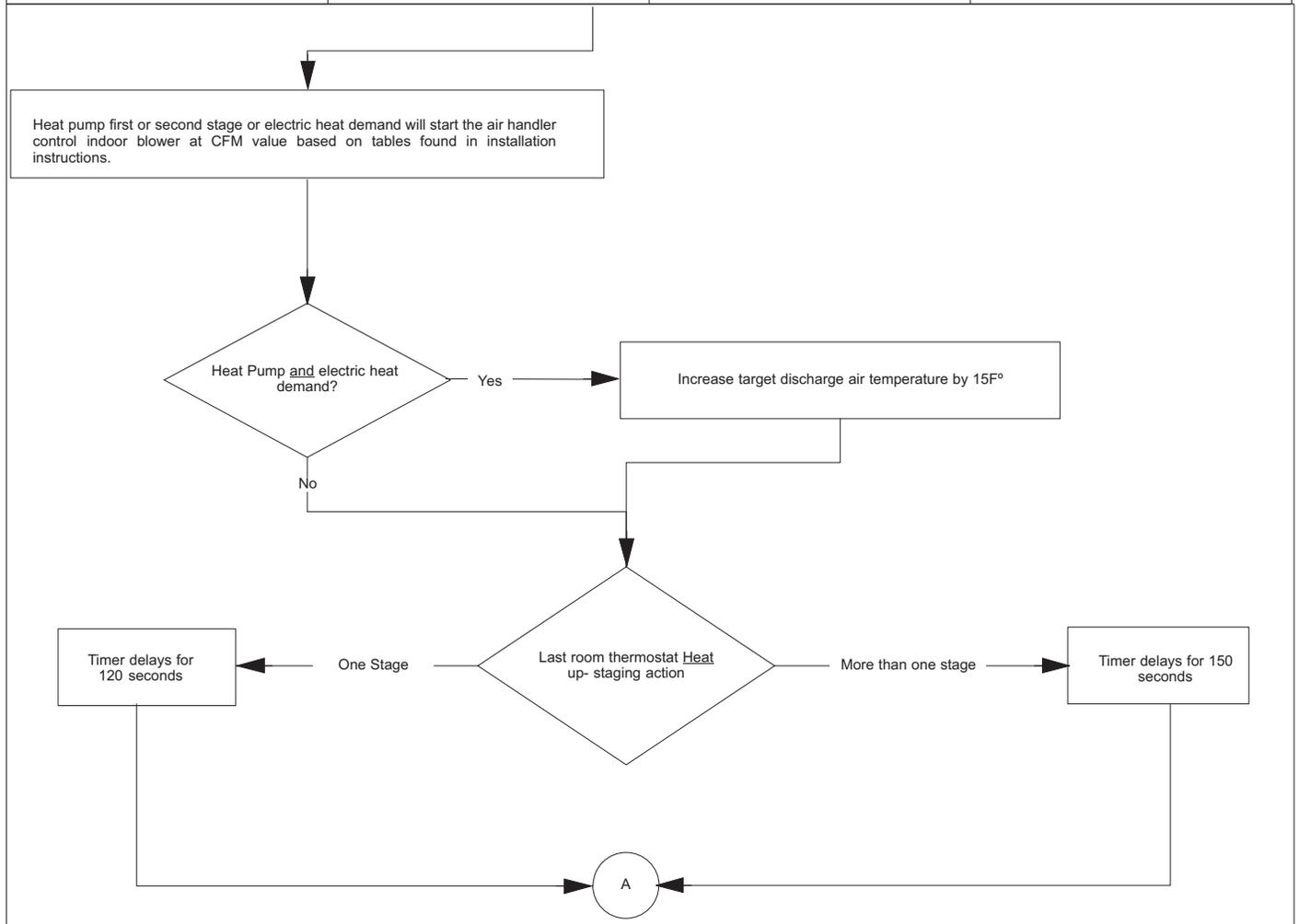


Figure 9. EVENHEAT Operation (1 of 2)

EVENHEAT Operation

Note 1 Activation delay

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

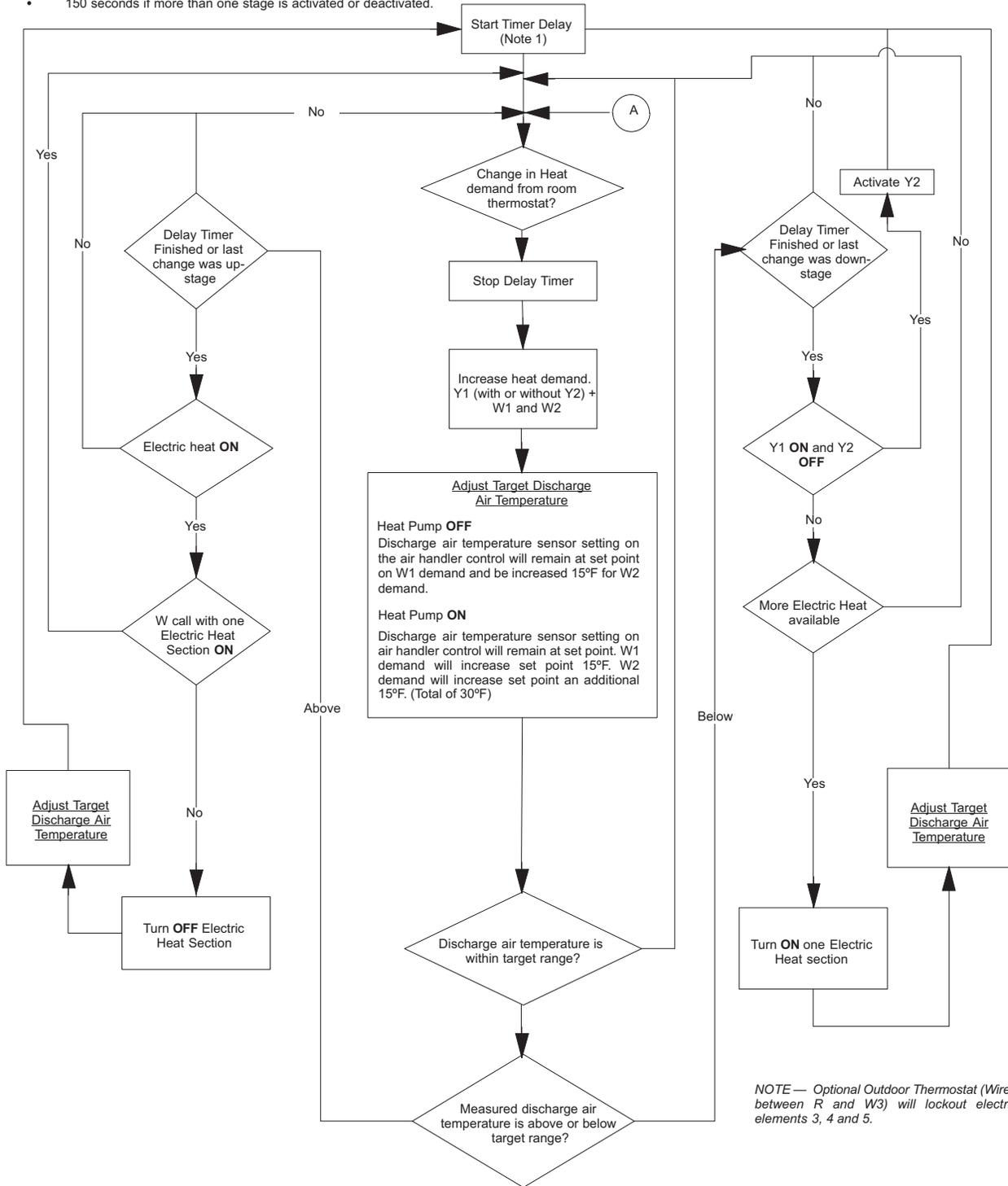


Figure 10. EVENHEAT Operation (2 of 2)

