



**RETAIN THESE INSTRUCTIONS
 FOR FUTURE REFERENCE**

⚠ WARNING

Due to higher operating pressures, CBWMV units must not be applied to steam boiler systems.

⚠ CAUTION

Unit is designed to be used with non-potable boiler systems only.

⚠ CAUTION

Physical contact with metal edges and corners while applying excessive force or rapid motion can result in personal injury. Be aware of, and use caution when working near these areas during installation or while servicing this equipment.

Introduction

The multi-positional Dave Lennox *Signature*™ Collection CBWMV air handler/hot water coil unit is designed to be used with non-potable boiler systems for warm air heating. A variety of Lennox air conditioning systems may be applied to the CBWMV unit for optional cooling.

INSTALLATION INSTRUCTIONS

CBWMV Series Units

AIR HANDLERS
 505,047M
 09/06
 Supersedes 02/06

TP Technical
 Publications
 Litho U.S.A.

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Shipping & Packing List

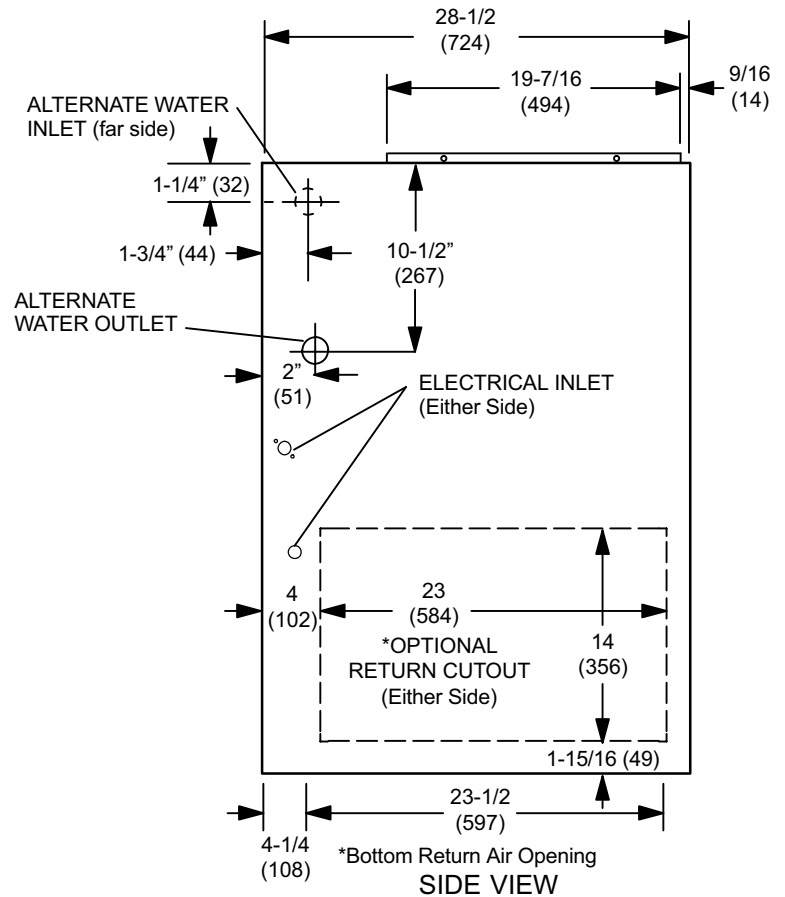
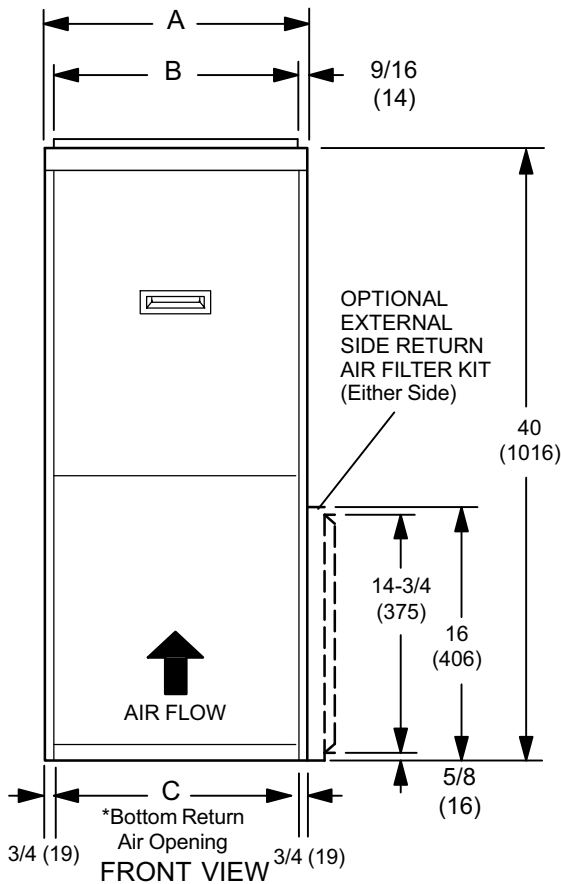
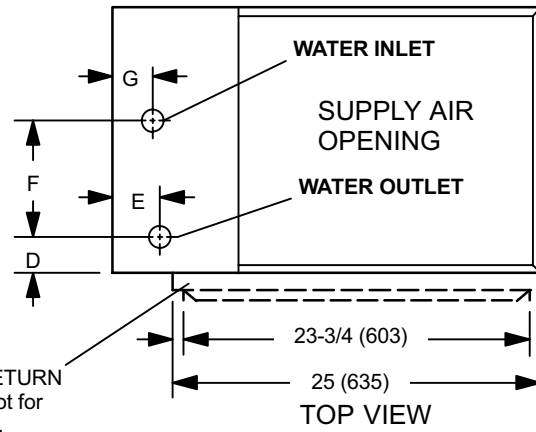
- 1 - CBWMV Air Handler [NOTE - Includes freezestat mounted to the manifold.]
- 1 - Bag assembly containing:
 - 1 - Electrical make-up box
 - 1 - Copper fitting
 - 1 - Snap bushing
 - 2 - Water line grommets
 - 3 - Wire nuts
 - 2-7/8" cabinet plugs

Check equipment for shipping damage. If you find any damage, immediately contact the last carrier.



CBWMV Unit Dimensions - inches (mm)

*NOTE - Single side inlet applications result in approximately 4 percent reduction of CFM on B-size units and approximately 5 percent reduction of CFM on C-size units.



CBWMV Model No.	A	B	C	D	E	F	G
-24B-040 -36B-070	17-1/2 (445)	16-3/8 (416)	16 (406)	1-1/2 (38)	1-3/4 (44)	8 (203)	2 (51)
-36C-090 -60C-100 -60C-120	21 (533)	19-7/8 (454)	19-1/2 (495)	2 (51)	2-1/2 (64)	9-1/2 (241)	1-1/2 (38)

General

These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities having jurisdiction before installation. Only qualified service technicians or installers may install and service this unit.

CBWMV Unit Parts Arrangement

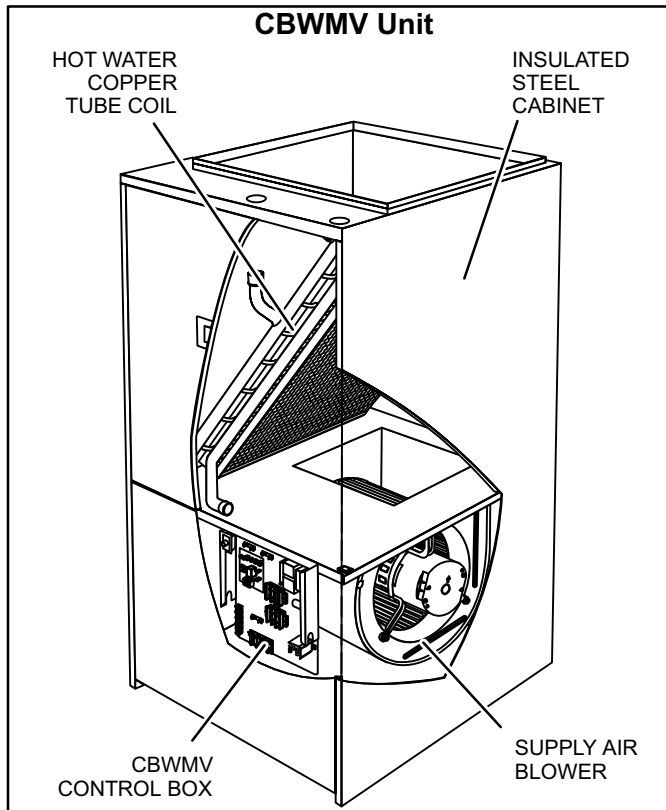


Figure 1

CBWMV Unit Parts Description

Blower

The CBWMV is equipped with a variable speed motor that provides separate cooling and heating CFM selections and low continuous fan speeds.

Hot Water Coil

The copper tube coil is equipped with aluminum fins which provide excellent heat transfer. Manual air bleed ports are located in the copper tubing to release trapped air in the water circuit in all unit configurations.

Blower Control

The control provides a fixed blower delay of 45 seconds ON / 30 seconds OFF on a W call.

Thermostat and accessory connections are made to the terminal strips in the control box.

CBWMV Unit Optional Accessories

Accessory Circulators (53J76, 99K69)

An accessory circulator should be used in long line applications. Two circulators are available with either 9 gallons per minute (99K69) or 14 gpm (53J76) flow rate. Both units have 7/8" soldering joints (inlet and outlet). See piping section for more information.

Downflow Base (68M03)

A downflow base kit is available for downflow applications without add-on cooling coils. The base provides clearance for routing the CBWMV unit's inlet and outlet water lines.

NOTE - Downflow applications with an add-on cooling coil require field-fabricated transitions to provide adequate clearance for servicing/removing the cooling coil without cutting the water lines.

Requirements

WARNING

Improper installation, adjustment, alteration, service or maintenance can cause personal injury, loss of life, or damage to property.

Installation and service must be performed by a qualified installer or service agency.

Installation of Lennox CBWMV unit must conform with local building codes. Refer to the electrical section (Page 8) for US and Canadian electrical regulations.

When paired with a water heating device, refer to local building codes for special considerations. Refer to water heating device for agency and service clearances. Clearances to combustibles for the CBWMV unit only is zero inches on all sides. Table 1 lists recommended service clearances.

Table 1

CBWMV Unit Service Clearances		
Clearances	Location	Inches (mm)
Recommended Service Access	Front Access Panel	30 (762)

NOTE - Service access clearance must be maintained.

Accessibility and service clearances must take precedence over fire protection clearances.

For installation in a residential garage, unit must be located or protected to avoid physical damage by vehicles.

The CBWMV unit must be installed so that its electrical components are protected from water.

When the CBWMV unit is used with an air conditioner, the air handler shall be installed on the upstream side of the cooling evaporator coil to avoid freeze-up of water system and condensation. With a parallel flow arrangement, a damper (or other means to control the flow of air) must adequately prevent chilled air from entering the air handler. If the damper is manually operated, it must be equipped to prevent operation of either the heating or the cooling unit, unless it is in the full HEAT or COOL setting.

NOTE - CBWMV series units must not be used in or for the following applications:

- construction heater - during any phase of construction
- unit heater
- mobile home heater
- potable water applications

Application

The CBWMV unit is designed for use in non-potable water boiler systems. The water heating device must be adequate to provide enough heat according to the Engineering Handbook specifications. The water heating device must provide a minimum of 6 gallons/minute for small units (CBWMV-040, -070) and 9 gallons/minute for large units (CBWMV-090, -100, -120).

Installation - Setting Equipment

WARNING

This product contains fiberglass wool.

Disturbing the insulation during installation, maintenance, or repair will expose you to fiberglass wool dust. Breathing this may cause lung cancer. (Fiberglass wool is known to the State of California to cause cancer.)

Fiberglass wool may also cause respiratory, skin, and eye irritation.

To reduce exposure to this substance or for further information, consult material safety data sheets available from address shown below, or contact your supervisor.

**Lennox Industries Inc.
P.O. Box 799900
Dallas, TX 75379-9900**

The boiler installation must conform to the requirements of the authority having jurisdiction or, in the absence of such requirements, to the latest revision of the National Fuel Gas Code, ANSI Z223. (Available from the American Gas Association, 8501 E. Pleasant Valley Road, Cleveland, OH 44134). Reference should also be made to local gas utility regulations and other codes in effect in the same area in which the installation is to be made. When installed in Canada: The latest revision of the CAN1/CSA-B149.1 and/or B149.2 Installation Codes for Gas-Burning Equipment and/or local codes.

Determine the CBWMV unit installation location and position units so that door panels are accessible. Keep in mind routing of the water and plumbing lines and electrical connections.

The CBWMV unit is multi-positional. No adjustment is necessary to apply unit for upflow or horizontal discharge. A downflow base is available and provides clearance for routing the inlet/outlet water lines when the CBWMV unit is applied without an add-on cooling coil. Downflow applica-

tions with add-on cooling coils require field-fabricated transitions that provide at least 6 inches of clearance for the CBWMV unit's inlet/outlet water lines. See figure 2 for examples.

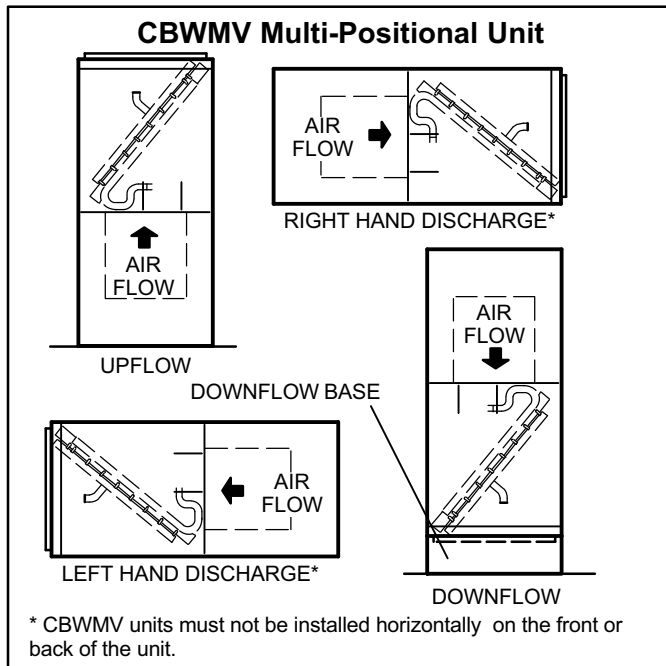


Figure 2

Units may be horizontally installed in either attic or crawl space.

⚠ CAUTION

CBWMV series units are shipped with an antifreeze thermostat to prevent the water coil from freezing. The thermostat is installed at the factory but must be field wired (see figures 12 and 13). Do not bypass this feature when you install or run the unit.

⚠ CAUTION

Use a drain pan for installations over finished living areas.

Either suspend the unit from the roof rafters or floor joists or mount on a platform. The CBWMV unit must be level and well supported.

*NOTE - 1/2 hp and 1 hp blower motors are equipped with three flexible legs and one rigid leg. The rigid leg is equipped with a shipping bolt and a flat white plastic washer (rather than the rubber mounting grommet used with a flexible mounting leg). **The bolt and washer must be removed before the air handler is placed into operation.** After the bolt and washer have been removed, the rigid leg will not touch the blower housing.*

Duct System

Use industry-approved standards (such as those published by Air Conditioning Contractors of America or American Society of Heating, Refrigerating and Air Conditioning Engineers) to size and install the supply and return air duct system. This will result in a quiet and low-static system that has uniform air distribution.

NOTE - Do not operate the air handler with an external static pressure that exceeds 0.8 inches w.c. Higher external static pressures may cause erratic operation.

Return Air Plenum

⚠ IMPORTANT

Return air must not be drawn from a room where any fossil fuel appliance (ie., a water heater) is installed.

When return air is drawn from a room, a negative pressure is created in the room. If a fossil fuel appliance is operating in a room with negative pressure, the flue products can be pulled back down the vent pipe and into the room. This reverse flow of the flue gas may result in incomplete combustion and the formation of carbon monoxide gas. This toxic gas might then be distributed throughout the house by the air handler duct system.

Return Air Opening Guidelines

NOTE - Do not bring in air from the back of the unit. Return air can be brought in from the sides or bottom only.

Bottom Return

If the air handler is installed on a platform with bottom return, make an airtight seal between the bottom of the air handler and the platform to ensure that the air handler operates properly and safely. Use aluminum tape or mastic between the plenum and the air handler cabinet to ensure a tight seal. The air handler is equipped with a removable bottom panel to facilitate installation.

Side Return

For side return air applications, cut the air handler cabinet at the maximum return air dimensions shown on page 2. See figure 3 for a typical side inlet arrangement with a transition and filter.

NOTE - Single side inlet applications result in approximately a 4 percent reduction of CFM on B-size units and approximately a 5 percent reduction of CFM on C-size units:

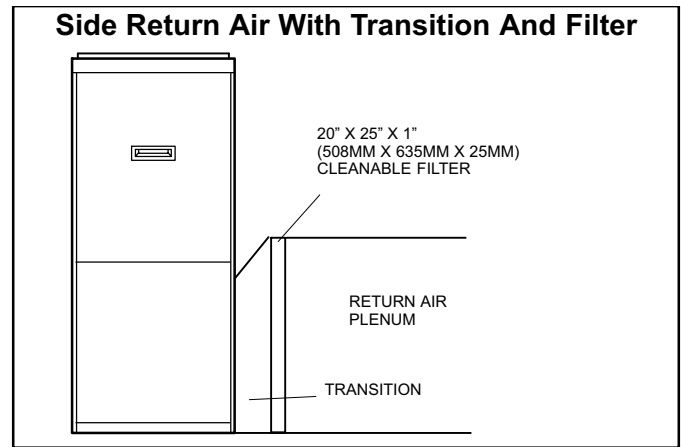


Figure 3

Return Air Base

For return air with the optional return air base (RAB), see figure 4 (and refer to installation instructions provided with Return Air Base kit).

***NOTE** - Both unit and return air base openings must be connected to and entirely covered by a single plenum or IAQ accessory opening. Optional side return air filter kits cannot be used with RAB Return Air Base.

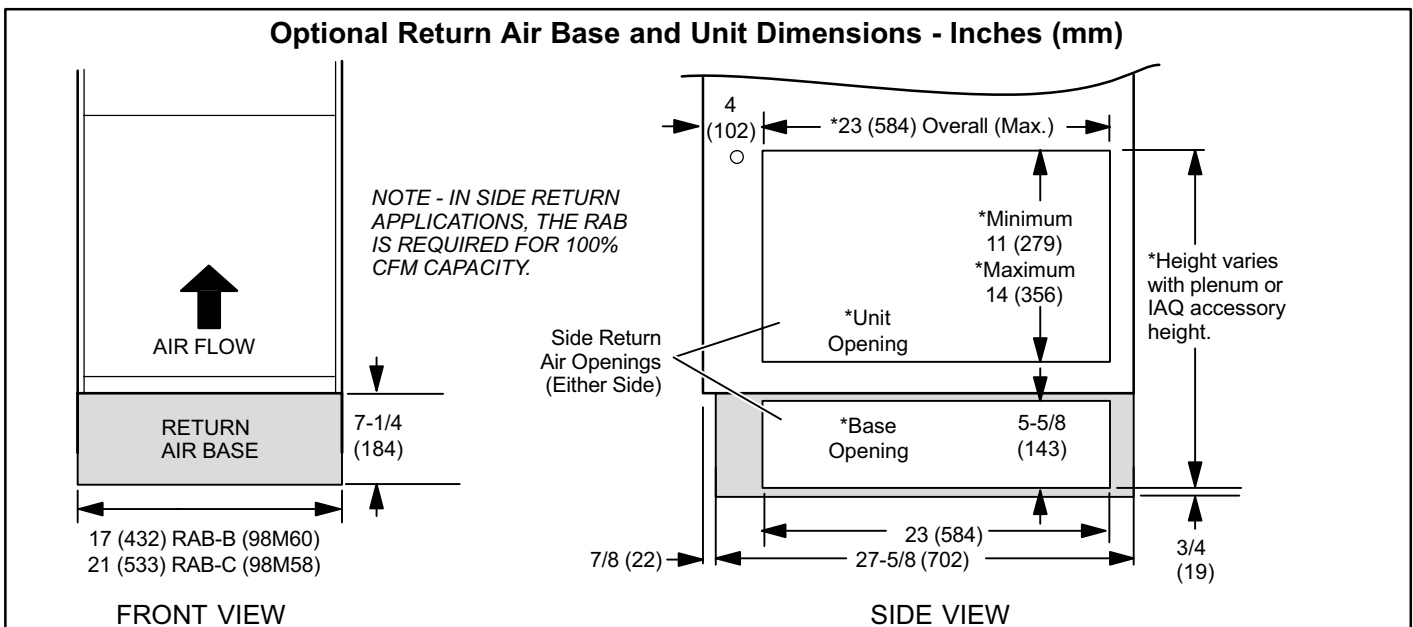


Figure 4

Removing the Bottom Panel (bottom return or return air base configurations)—Remove the two screws that secure the bottom cap to the air handler. Pivot the bottom cap down to release the bottom panel. Once the bottom panel has been removed, reinstall the bottom cap. See figure 5.

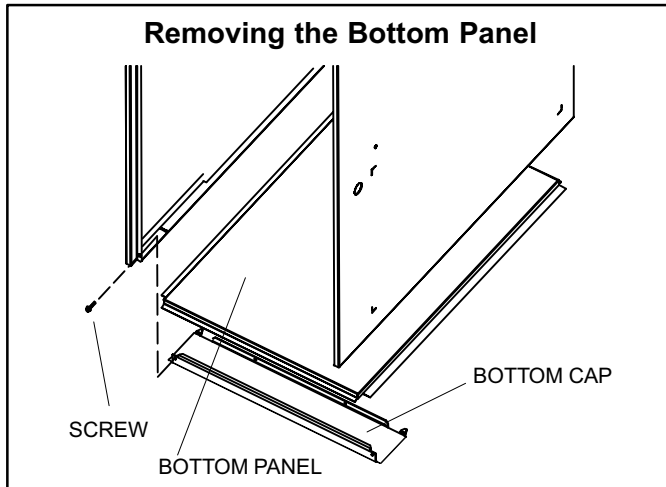


Figure 5

Leveling an Upflow Unit—When the side return air inlets are used in an upflow application, it may be necessary to install leveling bolts on the bottom of the air handler. Use field-supplied corrosion-resistant 5/16 inch machine bolts (4) and nuts (8). See figure 6.

NOTE - Maximum leveling bolt length is 1-1/2 inches.

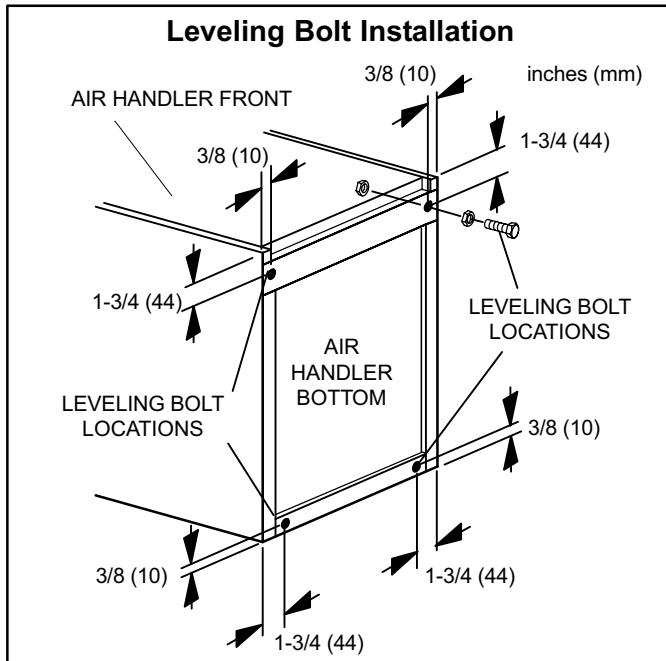


Figure 6

1. Lay the air handler on its back and drill a 5/16 inch diameter hole in each corner of the air handler's bottom. See figure 6 for the correct location of the holes. Drill

through the bottom panel and the bottom flange of the cabinet.

2. Install one bolt and two nuts into each hole. Screw the first nut onto a bolt and then insert the bolt into a hole. A flat washer may be added between the nut and the bottom of the unit.
3. Screw another nut onto the bolt on the inside of the air handler base. A flat washer may be added between the nut and the bottom of the unit.
4. Adjust the outside nut to the appropriate height and tighten the inside nut to secure the arrangement.

Horizontal Applications

The CBWMV air handler can be installed in horizontal applications. Refer to Engineering Handbook for additional information. Allow for clearances to combustible materials as indicated on the unit nameplate.

This air handler may be installed in either an attic or a crawlspace. Either suspend the air handler from roof rafters or floor joists, as shown in figure 7. The unit must be supported at both ends and beneath the blower deck to prevent sagging.

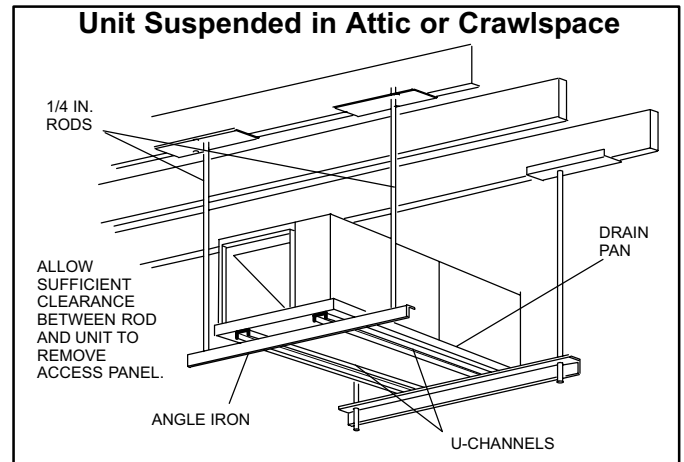


Figure 7

*NOTE - Heavy-gauge, perforated sheet metal straps (plumbers' straps) may be used to suspend the unit from roof rafters or ceiling joists. When suspending the unit in this manner, support must be provided for both the ends and the middle of the air handler to prevent sagging. Straps must not interfere with plenum or water piping. Securing screws should be 1/2 inch from the top edge and 1-1/2 inch from the side edge in all cases. **Cooling coils and supply and return air plenums must be supported separately.***

NOTE - When the air handler is installed on a platform in a crawlspace, it must be elevated enough to avoid water damage and to allow the optional evaporator coil to drain.

Horizontal and Downflow Applications

Return air can be brought in through the end of an air handler installed in the horizontal or downflow application. The air handler is equipped with a removable bottom panel to facilitate installation (see figure 5).

Filter Assembly & Filters

This unit is not equipped with a filter or rack. A field-provided high-velocity filter is required for the unit to operate properly. Table 2 lists recommended filter sizes. A filter must be in place any time the unit is operating.

Table 2

Recommended Filter Sizes		
Air Handler Cabinet Size	Filter Size	
	Side Return	Bottom Return
17-1/2"	16 X 25 X 1 (1)	16 X 25 X 1 (1)
21"	16 X 25 X 1 (1)	20 X 25 X 1 (1)

Plumbing

Pipe and Fitting Specifications

Refer to local building and plumbing codes for approved copper pipe and fittings.

Plumbing Procedures

Refer to the installation instructions of the water heating device to be used with the CBWMV unit. Follow the recommendations outlined in that instruction as well as governing plumbing codes and practices.

Plumbing Checklist

- Flush water lines between the CBWMV unit and the water heating device before start-up. Normal flushing procedures should be used to rid the system of contaminants and foreign debris.
- CBWMV units are installed in non-potable systems.

Electrical

Wiring and grounding 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 overcurrent protection size.

Select the proper supply circuit conductors in accordance with tables 310-16 and 310-17 in the National Electric Code, ANSI/NFPA No. 70 or tables 1 through 4 in the Canadian Electric Code, Part I, CSA Standard C22.1.

CAUTION

USE COPPER CONDUCTORS ONLY.

WARNING



Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

Refer to figure 12 for schematic wiring diagram and troubleshooting.

Line Voltage (120V)

Line voltage field supply conductors are terminated at the CBWMV unit. The unit is shipped with the line voltage connections secured to the lower left coil manifold for left side make-up box installations. For right side make-up box installations, remove the wire tie that holds the line voltage connections and pull excess wires into blower deck/control box area as shown in figure 8.

Install make-up box (provided for line voltage wiring in the unit's bag assembly) as shown in figure 9.

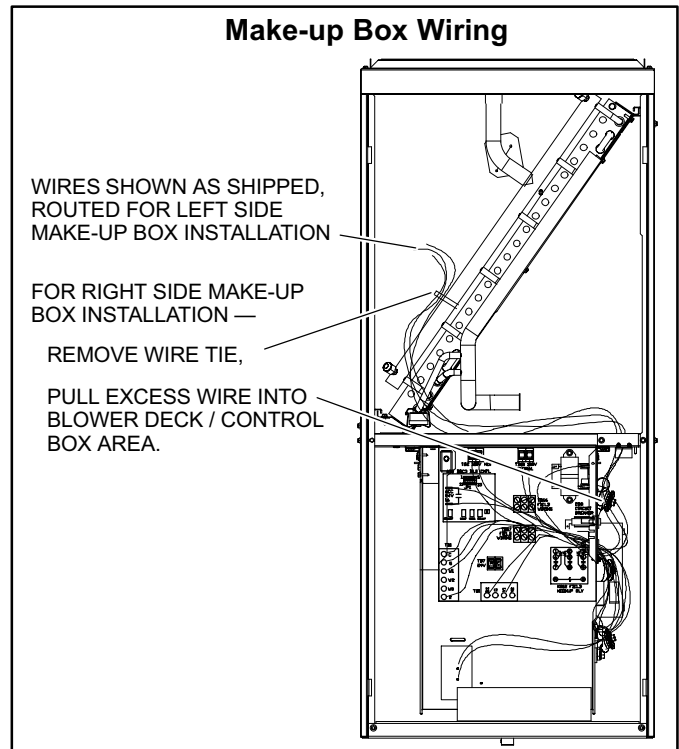


Figure 8

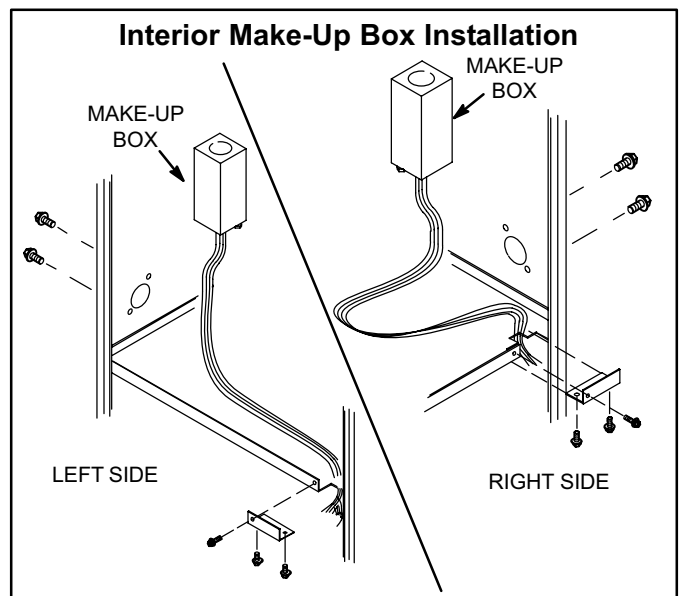


Figure 9

Electrostatic Discharge (ESD) - Precautions And Procedures

⚠ CAUTION

Electrostatic discharge can affect electronic components. Take precautions during air handler installation and service to protect the air handler's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the air handler, the control and the technician at the same electrostatic potential. Neutralize electrostatic charge by touching hand and all tools on an unpainted unit surface, such as the blower deck, before performing any service procedure.

Refer to table 3 for field wiring.

1. Refer to the CBWMV unit's nameplate for minimum circuit ampacity and maximum overcurrent protection size.
2. Install a separate disconnect switch (protected by either fuse or circuit breaker) near the air handler so that power can be turned off for servicing.
3. Complete the wiring connections to the equipment. Use the provided unit wiring diagram and the field wiring diagrams shown in table 3. Use 18-gauge wire or larger that is suitable for Class II rating for thermostat connections.
4. Electrically ground the unit according to local codes or, in the absence of local codes, according to the current

National Electric Code (ANSI/NFPA No. 70) for the USA and current Canadian Electric Code part 1 (CSA standard C22.1) for Canada. A green ground wire is provided in the field make-up box.

5. Install the room thermostat according to the instructions provided with the thermostat. See table 3 for field wiring connections in varying applications. If the air handler is being matched with a heat pump, refer to the FuelMaster21[®] installation instruction.

Removeable Jumpers

Removeable Jumper DS to Y1—The factory-installed wire jumper that connects terminals DS and Y1 on the TB1 terminal strip in the control box must be removed when the air handler is installed in a system supporting dehumidification using a *SignatureStat*[™] thermostat (e.g., Humiditrol[®] Enhanced Dehumidification Accessory or Harmony[™] zone controls).

Removeable Jumper R to O—The factory-installed wire jumper that connects TB7 (24V) terminal R to TB1 terminal O must be removed when the air handler is installed in applications which include a heat pump unit and the FuelMaster21[®] control board. If the jumper is left intact, terminal O will remain energized, eliminating the heat mode in the heat pump.

Removeable Jumper Y1 to Y2—The factory-installed wire jumper that connects Y1 and Y2 on the TB1 terminal strip must be removed if two-stage cooling is used. If the jumper is not removed the outdoor unit will only operate in second-stage cooling.

Table 3

Field Wiring Application Jumper Settings (See figure 12)				
Thermostat (Application)	TB1 Y1 to Y2	TB1 DS to Y1	TB1 R to O	Wiring Connections
1 Heat / 1 Cool with <i>SignatureStat</i> [™] Thermostat [Single-Stage Heat Pump]	Yes	No (Remove)	No (Remove)	
2 Heat / 2 Cool with <i>SignatureStat</i> [™] Thermostat [Two-Stage Heat Pump (Refer to FM21 Instructions)]	No (Remove)	No (Remove)	No (Remove)	

"O" terminal used only with heat pumps.

Indoor Blower Speeds

1. When the thermostat is set to "FAN ON," the indoor blower will run continuously at approximately 38% of the second-stage cooling speed when there is no cooling or heating demand.
2. When the CBWMV is in the heating mode, the indoor blower will run on the heating speed designated by the position of the HEAT pin.
3. When there is a cooling demand, the indoor blower will run on the cooling speed designated by the position of the COOL pin.

Accessory Field Wiring (K212)

Connect field wiring to 3PDT relay K212 (Lennox part 67K66) as shown in figure 10.

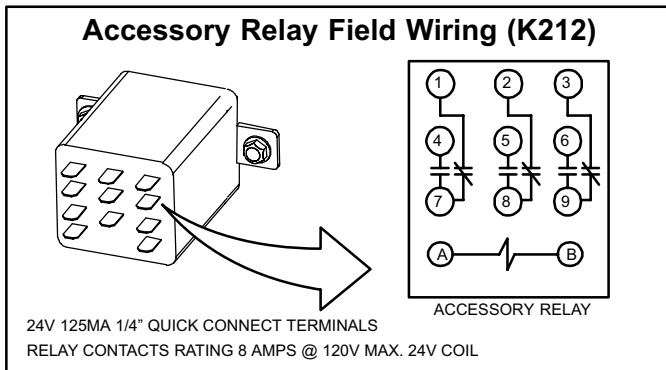


Figure 10

Accessory Field Wiring (TB66 & TB67)

Connect wires from accessories (e.g. powered air cleaners, humidifiers) to terminal blocks TB66 and TB67 (see detail in figure 11).

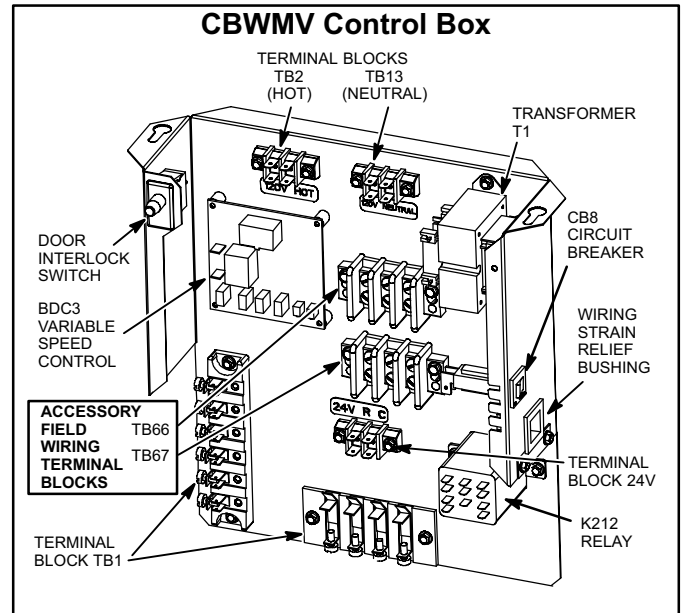


Figure 11

Typical CBWMV Wiring Diagram

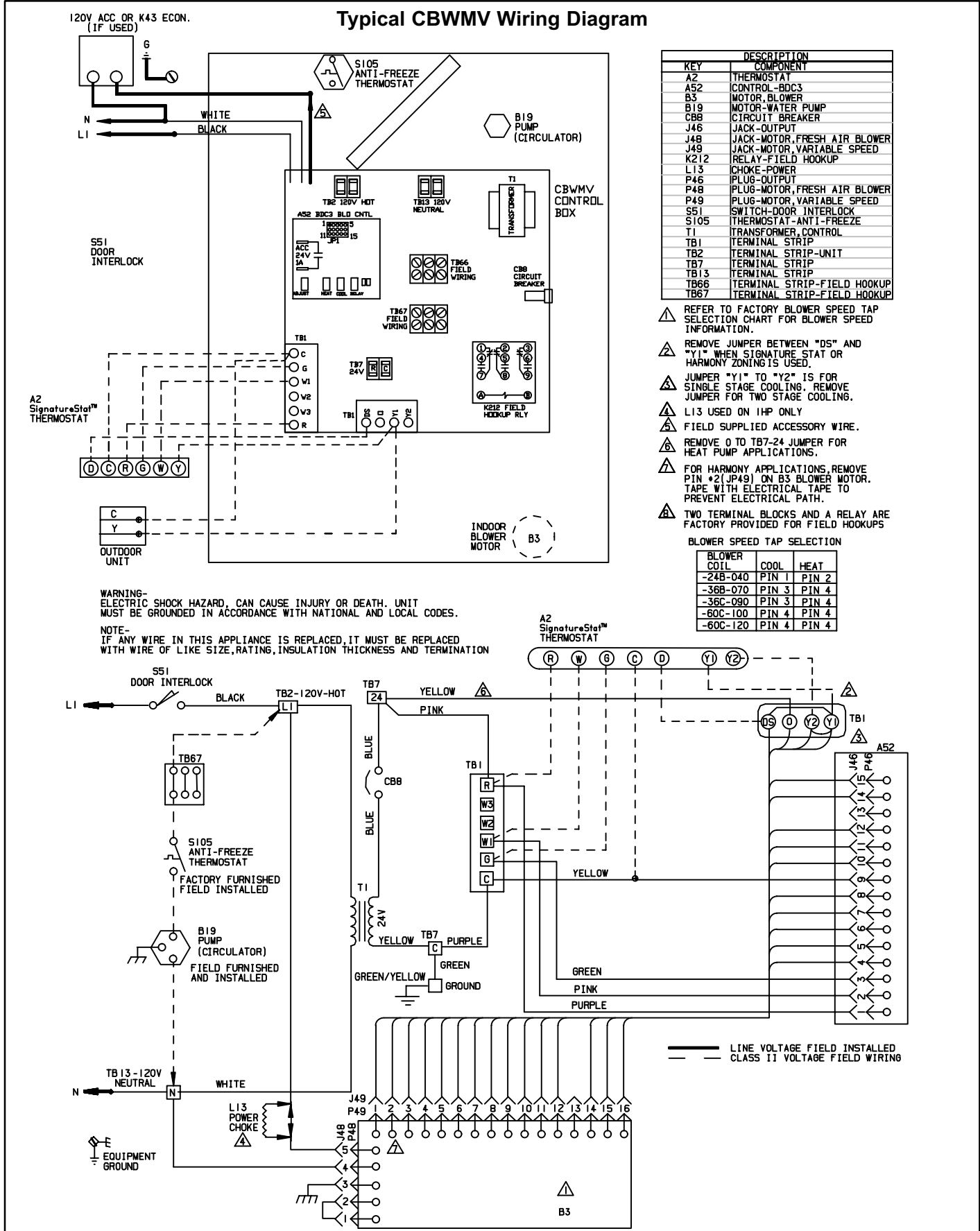


Figure 12

Freezestat Operation

⚠ IMPORTANT

Use of the freezestat feature is required in all installations using CBWMV units.

The CBWMV unit is equipped with a field-wired freezestat. The freezestat protects the CBWMV system from freezing temperatures when the unit is installed in unconditioned areas.

The factory-provided freezestat must energize the circulator when water temperatures fall below 45°F. Freezestat wiring is shown in figure 13.

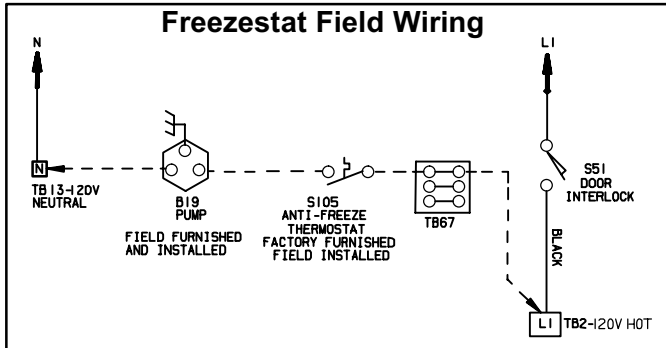


Figure 13

BDC3 Variable Blower Control Board

CBWMV units are equipped with a variable speed motor that is capable of maintaining a specified CFM throughout the external static range. A particular CFM can be obtained by positioning jumpers (**COOL**, **HEAT**, and **ADJUST**) on the BDC3 control board. The **COOL** and **HEAT** jumpers are labeled 1, 2, 3, and 4. Each of the numbers corresponds with an air volume (CFM) setting. The **ADJUST** jumper is labeled **TEST**, **-**, **+**, and **NORM**. The **+** and **-** pin settings are used to add or subtract a percentage of the CFM selected. The **TEST** jumper is used to operate the motor in the test mode. The **DELAY** jumper controls ramping profiles.

Figure 14 shows the BDC3 control board. Use tables 5 through 9 to determine the correct air volume for heat and cool speed taps.

Diagnostic LEDs located on the BDC3 control board are provided to aid in identifying the unit's mode of operation. Certain scenarios will arise depending on the jumper positions. Read through the jumper settings sections before adjusting blower speed. Refer to figure 14 for identification.

Continuous Low Blower Option

Refer to the blower speed chart located on the CBWMV unit wiring diagram for factory set cooling, heating and low (continuous) blower speeds. Systems using a cooling thermostat subbase may operate continuous blower (factory-set to operate at 38% of second-stage cooling speed) through the FAN-ON switch of the thermostat. For continuous low blower with a system without a cooling subbase, a fan switching subbase may be used.

Heating or cooling demand will cause blower to go to heat or cool speed.

Blower Speed Adjustments

Diagnostic LEDs

RUN LED — Indicates a demand for blower operation in either the heating mode or continuous fan-only mode. RUN LED will not illuminate during a cooling demand.

CFM LED — Indicates the CFM at which the unit is operating. The light flashes once for approximately every 100 CFM. For example, if the unit is operating at 1000 CFM, CFM LED will flash 10 times. If the CFM is 1150, CFM LED will flash 11 full times plus one fast or half flash.

At times the light may appear to flicker or glow. This takes place when the control is communicating with the motor between cycles. This is normal operation.

The appropriate speed according to application and CFM need is selected by moving jumper pins.

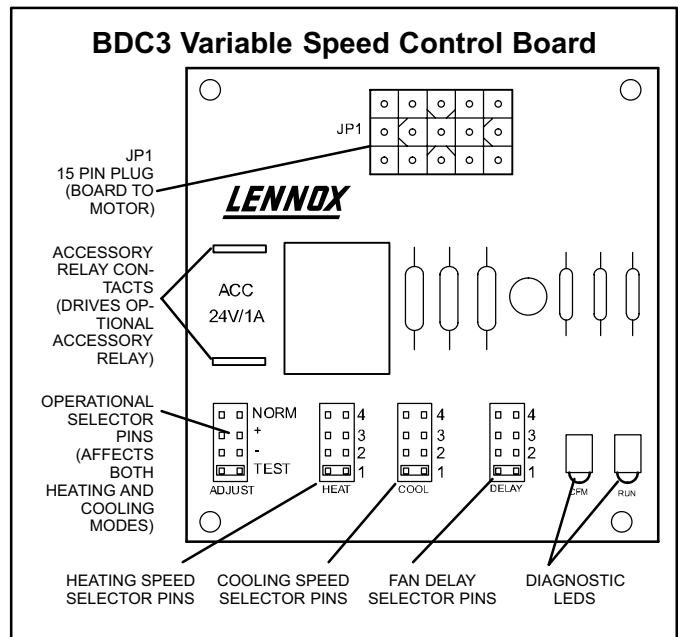


Figure 14

Jumper Settings

⚠ IMPORTANT

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

Table 4 shows the factory blower speed tap settings for CBWMV series units. These settings are for nominal tonnage match-ups with the CBWMV. When matched with other sizes, it is recommended that the CFM be adjusted approximately to 400 CFM per ton.

Table 4

CBWMV Blower Coil	Speed Tap Selection			
	Cool Pin	Heat Pin	Adjust	Delay
-24B-040	1	2	NORM	4
-36B-070	3	4	NORM	4
-36C-090	3	4	NORM	4
-60C-100	4	4	NORM	4
-60C-120	4	4	NORM	4

To change jumper positions, gently pull the jumper off the pins and place it on the desired set of pins. The following section outlines the different jumper selections available and conditions associated with each one. Refer to figure 14.

After the CFM for each application has been determined, the jumper settings must be adjusted to reflect those given in tables 5 through 9. From the tables, determine which row of CFM volumes most closely matches the desired CFM. Once a specific row has been chosen (+, NORMAL, or -), CFM volumes from other rows cannot be used. Below are descriptions of the jumper selections.

ADJUST Pins — The ADJUST pins allow the motor to run at normal speed, approximately 10% higher, or approximately 10% lower than normal speed. Tables 5 through 9 gives three rows (+, NORMAL, and -) with their respective CFM volumes. Notice that the normal adjustment setting for heat speed position #3 is 1070 CFM. The + adjustment setting for that position is 1180 CFM and for the - adjustment setting is 940 CFM. After the adjustment setting has been determined, chose the remainder speed jumper settings from those offered in the table in that row.

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

COOL Pins — The COOL jumper is used to determine the CFM during either 1) cooling or 2) heat pump operation without a W1 call for electric heat. These jumper selections are activated for cooling when Y1 and/or Y2 and DS terminals in the CBWMV unit are energized and for heating when Y1 and/or Y2 is energized.

For applications with the Harmony® Zoning System, the blower CFM volume is determined by the Harmony control center. The minimum blower speed is predetermined at 400 CFM for -CBWMV-24B-040 and 36B-070 series units and 600 CFM for CBWMV-36C-090, 60C-100, and 60C-120 series units. This speed is not adjustable.

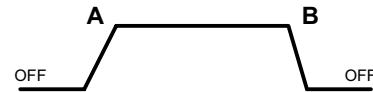
With the thermostat set for “Continuous Fan” and without a call for heating or cooling, the CBWMV will provide 38% of the **COOL** CFM selected.

HEAT Pins — The **HEAT** jumper is used to determine CFM heating. These jumper selections are activated only when W1 is energized. (There is a fixed 45 seconds ON and 30 seconds OFF delay on a W call.)

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

#1 Pins Jumpered —

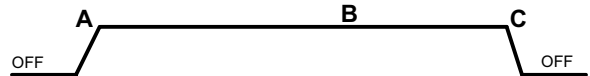
A Motor runs at 100% until demand is satisfied.



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

#2 Pins Jumpered —

A Motor runs at 100% until demand is satisfied.



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

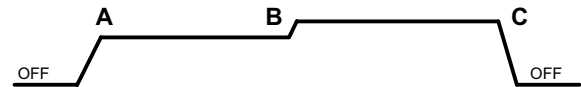
C ramps down to stop.

NOTE - Blower OFF DELAY also applies during heat pump operation

#3 Pins Jumpered —

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

B motor runs at 100% until demand is satisfied.



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

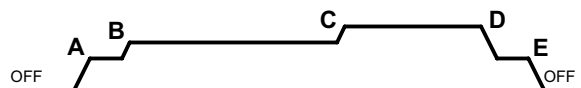
#4 Pins Jumpered —

A Motor runs at 50% for 30 seconds.

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

C Motor runs at 100% until demand is satisfied.

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



E ramps down to stop.

Table 5

CBWMV-24B-040 Blower Performance																
0 through 0.80 in. w.g. (0 Through 200 Pa) External Static Pressure Range ; Factory Settings: Heating Speed - 2, Cooling Speed - 1, Speed Adjust - NORM; Applications with single sided inlets will reduce CFM by approximately 4%.																
“ADJUST” Jumper Setting	BDC3 Jumper Speed Positions															
									1st Stage “COOL” Speed							
	1		2		3		4		1		2		3		4	
	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s
+	610	290	770	365	930	440	1010	475								
NORM	560	265	700	330	830	390	910	430								
—	510	240	630	295	750	355	810	380								
“ADJUST” Jumper Setting	“HEAT” Speed								2nd Stage “COOL” Speed							
	1		2		3		4		1		2		3		4	
	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s
	+	820	385	990	465	1180	555	1340	630	880	415	1120	530	1340	630	1440
NORM	750	355	900	425	1070	505	1230	580	800	375	1000	470	1200	565	1300	615
—	970	315	810	380	940	445	1080	510	720	340	900	425	1080	510	1170	550

The effect of static pressure and filter resistance is included in air volumes shown.
 1st stage COOL is approximately 70% of the same 2nd stage COOL speed position.
 Continuous Fan Only speed is approximately 38% of the same 2nd stage COOL speed position.
 Lennox Harmony zone control applications - Minimum blower speed is 400 cfm. Max cfm is the same as 2nd stage cool position.

Table 6

CBWMV-36B-070 Blower Performance																
0 through 0.80 in. w.g. (0 Through 200 Pa) External Static Pressure Range ; Factory Settings: Heating Speed - 4, Cooling Speed - 3, Speed Adjust - NORM; Applications with single sided inlets will reduce CFM by approximately 4%.																
“ADJUST” Jumper Setting	BDC3 Jumper Speed Positions															
									1st Stage “COOL” Speed							
	1		2		3		4		1		2		3		4	
	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s
+	590	280	745	350	895	420	975	460								
NORM	545	255	680	320	805	380	890	420								
—	490	230	600	280	725	340	780	370								
“ADJUST” Jumper Setting	“HEAT” Speed								2nd Stage “COOL” Speed							
	1		2		3		4		1		2		3		4	
	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s
	+	790	370	980	465	1140	540	1310	620	850	400	1090	515	1300	620	1430
NORM	730	345	870	410	1040	490	1190	560	775	365	990	465	1190	560	1280	605
—	640	300	770	360	920	435	1070	505	700	330	870	410	1065	500	1150	540

The effect of static pressure and filter resistance is included in air volumes shown.
 1st stage COOL is approximately 70% of the same 2nd stage COOL speed position.
 Continuous Fan Only speed is approximately 38% of the same 2nd stage COOL speed position.
 Lennox Harmony zone control applications - Minimum blower speed is 400 cfm. Max cfm is the same as 2nd stage cool position.

Table 7

CBWMV-36C-090 Blower Performance																
0 through 0.80 in. w.g. (0 Through 200 Pa) External Static Pressure Range ; Factory Settings: Heating Speed - 4, Cooling Speed - 3, Speed Adjust - NORM; Applications with single sided inlets will reduce CFM by approximately 5%.																
“ADJUST” Jumper Setting	BDC3 Jumper Speed Positions															
									1st Stage “COOL” Speed							
	1		2		3		4		1		2		3		4	
	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s
+	620	290	770	365	930	440	1010	475	570	270	700	330	830	390	910	430
NORM	520	245	630	295	760	360	810	380	520	245	630	295	760	360	810	380
—																
“ADJUST” Jumper Setting	“HEAT” Speed								2nd Stage “COOL” Speed							
	1		2		3		4		1		2		3		4	
	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s
	+	820	385	1000	470	1180	555	1340	630	890	420	1130	535	1340	630	1450
NORM	760	360	900	425	1070	505	1220	575	800	380	1020	480	1220	575	1310	620
—	675	320	810	380	950	450	1100	520	720	340	900	425	1100	520	1180	555

The effect of static pressure and filter resistance is included in air volumes shown.
 1st stage COOL is approximately 70% of the same 2nd stage COOL speed position.
 Continuous Fan Only speed is approximately 38% of the same 2nd stage COOL speed position.
 Lennox Harmony zone control applications - Minimum blower speed is 400 cfm. Max cfm is the same as 2nd stage cool position.

Table 8

CBWMV-60C-100 Blower Performance																
0 through 0.80 in. w.g. (0 Through 200 Pa) External Static Pressure Range ; Factory Settings: Heating Speed - 4, Cooling Speed - 3, Speed Adjust - NORM; Applications with single sided inlets will reduce CFM by approximately 5%.																
“ADJUST” Jumper Setting	BDC3 Jumper Speed Positions															
									1st Stage “COOL” Speed							
	1		2		3		4		1		2		3		4	
	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s
+	1110	525	1250	590	1380	650	1530	720	1000	470	1130	535	1250	590	1380	650
NORM	930	440	1040	490	1130	535	1260	595	930	440	1040	490	1130	535	1260	595
—																
“ADJUST” Jumper Setting	“HEAT” Speed								2nd Stage “COOL” Speed							
	1		2		3		4		1		2		3		4	
	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s
	+	1500	710	1700	800	1880	885	2100	990	1540	725	1760	830	1970	930	2200
NORM	1370	645	1540	725	1720	810	1920	905	1400	660	1600	755	1800	850	1980	935
—	1250	590	1380	650	1540	725	1720	810	1270	600	1420	670	1600	755	1780	840

The effect of static pressure and filter resistance is included in air volumes shown.
 1st stage COOL is approximately 70% of the same 2nd stage COOL speed position.
 Continuous Fan Only speed is approximately 38% of the same 2nd stage COOL speed position.
 Lennox Harmony zone control applications - Minimum blower speed is 600 cfm. Max cfm is the same as 2nd stage cool position.

Table 9

CBWMV-60C-120 Blower Performance																
0 through 0.80 in. w.g. (0 Through 200 Pa) External Static Pressure Range ; Factory Settings: Heating Speed - 4, Cooling Speed - 4, Speed Adjust - NORM; Applications with single sided inlets will reduce CFM by approximately 5%.																
"ADJUST" Jumper Setting	BDC3 Jumper Speed Positions															
	1st Stage "COOL" Speed								2nd Stage "COOL" Speed							
	1		2		3		4		1		2		3		4	
	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s
+	1100	520	1250	590	1400	660	1560	735	1570	740	1800	850	2000	945	2200	1040
NORM	990	465	1130	535	1260	595	1400	660	1410	665	1620	765	1820	860	2020	955
-	930	440	1020	480	1130	535	1260	595	1260	595	1440	680	1620	765	1810	855
"ADJUST" Jumper Setting	"HEAT" Speed								2nd Stage "COOL" Speed							
	1		2		3		4		1		2		3		4	
	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s
	+	1510	715	1720	810	1900	895	2120	1000	1570	740	1800	850	2000	945	2200
NORM	1380	650	1560	735	1740	820	1920	905	1410	665	1620	765	1820	860	2020	955
-	1240	585	1380	650	1540	725	1720	810	1260	595	1440	680	1620	765	1810	855

The effect of static pressure and filter resistance is included in air volumes shown.
 1st stage COOL is approximately 70% of the same 2nd stage COOL speed position.
 Continuous Fan Only speed is approximately 38% of the same 2nd stage COOL speed position.
 Lennox Harmony zone control applications - Minimum blower speed is 600 cfm. Max cfm is the same as 2nd stage cool position.

Initial Air Purging

After all plumbing connections have been made, leak tested and flushed, the water heating device is ready to be filled with water and purged of air. Air bleeder valves are provided as a convenience for installations that are not equipped with purge manifolds.

1. Make sure electrical power and gas supply to system are **OFF**.
2. Remove CBWMV coil section access panel.
3. Remove cap from highest air bleed valve and depress valve stem until water is released. This may be done with a refrigerant style hose. See figure 15.
4. Replace cap on valve and access panel.
5. Apply electrical power and gas supply to the system.
6. Follow the System Start-Up section to operate the system. Complete purging of air after unit has gone through initial start-up.

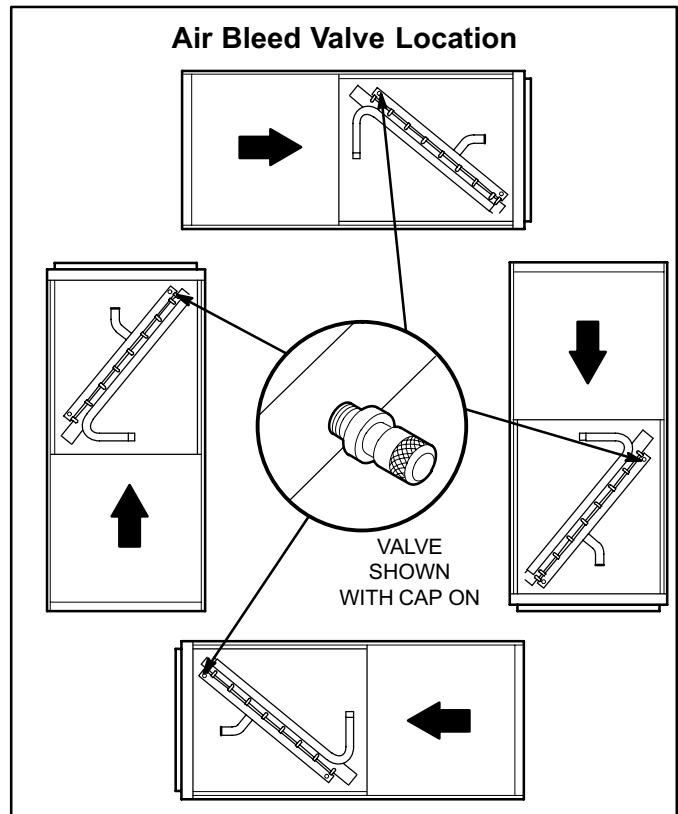


Figure 15

System Adjustments

Timed-ON and Timed-OFF Delays

The 45-second timed-ON delay and the 30-second timed-OFF delay for heating (time that the blower operates after the heat demand has been satisfied) is not adjustable.

Blower Speeds

Select the blower speed by moving the pins on the variable speed control board. See figure 14.

Refer to the speed selection chart on unit wiring diagram.

NOTE - To check for proper CFM, take the reading external to the unit. The coil must be dry when you take the reading.

Annual Service

WARNING



Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

At the beginning of each heating season, system should be checked as follows by a qualified service technician:

Electrical

1. Check all wiring for loose connections.
2. Check for correct voltage at CBWMV unit (unit operating).
3. Check to see that blower is operating.

Blower

1. Check and clean blower wheel.

2. Motors are pre-lubricated for extended life; no further lubrication is required.

Freezestat

Verify that the freezestat functions.

Service Filters

Filters must be cleaned or replaced when dirty to assure proper unit operation.

Winterizing CBWMV Water Coil

If unit is installed in an unconditioned space, the piping between the CBWMV unit and the water heating device should be insulated. If power is removed from the unit, water must be drained from the system to prevent freezing.

Repair Parts List

The following repair parts are available. When ordering parts, include the complete unit model number listed on the unit rating plate of each piece of equipment.

Cabinet Parts

- Blower Access Panel
- Coil Access Panel

Hot Water Coil Parts

- Coil Replacement Kit

Blower Part

- Blower Wheel
- Blower Motor
- Blower Housing

Electrical Parts

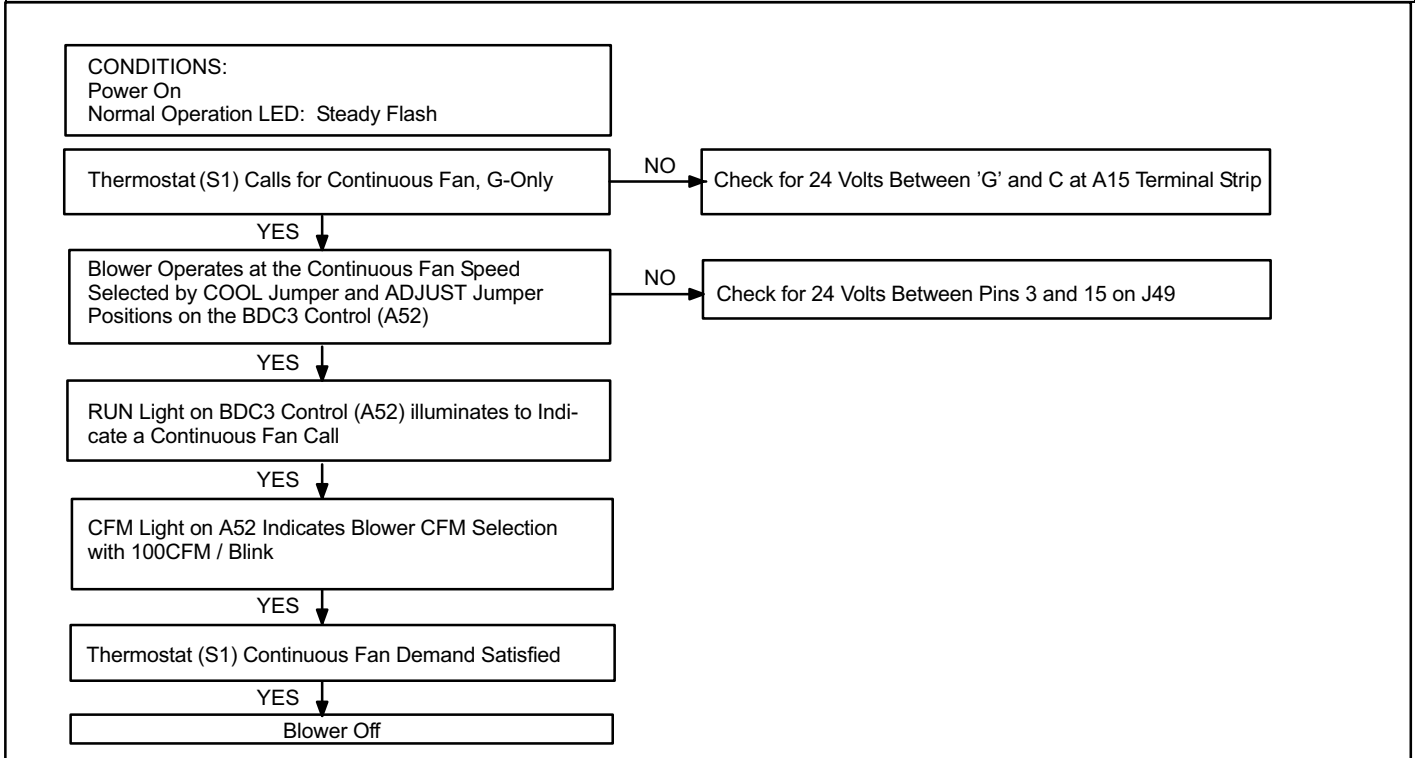
- BDC3 Board
- Transformer
- Circuit Breaker, 24VAC
- 3PDT Relay

⚠ WARNING



WARNING TO SERVICE PERSONS! Electric shock hazard. When electrical power to the internal control box components must be available for troubleshooting, a common practice is to construct a “by-pass” of the door interlock switch. When such a by-pass is in place, a potential shock hazard is present which can cause injury or death. Make sure any door interlock switch by-pass has been removed after troubleshooting is complete and **BEFORE** attempting any repairs to the control box components!

Troubleshooting: Continuous Fan Sequence of Operation

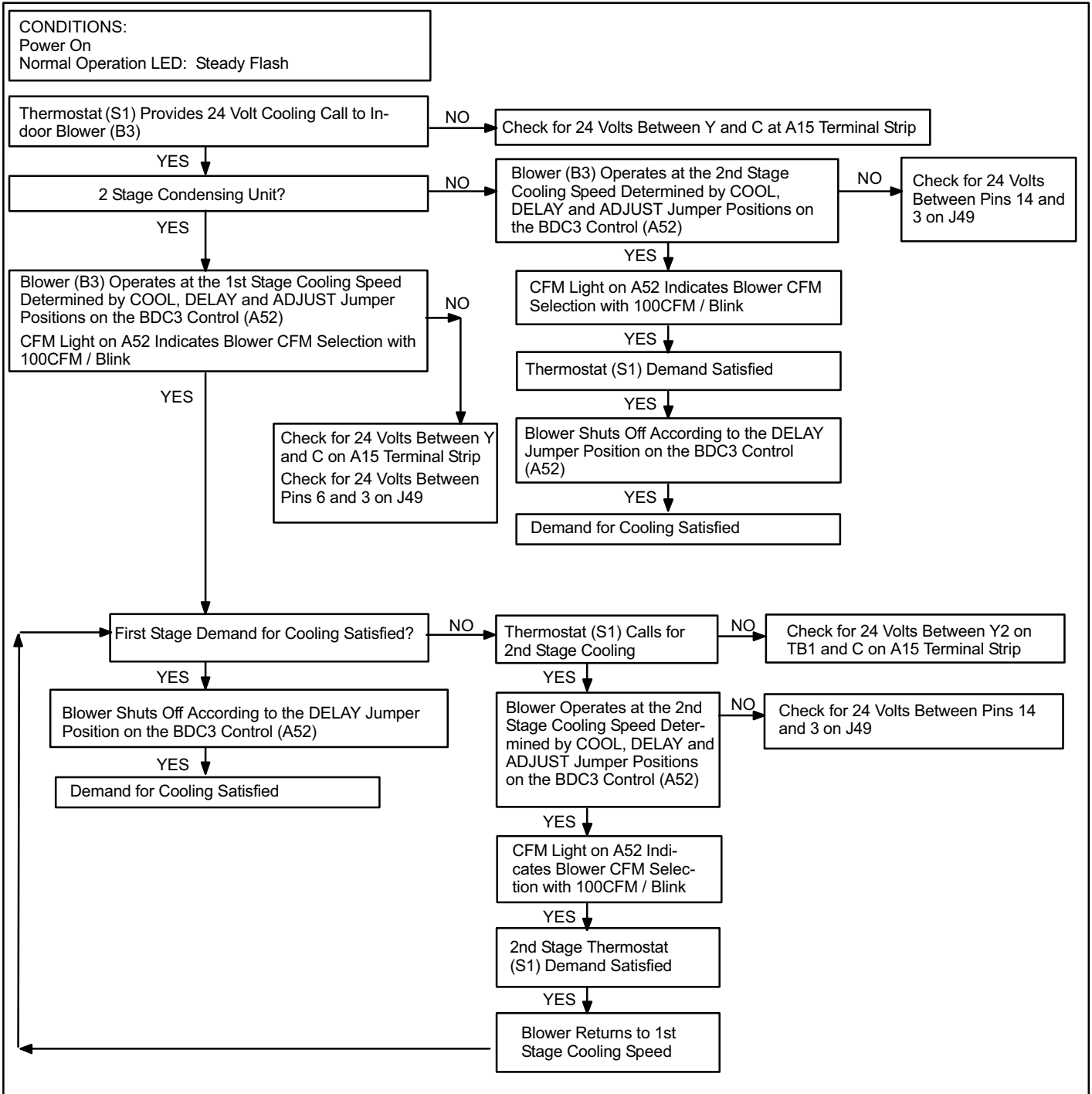


⚠ WARNING



WARNING TO SERVICE PERSONS! Electric shock hazard. When electrical power to the internal control box components must be available for troubleshooting, a common practice is to construct a “by-pass” of the door interlock switch. When such a by-pass is in place, a potential shock hazard is present which can cause injury or death. Make sure any door interlock switch by-pass has been removed after troubleshooting is complete and **BEFORE** attempting any repairs to the control box components!

Troubleshooting: Cooling Sequence of Operation



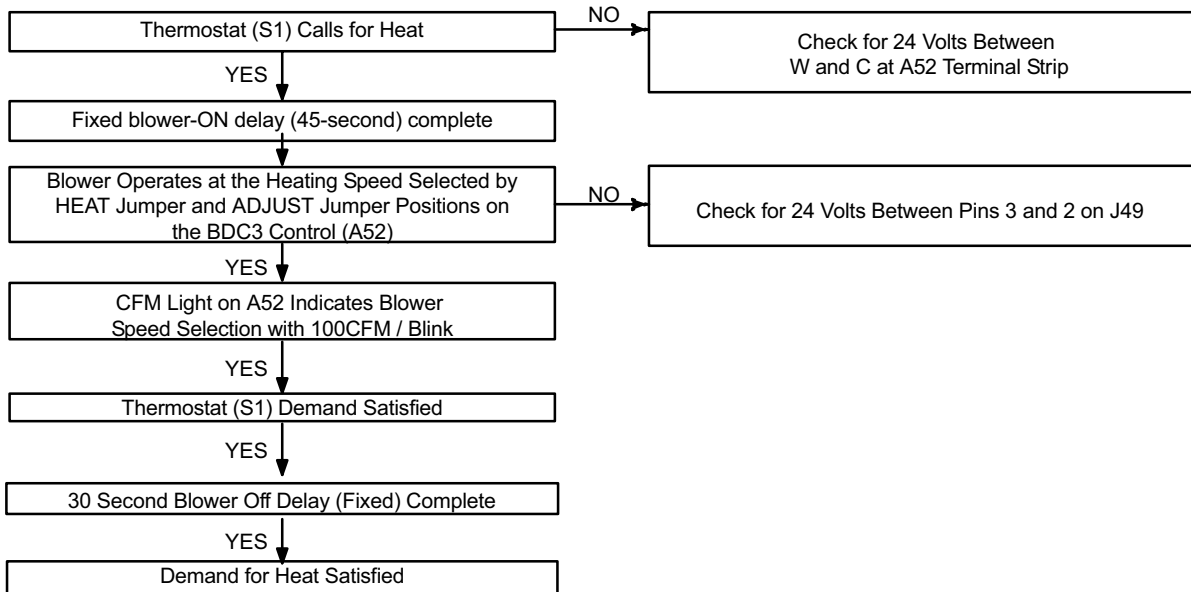
⚠ WARNING



WARNING TO SERVICE PERSONS! Electric shock hazard. When electrical power to the internal control box components must be available for troubleshooting, a common practice is to construct a “by-pass” of the door interlock switch. When such a by-pass is in place, a potential shock hazard is present which can cause injury or death. Make sure any door interlock switch by-pass has been removed after troubleshooting is complete and **BEFORE** attempting any repairs to the control box components!

Troubleshooting: Heating Sequence of Operation

CONDITIONS:
Power On
Normal Operation LED: Steady Flash



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