

# Thermo Pride®



## CONDENSING GAS FURNACE INSTALLATION AND OPERATION MANUAL

### MODELS:

<b>CHB1-50N</b>	<b>CDB1-50N</b>
<b>CHB1-75N</b>	<b>CDB1-75N</b>
<b>CHB1-100N</b>	<b>CDB1-100N</b>
<b>CHB1-125N</b>	<b>CDB1-125N</b>

**⚠WARNING:** IF YOU DO NOT FOLLOW THE SAFETY PRECAUTIONS BELOW AND IN THIS MANUAL, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY, OR LOSS OF LIFE.

*DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.*

*WHAT TO DO IF YOU SMELL GAS:*

- *DO NOT TRY TO LIGHT ANY APPLIANCE.*
- *DO NOT TOUCH ANY ELECTRICAL SWITCH; DO NOT USE ANY PHONE IN YOUR BUILDING.*
- *LEAVE THE BUILDING IMMEDIATELY.*
- *IMMEDIATELY CALL YOUR GAS SUPPLIER FROM A NEIGHBOR'S PHONE. FOLLOW THE GAS SUPPLIER'S INSTRUCTIONS.*
- *IF YOU CANNOT REACH YOUR GAS SUPPLIER; CALL THE FIRE DEPARTMENT.*

*INSTALLATION AND SERVICE MUST BE PERFORMED BY A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER. (REFERRED TO IN THESE INSTRUCTIONS AS A QUALIFIED HEATING CONTRACTOR).*

PLEASE READ THESE INSTRUCTIONS PRIOR TO INSTALLATION, INITIAL FIRING, AND BEFORE PERFORMING ANY SERVICE OR MAINTENANCE. THESE INSTRUCTIONS MUST BE LEFT WITH THE HOMEOWNER AND SHOULD BE RETAINED FOR FUTURE REFERENCE BY QUALIFIED SERVICE PERSONNEL.



THERMO PRODUCTS, LLC.  
BOX 217  
NORTH JUDSON, IN 46366  
PHONE: (574) 896-2133



MADE IN USA

**MG-1006**  
ECN 5355-MA 140303

## I. SAFETY INFORMATION

This and the following page contain reproductions of the various warning and instruction labels placed on the Thermo Pride Condensing Gas Furnaces. Please read and comply with the contents of these labels.

MODEL NO. CDR1-125N  
SERIAL NO. 00000000

**AHRI CERTIFIED**  
www.ahridirectory.org

DIRECT VENT FORCED AIR FURNACE  
FOR INDOOR INSTALLATION IN BUILDING  
CONSTRUCTED ON SITE.

CONFORMS TO  
ANS Z21.47 · CSA 2.3-2012 CENTRAL FURN  
CATEGORY IV TYPE FSP

115V 1PH 60CY MAX TOTAL INPUT AMPS 20.0

INPUT	OUTPUT
BTU/HR 125,000	116,000

FACTORY EQUIPPED WITH #42 ORIFICES FOR NAT GAS.  
SUITABLE FOR LP GAS WHEN EQUIPPED WITH #54 ORIFICES.  
NORMAL MANIFOLD PRESS 3.5 IN WC (NAT) 10.0 IN WC (LP)  
MIN GAS SUPPLY PRESS FOR INPUT ADJUSTMENT 4.5 IN WC (NAT) 11.0 IN WC (LP)  
MAX GAS SUPPLY PRESS 14.0 IN WC

AIR TEMPERATURE RISE 55°F TO 85°F  
MAX EXTERNAL STATIC PRESSURE 0.50 INCHES WC  
MAXIMUM OUTLET AIR TEMPERATURE 190°F

CERTIFIED FOR CLOSET INSTALLATION AT MINIMUM CLEARANCES  
TO COMBUSTIBLE CONSTRUCTION AS SHOWN.

	TOP	FRONT	BACK	LS/RS	FLUE PIPE
(INCHES)	1	6	0	0	0

FOR INSTALLATION ON NON-COMBUSTIBLE FLOORS ONLY.  
FOR INSTALLATION ON COMBUSTIBLE FLOORING ONLY WHEN  
INSTALLED ON SPECIAL BASE PART NO. 125CA BASE.

THIS FURNACE REQUIRES A SPECIAL VENTING SYSTEM. REFER TO  
INSTALLATION INSTRUCTIONS NO. MG-1006 FOR PARTS LIST AND  
METHOD OF INSTALLATION.

MAX. VENT LENGTH 35 FEET. MIN. VENT LENGTH 8 FEET.  
MIN. WALL THICKNESS THROUGH WHICH THE VENT/AIR INTAKE  
PIPES MAY PASS IS 2 INCHES AND THE MAX. IS 18 INCHES.

FILTERS MUST BE INSTALLED EXTERNAL TO THE FURNACE CASING.

THIS FURNACE MUST BE INSTALLED IN ACCORDANCE WITH  
THERMO PRODUCTS INSTRUCTIONS AND LOCAL CODES. IN  
ABSENCE OF LOCAL CODES, FOLLOW THE NATIONAL FUEL  
GAS CODE - ANSI Z223.1

THERMO PRODUCTS, LLC.  
P.O. BOX 217 - NORTH JUDSON, IN 46366

MODEL NO. CHB1-125N  
SERIAL NO. 00000000

**AHRI CERTIFIED**  
www.ahridirectory.org

DIRECT VENT FORCED AIR FURNACE  
FOR INDOOR INSTALLATION IN BUILDING  
CONSTRUCTED ON SITE.

CONFORMS TO  
ANS Z21.47 · CSA 2.3-2012 CENTRAL FURN  
CATEGORY IV TYPE FSP

115V 1PH 60CY MAX TOTAL INPUT AMPS 20.0

INPUT	OUTPUT
BTU/HR 125,000	116,000

FACTORY EQUIPPED WITH #42 ORIFICES FOR NAT GAS.  
SUITABLE FOR LP GAS WHEN EQUIPPED WITH #54 ORIFICES.  
NORMAL MANIFOLD PRESS 3.5 IN WC (NAT) 10.0 IN WC (LP)  
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MAXIMUM OUTLET AIR TEMPERATURE 190°F

CERTIFIED FOR CLOSET INSTALLATION AT MINIMUM CLEARANCES  
TO COMBUSTIBLE CONSTRUCTION AS SHOWN.

	TOP	FRONT	BACK	LS/RS	FLUE PIPE
(INCHES)	1	6	0	0	0

FOR INSTALLATION ON COMBUSTIBLE FLOORING.

THIS FURNACE REQUIRES A SPECIAL VENTING SYSTEM. REFER TO  
INSTALLATION INSTRUCTIONS NO. MG-1006 FOR PARTS LIST AND  
METHOD OF INSTALLATION.

MAX. VENT LENGTH 35 FEET. MIN. VENT LENGTH 8 FEET.  
MIN. WALL THICKNESS THROUGH WHICH THE VENT/AIR INTAKE  
PIPES MAY PASS IS 2 INCHES AND THE MAX. IS 18 INCHES.

FILTERS MUST BE INSTALLED EXTERNAL TO THE FURNACE CASING.

THIS FURNACE MUST BE INSTALLED IN ACCORDANCE WITH  
THERMO PRODUCTS INSTRUCTIONS AND LOCAL CODES. IN  
ABSENCE OF LOCAL CODES, FOLLOW THE NATIONAL FUEL  
GAS CODE - ANSI Z223.1

THERMO PRODUCTS, LLC.  
P.O. BOX 217 - NORTH JUDSON, IN 46366

**⚠ WARNING**

Hazardous flue gas. Inspect rubber hose connecting inducer outlet to PVC tee and all vent system joints for leak free connections before furnace operation.

Can cause personal injury or loss of life.

390411

**WARNING**

THIS COMPARTMENT MUST BE CLOSED EXCEPT WHEN SERVICING

THIS FURNACE MUST BE INSTALLED SO THERE ARE PROVISIONS FOR VENTILATING AIR.

390410

**OUTSIDE POWER SOURCE  
CONNECT 115v 60Hz TO  
L1 HOT AND L2 COMMON.**

390229

**REMOVE THIS PANEL FIRST IN ORDER  
TO REMOVE BLOWER DOOR.**

INSTALLATION AND USERS MANUALS  
ARE LOCATED BEHIND BLOWER DOOR.

390289

**All installations and services must be performed by qualified service personnel.**

This and the previous page contain reproductions of the various warning and instruction labels placed on the Thermo Pride Condensing Gas Furnaces. Please read and comply with the contents of these labels.

**FOR YOUR SAFETY READ BEFORE OPERATING**

**WARNING:** If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with a hot surface igniter that automatically lights the burner. Do **not** try to light the burner by hand.

B. **BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the base of unit because some gas is heavier than air and will settle on the floor or ground.

**WHAT TO DO IF YOU SMELL GAS**  
 ? Do not try to light any appliance.  
 ? Do not touch any electric switch; do not use any phone in your building.  
 ? Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.  
 ? If you cannot reach your gas supplier, call the fire department.

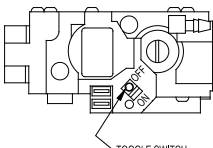
C. Use only your hand to move the gas control switch. Never use tools. If the switch will not move by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been underwater.

**OPERATING INSTRUCTIONS**

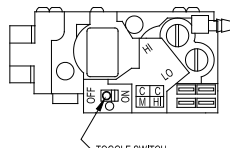
1. **STOP!** Read the safety information above on this label.
2. Set the thermostat to the lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with a hot surface igniter that automatically lights the burner. Do **not** try to light the burner by hand.
5. Move the gas control switch to the "OFF" position.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor or ground. If you smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
7. Move the gas control switch to the "ON" position.
8. Turn on all electric power to the appliance.
9. Set thermostat to desired setting, and, if equipped, set the operating mode to "HEAT".
10. If appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

GAS CONTROL VALVE



TOGGLE SWITCH

GAS CONTROL VALVE  
2-STAGE



TOGGLE SWITCH

**TO TURN OFF GAS TO APPLIANCE**

1. Set thermostat to lowest setting, and, if equipped, set the operating mode to "COOL" or "OFF".
2. If service is to be performed, turn off all electric power to the appliance.
3. To turn off gas control valve, remove the burner compartment cover.
4. Move the gas control switch to the "OFF" position.
5. Replace the burner compartment cover.

390540

⚠ WARNING

SPECIAL HOMEOWNERS INSTRUCTIONS

- **IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE OR MAINTENANCE CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.**
- **FOR SAFE OPERATION** IT IS THE RESPONSIBILITY OF THE OWNER AND/OR USER THAT THE BURNER, CHIMNEY/VENT PIPE, HEAT EXCHANGER AND CONTROLS SHOULD BE INSPECTED EVERY YEAR BY A QUALIFIED HEATING CONTRACTOR.
- THE OWNER AND/OR USER SHOULD ALSO CONDUCT PERIODIC VISUAL INSPECTIONS. REFER TO THE USERS INFORMATION MANUAL PROVIDED WITH THIS FURNACE FOR DETAILS.
- ANY DEFICIENCIES NOTED MUST BE CORRECTED AT ONCE BY A QUALIFIED HEATING CONTRACTOR. DO NOT ATTEMPT TO MAKE REPAIRS YOURSELF!
- FOR ASSISTANCE OR ADDITIONAL INFORMATION CONSULT A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER.

CAUTION

MOVING PARTS CAN CAUSE SEVERE PERSONAL INJURY SHUT OFF FURNACE BEFORE REMOVING THIS PANEL.

FILTER MAINTENANCE: WHEN IT BECOMES NECESSARY TO REPLACE OR WASH FILTER REMOVE THE DIRTY FILTER FROM THE RACKS PROVIDED AND WASH OR REPLACE WITH IDENTICAL NEW FILTERS.

DO NOT REMOVE THIS LABEL

FOR YOUR SAFETY

WHAT TO DO IF YOU SMELL GAS:

1. DO NOT TRY TO LIGHT ANY APPLIANCE.
2. DO NOT TOUCH ANY ELECTRICAL SWITCH; DO NOT USE ANY PHONE IN YOUR BUILDING.
3. IMMEDIATELY CALL YOUR GAS SUPPLIER FROM A NEIGHBOR'S PHONE. FOLLOW THE GAS SUPPLIER'S INSTRUCTIONS.
4. IF YOU CANNOT REACH YOUR GAS SUPPLIER, CALL THE FIRE DEPARTMENT.

FOR YOUR SAFETY

DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE. THIS UNIT MUST BE INSTALLED AND SERVICED BY A QUALIFIED CONTRACTOR ONLY. OPERATING INSTRUCTIONS ARE LOCATED INSIDE APPLIANCE NEAR BURNER ASSEMBLY.

390231

**All installations and services must be performed by qualified service personnel.**

The following safety information should be read, understood, and followed by the installer.

1. Use only with type of gas approved for this furnace. Refer to furnace rating plate.
2. Connect this furnace to an approved vent system only. Combustion products must be carried outdoors. Refer to Section III, D thru H, of this manual.

The following pages contain various warnings and cautions found throughout the Thermo Pride Highboy and Dual Poise Condensing Gas Furnace Manual. Please read and comply with the statements below.

**⚠WARNING:** *This furnace is not to be used for temporary heating of buildings or structures under construction.*

**⚠CAUTION:** *These high efficiency condensing furnaces are not certified for and shall not be vented into a standard or any type of chimney.*

**⚠WARNING:** *These furnaces may not be common vented with any other appliance.*

**⚠CAUTION:** *The vent and air intake elbows must be kept away from bushes, shrubs or any vegetation that may restrict the flow of flue products. It must also be kept clear of any leaves, weeds or other combustible materials. Keep the vent hood clear of snow. Avoid locating the terminals in areas where standing water or condensate drippage may be a problem.*

**⚠WARNING:** *This CHB1/CDB1 furnace has been designed to be installed as a direct vent system. The failure to install the vent/air intake system as specified in these instructions will void the heat exchanger warranty and may result in property damage, personal injury or loss of life.*

**⚠CAUTION:** *Outside combustion air must not come from an area that is directly adjacent to a pool, hot tub or spa. Measures should be taken to prevent the entry of corrosive chemicals or vapors to the combustion and ventilation air supply. Such chemicals include but are not limited to chlorinated and/or fluorinated hydrocarbons such as found in refrigerants, aerosol propellants, dry cleaning fluids, degreasers and removers. Other harmful compounds may come from bleaches, air fresheners or mastics. Vapors from such products can form acid compounds when burned in a gas flame. Should acid compounds form in your furnace; it may reduce the life of the furnace.*

**⚠WARNING:** *Because of the potential of odorant fade, a gas leak may not be detected by smell. If this furnace is installed below grade, contact your gas supplier for a gas detector.*

**⚠WARNING:** *Turn off power to furnace before it is placed into service. The gas piping system must have been leak tested by a qualified heating contractor.*

**⚠WARNING:** *It may be necessary to purge the air out of the gas line for initial start-up of the furnace after installation. This should be done by a qualified heating contractor. If excessive gas escapes when purging the gas supply at the union, allow the area to ventilate for at least 15 minutes before attempting to start the furnace. LP gas is especially dangerous because the specific gravity of LP gas allows it to accumulate at floor level at a dangerous concentration. For remainder of operating instructions, reference Users Information Manual.*

**⚠WARNING:** *Heat exchanger oil will burn off on initial firing creating an unpleasant odor. To prevent this odor from occurring more than once, it is suggested that:*

1. *A window(s) be opened.*
2. *The thermostat set at highest setting.*
3. *The furnace remain running at conditions 1&2 for 30 minutes or until odor has dissipated.*

**All installations and services must be performed by qualified service personnel.**

**⚠CAUTION:** *The CHB1/CDB1 furnace models are sealed combustion design, which does not require an air shutter adjustment (air shutters are not used) for proper flame characteristics. Burner box access cover must always be secured with all screws in place and tightened before operating furnace.*

**⚠WARNING:** *Personal injury or property damage could result from repair or service of this furnace by anyone other than a qualified heating contractor. Only the homeowner/user routine maintenance described in the Users Information Manual may be performed by the user.*

**All installations and services must be performed by qualified service personnel.**

**INDEX**

<b><u>SECTION</u></b>	<b><u>BEGINNING PAGE</u></b>
I. SAFETY INFORMATION	i
II. FURNACE SPECIFICATIONS	1
III. GENERAL INSTALLATION	5
A. CODES AND CLEARANCES	5
B. FURNACE LOCATION	6
B1.CDB1 HORIZONTAL APPLICATION	7
C. REPLACING EXISTING FURNACE FROM A COMMON VENT	8
D. GENERAL REQUIREMENTS FOR VENTING CHB1/CDB1	9
E. SIDEWALL VENTING	11
E1. SINGLE PIPE (SIDEWALL) VENTING OPTION	14
F. INSTALLATION OF OUTSIDE VENT/AIR INTAKE TERMS.	14
G. CONNECTING FURNACE TO ROOF VENT/AIR TERMS.	16
H. CONNECTING FURNACE TO VENT/AIR INTAKE TERMS.	17
I. CONDENSATE DRAIN LINE & TRAP ASSY.	22
J. GENERAL GAS PIPING	25
J1. REQUIREMENTS & SIZING OF DUCTWORK	26
K. FILTERS	29
L. WIRING	31
IV. STARTING THE UNIT	34
A. SEQUENCE OF OPERATIONS	34
B. INITIAL START-UP	36
C. ADJUSTMENT OF BTU INPUT RATE	36
D. BURNER ADJUSTMENT	37
E. FURNACE CHECKOUT PROCEDURE	38
VI. INSTALLER'S INSTRUCTIONS TO USER	39
VII. TROUBLESHOOTING	40
APPENDIX – A           REPLACEMENT PARTS LIST	46
APPENDIX – B           WIRING DIAGRAMS	50

**All installations and services must be performed by qualified service personnel.**

## II. FURNACE SPECIFICATIONS

### CHB1 SERIES

MODEL NO.	CHB1-50	CHB1-75	CHB1-100	CHB1-125
BTU/HR INPUT	50,000	75,000	100,000	125,000
BTU/HR OUTPUT	47,000	72,000	94,000	116,000
HT. OF CASING	44-1/4"	44-1/4"	44-1/4"	44-1/4"
WIDTH OF CASING	17"	17"	21"	24"
DEPTH OF CASING	27-1/2"	27-1/2"	27-1/2"	27-1/2"
WARM AIR OUTLET	15 x 18	15 x 18	19 x 18	22 x 18
RETURN AIR INLET	25 x 16	25 x 16	25 x 16	25 x 16
DIA. OF FLUE	2"	2"	3"	3"
DIA. OF COMBUSTION AIR INTAKE	2"	2"	3"	3"
CFM @ .2" & .5" w.c. EXTERNAL STATIC PRESSURE	.2" .5"	.2" .5"	.2" .5"	.2" .5"
@HI SPEED	1100 860	1600 1380	1940 1700	2770 2060
@MH SPEED	1000 720	1250 1150	1720 1540	1800 1700
@ML SPEED	-- --	1030 930	1530 1380	1730 1600
@LO SPEED	610 420	820 700	1340 1220	1670 1550
TEMPERATURE RISE	70	70	70	70
BLOWER MOTOR HP	.20	.41	.50	.75
NO. OF SPEEDS	3	4	4	4
RUN CAPACITOR	10 mfd	10 mfd	10 mfd	10 mfd
LARGEST RECOMMENDED AIR CONDITIONER	2 Ton	3.5 Ton	4 Ton	5 Ton
SIZE OF FILTERS	24-3/4" x 15-3/4"	24-3/4" x 15-3/4"	24-3/4" x 15-3/4"	24-3/4" x 19-3/4"

#### NOTES:

1. BTU output based on annual fuel utilization efficiency rated by manufacturer.
2. On all outlet and inlet dimensions, the first dimension is width.
3. To permit largest recommended air conditioning (at .5 static pressure), selection of the highest motor speed is required.

**All installations and services must be performed by qualified service personnel.**

**CDB1 SERIES**

<b>MODEL NO.</b>	<b>CDB1-50</b>	<b>CDB1-75</b>	<b>CDB1-100</b>	<b>CDB1-125</b>
<b>BTU/HR INPUT</b>	50,000	75,000	100,000	125,000
<b>BTU/HR OUTPUT</b>	47,000	70,000	94,000	116,000
<b>HT. OF CASING</b>	46-1/4"	46-1/4"	46-1/4"	46-1/4"
<b>WIDTH OF CASING</b>	17"	17"	21"	24"
<b>DEPTH OF CASING</b>	27-1/2"	27-1/2"	27-1/2"	27-1/2"
<b>WARM AIR OUTLET</b>	15 x 18	15 x 18	19 x 18	22 x 18
<b>RETURN AIR INLET</b>	15 x 22	15 x 22	19 x 22	22 x 22
<b>DIA. OF FLUE</b>	2"	2"	3"	3"
<b>DIA. OF COMBUSTION AIR INTAKE</b>	2"	2"	3"	3"
<b>CFM @ .2" &amp; .5" w.c. EXTERNAL STATIC PRESSURE</b>	.2" .5"	.2" .5"	.2" .5"	.2" .5"
<b>@HI SPEED</b>	1120 930	1530 1340	1830 1590	2280 2010
<b>@MH SPEED</b>	1000 750	1270 1110	1660 1460	1830 1650
<b>@ML SPEED</b>	-- --	1050 930	1520 1340	1750 1570
<b>@LO SPEED</b>	616 420	850 720	1370 1230	1660 1530
<b>TEMPERATURE RISE</b>	70	70	70	70
<b>BLOWER MOTOR HP</b>	.20	.41	.50	.75
<b>NO. OF SPEEDS</b>	3	4	4	4
<b>RUN CAPACITOR</b>	10 mfd	10 mfd	10 mfd	15 mfd
<b>LARGEST RECOMMEDED AIR CONDITIONER</b>	2 Ton	3.5 Ton	4 Ton	5 Ton
<b>SIZE OF FILTERS</b>	21-3/4" x 14"(2)	21-3/4" x 14"(2)	21-3/4" x 14"(2)	21-3/4" x 14"(2)

**NOTES:**

1. BTU output based on annual fuel utilization efficiency rated by manufacturer.
2. On all outlet and inlet dimensions, the first dimension is width.
3. To permit largest recommended air conditioning (at .5 static pressure), selection of the highest motor speed is required.
4. Electrical characteristics at 115 volts, 60 Hz., 1 phase (less than 15 amps. for all models).
5. All specifications are subject to change without notice.



**All installations and services must be performed by qualified service personnel.**

**INSTALLATION PARTS PACKAGES - CHB1-50/75**

<b>PARTS PACKAGE #S00S4405/4406</b>	<b>DESCRIPTION</b>	<b>PART #</b>	<b>QUANTITY</b>
	2-3/8" ID radiator hose	410017	1
	Thermostat lead bushing	350750	1
	PVC trap assembly	320816	1
	#8 x 3/4 coated TEK screws for mounting trap & inlet/outlet collars	300283	4
	11/16" OD x 1/2" ID vinyl tubing	410060	24"
	2 x 4 electrical J-box	350024	1
	2 x 4 electrical J-box cover	350020	1
	#8 x 1/2 TEK screws for mounting 2 x 4 J-box	300208	2
	#10-32 x 1/2 green ground screw	300109	1
	#10-32 hex nut	300110	1
	3/16" dia. star washer	300270	1
	Grounding instructions	MG-966	1
	Wire nut	300132	2
	3" stainless steel hose clamp	300276	2
	J-box wire bushing	350016	1
	Drain hose grommet	350446	1
	Spring clamp, 11/16"	300299	3
	Installation notice	MG-987	1
	PVC tee assembly, 2" dia.	320818	1
	CPVC XPVC adapter	320833	1
	Gas Conversion Kit	AOPS7677/7678	1

**INSTALLATION PARTS PACKAGES - CHB1-100/125**

<b>PARTS PACKAGE #S00S4407/4408</b>	<b>DESCRIPTION</b>	<b>PART #</b>	<b>QUANTITY</b>
	2-3/8" ID radiator hose	410017	1
	Thermostat lead bushing	350750	1
	PVC trap assembly	320816	1
	#8 x 3/4 coated TEK screws for mounting trap & inlet/outlet collars	300283	4
	11/16" OD x 1/2" ID vinyl tubing	410060	24"
	2 x 4 electrical J-box	350024	1
	2 x 4 electrical J-box cover	350020	1
	#8 x 1/2 TEK screws for mounting 2 x 4 J-box	300208	2
	#10-32 x 1/2 green ground screw	300109	1
	#10-32 hex nut	300110	1
	3/16" dia. star washer	300270	1
	Grounding instructions	MG-966	1
	Wire nut	300132	2
	3" stainless steel hose clamp	300276	2
	J-box wire bushing	350016	1

**All installations and services must be performed by qualified service personnel.**

	Drain hose grommet	350446	1
	Spring clamp, 11/16"	300299	3
	Installation notice	MG-987	1
	PVC tee assembly, 2 x 3" dia.	320817	1
	CPVC XPVC adapter	320833	1
	Gas Conversion Kit	AOPS7679/7664	1

**INSTALLATION PARTS PACKAGES - CDB1-50/75**

<b>PARTS PACKAGE #S00S4409/4410</b>	<b>DESCRIPTION</b>	<b>PART #</b>	<b>QUANTITY</b>
	2-3/8" ID radiator hose	410017	1
	Thermostat lead bushing	350750	1
	PVC trap assembly	320816	1
	#8 x 3/4 coated TEK screws for mounting trap & inlet/outlet collars	300283	6
	11/16" OD x 1/2" ID vinyl tubing	410060	24"
	2 x 4 electrical J-box	350024	1
	2 x 4 electrical J-box cover	350020	1
	#8 x 1/2 TEK screws for mounting 2 x 4 J-box	300208	2
	#10-32 x 1/2 green ground screw	300109	1
	#10-32 hex nut	300110	1
	3/16" dia. star washer	300270	1
	Grounding instructions	MG-966	1
	Wire nut	300132	2
	3" stainless steel hose clamp	300276	2
	J-box wire bushing	350016	1
	Drain hose grommet	350446	1
	Spring clamp, 11/16"	300299	3
	Installation notice	MG-987	1
	PVC tee assembly, 2" dia.	320819	1
	Pipe 2" dia. PVC 15"	14401	1
	Bracket	14406	1
	CPVC XPVC adapter	320833	1
	Gas Conversion Kit	AOPS7677/7678	1

**INSTALLATION PARTS PACKAGES - CDB1-100/125**

<b>PARTS PACKAGE #S00S4411/4412</b>	<b>DESCRIPTION</b>	<b>PART #</b>	<b>QUANTITY</b>
	2-3/8" ID radiator hose	410017	1
	Thermostat lead bushing	350750	1
	PVC trap assembly	320816	1
	#8 x 3/4 coated TEK screws for mounting trap & inlet/outlet collars	300283	4
	11/16" OD x 1/2" ID vinyl tubing	410060	24"
	2 x 4 electrical J-box	350024	1
	2 x 4 electrical J-box cover	350020	1

**All installations and services must be performed by qualified service personnel.**

	#8 x 1/2 TEK screws for mounting 2 x 4 J-box	300208	2
	#10-32 x 1/2 green ground screw	300109	1
	#10-32 hex nut	300110	1
	3/16" dia. star washer	300270	1
	Grounding instructions	MG-966	1
	Wire nut	300132	2
	3" stainless steel hose clamp	300276	2
	J-box wire bushing	350016	1
	Drain hose grommet	350446	1
	Spring clamp, 1 1/16"	300299	3
	Installation notice	MG-987	1
	PVC tee assembly, 2 x 3" dia.	320817	1
	PVC tee assembly, 2" dia.	320819	1
	Pipe 2" dia. PVC 15"	14401	1
	Bracket	14406	1
	Reducer 2" x 3" PVC	320067	1
	CPVC XPVC adapter	320833	1
	Gas Conversion Kit	AOPS7679/7664	1

### III. GENERAL INSTALLATION

This furnace is equipped with orifices size for operation with natural gas. For conversion to Propane Gas see instruction in Gas Conversion Section of this manual.

These Category Type IV furnaces are shipped completely assembled and wired (internally). See the Dealer Receiving and Freight Claim Procedure Section of the price guide for parts shortage or damage. The furnace and duct system must be adjusted to obtain a temperature rise of 55°F to 85°F (35°F to 65°F CHB1-75) through the furnace after installation. (See rating label located on side panel inside the furnace vestibule). The installation must conform with local codes, or in the absence of local codes, with the National Fuel Gas Codes (ANSI Z223.1 or latest edition) and with these instructions.

**⚠WARNING:** *This furnace is not to be used for temporary heating of buildings or structures under construction.*

Many of the chemicals used during construction, when burned, form acid bearing condensate that can substantially reduce the life of the heat exchanger.

It is recommended that a commercially available CO alarm be installed in conjunction with any fossil fuel burning appliance. The CO alarm shall be installed according to the alarm manufacturer's installation instructions and be listed in accordance with the latest edition of the UL Standard for Single and Multiple Station Carbon Monoxide Alarms, UL 2034, or the CSA International Standard, Residential Carbon Monoxide Alarming Devices, CSA 6.19.

#### A. CODES AND CLEARANCES

The following items must be considered when choosing the size and location of the furnace.

1. All local codes and/or regulations take precedence over the instructions in this manual and should be followed accordingly. In the absence of local codes, installation must conform with these instructions, regulations of the National Fire Protection Association, provisions of National Electrical Code (ANSI/NFPA70 or latest edition), and the National Fuel Gas Code (ANSI Z223.1 or latest edition).

**All installations and services must be performed by qualified service personnel.**

2. The BTU output capacity of the furnace proposed for installation should be based on a heat loss calculation made according to the manuals provided by the Air Conditioning Contractors of America (ACCA) or ASHRAE.
3. **MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS**

**TABLE 1**

<b>MODEL NO.</b>	<b>FROM SIDES OF FURNACE &amp; REAR</b>	<b>FRONT</b>	<b>TOP OF PLENUM</b>	<b>FROM THE FLUE OR VENT</b>	<b>SIDE OF PLENUM</b>
<b>CHB1-50</b>	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
<b>CHB1-75</b>	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
<b>CHB1-100</b>	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
<b>CHB1-125</b>	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
<b>CDB1-50</b>	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
<b>CDB1-75</b>	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
<b>CDB1-100</b>	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
<b>CDB1-125</b>	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.

The CHB1-50, 75, 100 and 125 furnaces may be installed on combustible flooring. The furnace shall not be installed directly on carpeting, tile or other combustible material other than wood flooring.

The CDB1-50, 75, 100 and 125 furnaces are to be installed on non-combustible flooring only. The non-combustible floor bases model no. 50 DA base for CDB1- (50,75) model no. 100 CA base for the model no. CDB1-100 and model no. 125 CA base for CDB1-125 are available for the counterflow furnaces to allow their installations on combustible flooring.

These furnaces may be installed in an alcove or in a closet if the minimum clearances to combustible construction (listed previously) are met. The CDB1 series furnaces may be installed in an attic or crawl space. Refer to section III, B1 of this installation manual.

The minimum clearances are listed for fire protection. Clearance for servicing the front of the furnaces and to all points on the furnace requiring access must be 24"\*.

\*For horizontal furnace installation, refer to section III, B1 of this installation manual.

**Equipment must be installed in accordance with regulations of the National Board of Fire Underwriters. Authorities having jurisdiction should be consulted before installations are made.**

**B. FURNACE LOCATION**

**⚠CAUTION:** *These high efficiency condensing furnaces are not certified for and shall not be vented into a standard or any type of chimney.*

The following shall be considered for locating the furnace:

1. For best performance locate the furnace so that it is centralized with respect to the duct system and as near as possible to a floor drain since condensate drainage must be provided.
2. Place the unit so that proper venting can be achieved, with a minimum number of elbows, in accord with the instructions in this manual.
3. The furnace must be located on a level, dry surface. The furnace must be installed so that the electrical components are protected from water. If the area becomes wet or damp at times, the furnace should be raised above the floor using a concrete base, bricks, patio blocks, etc.

**NOTICE: Ensure furnace is level after installation to ensure proper drainage and operation.**

**All installations and services must be performed by qualified service personnel.**

4. This furnace must be connected to a drain in accordance with these instructions. If it is not practical to connect the unit to a drain, a condensate pump must be used and can be ordered as an accessory, part number 350225. If an acid neutralizer kit is required by local code or the customer, it is available under part number 320095.

**B1. CDB1 HORIZONTAL APPLICATION**

The CDB1-50, 75, 100, and 125 furnaces may be installed in a horizontal position by placing the furnace on the left or right side (as viewed from the front in the upright position).

For left or right horizontal applications of the CDB1 series units, the rollout switch located on the burner box must be moved to the pre-punched mounting holes on the side of the burner box. Screws are provided in pre-punched holes at the required limit location. Remove these screws and use them to mount the limit to new location. Utilize previously removed limit mounting screws to fill voided holes at previous limit location (See Figure 1).

For a right side horizontal application of the CDB1 series units, the hose from the single tap pressure switch (top switch) is already connected correctly (See Figure 1).

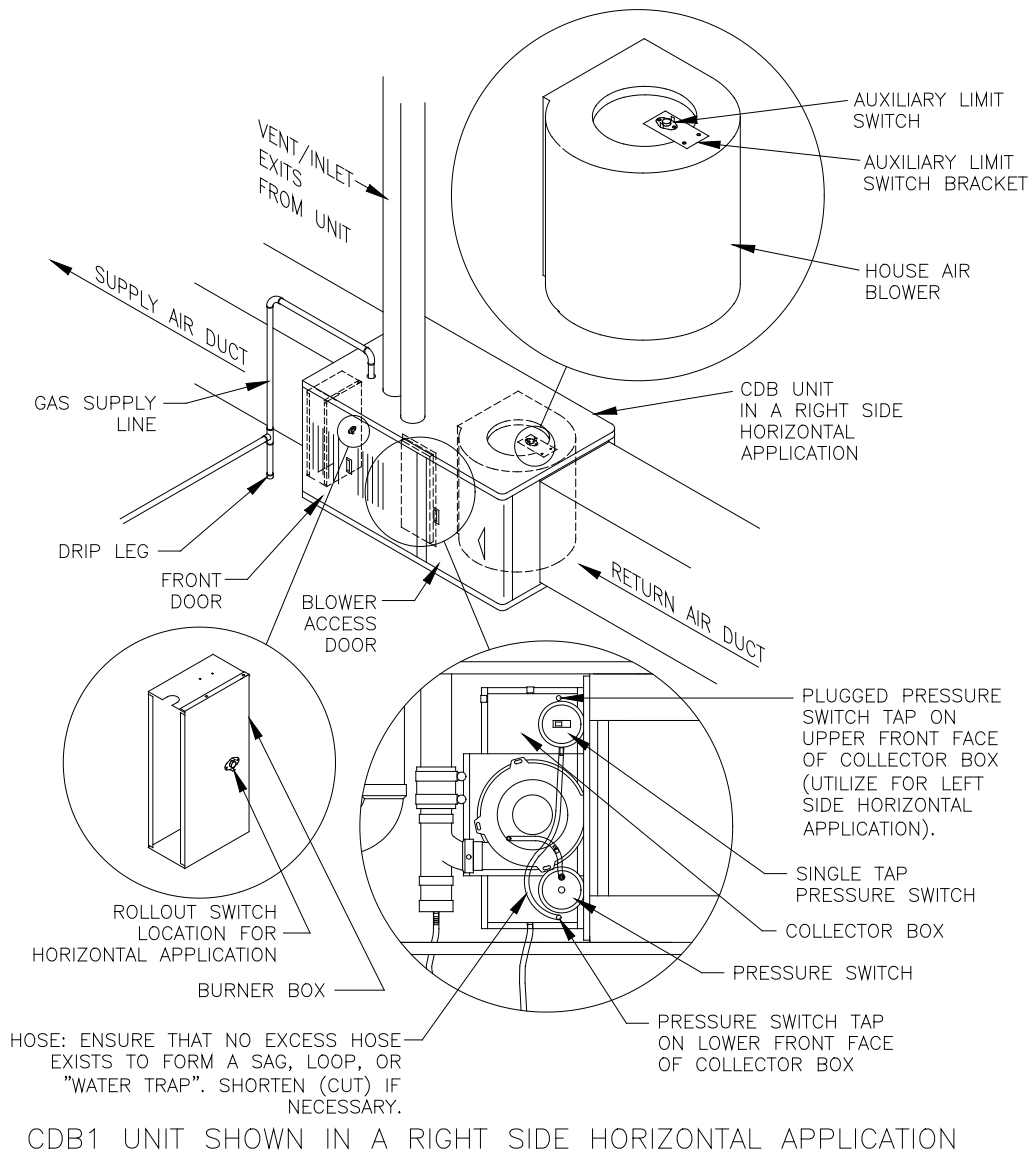
For a left side horizontal application of the CDB1 series units, the hose from the single tap pressure switch (bottom switch) must be moved to the lower front tap on the face of the collector box. Use the black cap removed from this tap to plug the original pressure switch tap.

**NOTE:** The hose, when moved, must be shortened (cut) to ensure that no excess hose exists to cause a sag, loop, or "water trap".

For a right side horizontal application of the CDB1 series units, the auxiliary limit switch located on the right side of the house air blower must be moved to the bracket on the opposite (left) side of the blower (See Figure 1).

**NOTE:** When the CDB1 is installed as horizontal unit, it is imperative that the auxiliary limit switch and bracket be located on the upper side of the house air blower; the burner rollout switch located on the burner box be relocated to the side of the burner box; and that the hose from the single tap pressure switch be connected to the lower tap on the front of the collector box (See Figure 1).

**All installations and services must be performed by qualified service personnel.**



**Figure 1**

The horizontal furnace installation should be on a service platform large enough to allow for proper clearances on all sides and service access to the front of the furnace (See Table 1). If the furnace is suspended, it must be supported at both ends and in the middle with clearance allowed for removal of both access doors. Gas supply line contact is only permissible between lines formed by the intersection of the top and two sides of the furnaces casing and the building joists, studs, or framing (See Figure 1).

**Equipment must be installed in accordance with regulations of the National Board of Fire Underwriters and the National Fuel Gas Code. Authorities having jurisdiction should be consulted before installations are made.**

### C. Replacing An Existing Furnace From A Common Vent

**⚠WARNING:** *These furnaces may NOT be common vented with any other appliance.*

## All installations and services must be performed by qualified service personnel.

### D. General Requirements For Venting Models CHB1 / CDB1

The CHB1 / CDB1 furnace venting system must be installed by a qualified service person in accordance with local installation codes and these instructions. In the absence of applicable local codes, conform to the National Fuel Gas Code, NFPA 54 /ANSI Z223.1-2002, or latest edition thereof.

Installation shall, at least, conform to the following requirements.

1. The exhaust vent / combustion air intake terminations specified by Thermo Products, in this manual, shall be used.
2. **All plastic pipe and pipefittings sourced to complete the exhaust vent and air intake systems shall be constructed of rigid PVC (polyvinyl chloride) thermoplastic. All components shall have a wall thickness equivalent to Schedule 40 series materials.**

In addition, all sourced PVC components shall be listed by a nationally recognized testing agency (e.g. NSF, UL, etc.) as conforming to one (1) or more of the following design standards.

<u>PVC Pipe Designation</u>	<u>Design Standard</u>
Cellular Core	ASTM-F891
DWV (Drain-Waste-Vent)	ASTM-D2665
Schedule 40	ASTM-D1785

3. The exhaust vent pipe and combustion air pipe shall be at least as large as the exhaust vent / air intake pipe specified by Thermo Products. **Size reduction is never permissible.** The required exhaust vent / air intake pipe sizes are:
  - nominal **2-inch diameter IPS**, Schedule 40 series, PVC thermoplastic pipe, **for models CHB1-50 / -75 & CDB1-50 / -75**, or
  - nominal **3-inch diameter IPS**, Schedule 40 series, PVC thermoplastic pipe, **for models CHB1-100 / -125 & CDB1-100 / -125**.
4. The furnace model series CHB1 / CDB1 shall **not** be common vented with any other appliance, including those burning solid fuels.
5. All horizontal runs of exhaust vent pipe shall slope upward at least ¼ inch per foot from the outlet of the furnace (for the model series CHB1), or the outlet of the drain tee (for the model series CDB1) to the vent termination, beyond the outside wall. This slope will permit proper drainage of the condensate.

Horizontal runs of air intake pipe shall slope downward at least ¼ inch per foot from the outlet of the last elbow or last horizontal run, before exiting the wall, to the intake termination beyond the outside wall. This slope will permit proper drainage of any precipitation that enters the intake pipe.

6. The exhaust vent pipe shall be supported at every joint (no more than 4-feet between supports) to prevent pipe blockage due to condensate trapped at a local low point, or sag, in the vent system.
7. The **maximum permissible length of piping** (consisting of a combination of straight pipe and a corresponding number of elbows) permitted is:
  - **75 equivalent feet**, for the **exhaust vent system**, and
  - **70 equivalent feet**, for the **combustion air intake system**
8. The maximum quantity of Schedule 40 series, type DWV thermoplastic pipe elbows allowed in each system is listed in Table 2. When counting pipe elbows, **all** elbows used in the exhaust vent or combustion air

**All installations and services must be performed by qualified service personnel.**

intake systems must be considered. This includes all elbows, or equivalent pipefittings, used inside the furnace jacket in addition to those used to construct the termination. Furthermore, a credit of 5-feet of straight pipe may be taken for each elbow, up to maximum of three (3) elbows, which is dropped from the maximum permissible number for each system.

**Table 2: Maximum Permissible Exhaust Vent and Combustion Air Intake Lengths When Using the Maximum Quantity of Elbows**

Thermoplastic Pipe Vent Size (Nominal)	2 in. Diameter IPS			3 in. Diameter IPS		
	Exhaust or Intake Straight Pipe Length (ft.)	Maximum Qty. of Exhaust Elbows <sup>1,2</sup>	Maximum Qty. of Intake Elbows <sup>2</sup>	Exhaust or Intake Straight Pipe Length (ft.)	Maximum Qty. of Exhaust Elbows <sup>1,2</sup>	Maximum Qty. of Intake Elbows <sup>2</sup>
CHB1 / CDB1-50	35	8	7	-	-	-
CHB1 / CDB1-75						
CHB1 / CDB1-100	<b>Not Permitted</b>			35	8	7
CHB1 / CDB1-125						

Superscripts:

<sup>1</sup> The drain tee supplied with CHB1 / CDB1 furnace model series is considered equivalent to one (1), 90° elbow.

<sup>2</sup> Two (2), 45° elbows can be substituted for one (1), 90° elbow.

Care should be taken to design the shortest possible intake and exhaust systems. Each system should contain as few elbows as possible to insure the satisfactory operation of the furnace. However, **system length should never be less than 8 ft of pipe with two (2), 90 deg. elbows.** For best overall operation of the combustion system, we recommend the actual equivalent lengths for both the constructed intake and the exhaust systems have approximately the same value.

- Use a saw designed to cut thermoplastic pipe. All cuts should be made at right angles to the pipe wall. Smooth jagged edges and remove all burrs and strings. **All pipe joints must utilize standard PVC Schedule 40 series, DWV type elbows, couplings, and fittings.** Clean all pipe surfaces at connections using a fine abrasive material or approved PVC cleaner (primer). Secure all pipe joints using suitable permanent PVC pipe solvent cement. Joints are **NOT** to be made by simply gluing raw edges of butted together vent pipe.

Piping joints inside the furnace vestibule should be sealed with silicone caulk, rather than pipe cement, to allow for disassembly and removal of piping, if necessary, during maintenance.

**NOTICE: DO NOT use silicone caulk to seal the pipe sleeve or coupling to the metal air intake collar on the burner box. Securing the sleeve or coupling to the collar using a screw is sufficient.**

- Vent connections shall be checked for leakage with the furnace induced draft blower running and with the vent termination blocked. Use a mild soap and water solution to check for leaks.
- Vent pipe passing through an unheated space shall be insulated with 1-inch thick, foil-faced fiberglass insulation, or equivalent, to prevent freezing of condensate within the pipe.
- No clearance is required from the outer surface of the thermoplastic piping to combustible materials for fire hazard prevention.
- Thermo Products does not require screens be installed in the exhaust vent and air intake piping. However, optional stainless steel screens are available from Thermo Products, should the homeowner request them.

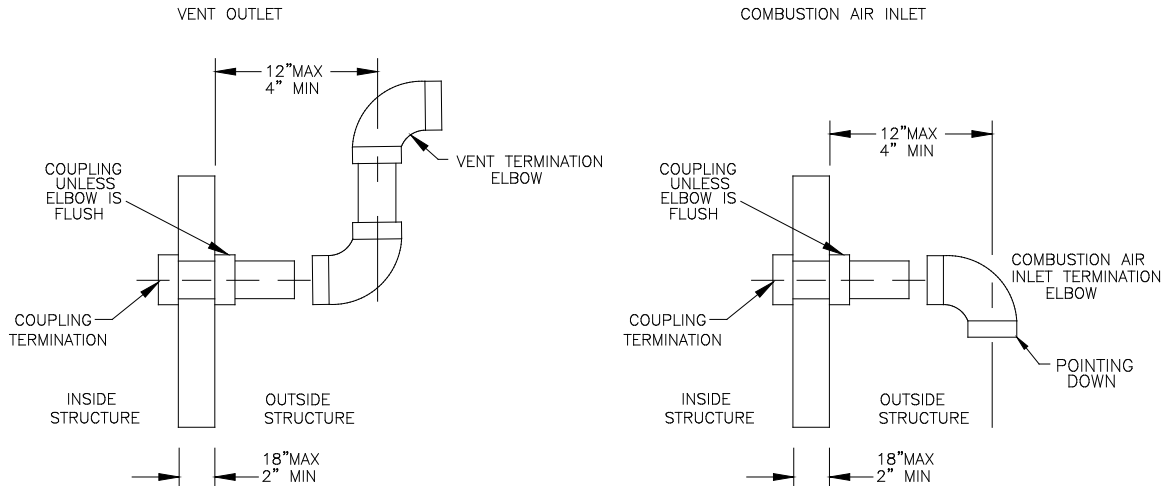


**All installations and services must be performed by qualified service personnel.**

**NOTICE:** The furnace model series CHB1 / CDB1 may be vented either through the sidewall or the roof. For sidewall instructions, continue to the following section. For roof venting, refer to Section III G, of this manual

### E. Direct Venting Through a Sidewall

1. Vent and combustion air pipes may pass through a maximum wall thickness of 18 inches. The minimum wall thickness is 2 inches. Referring to Figure 2, the maximum distance from the outer wall to the center of the elbow is 12 inches.

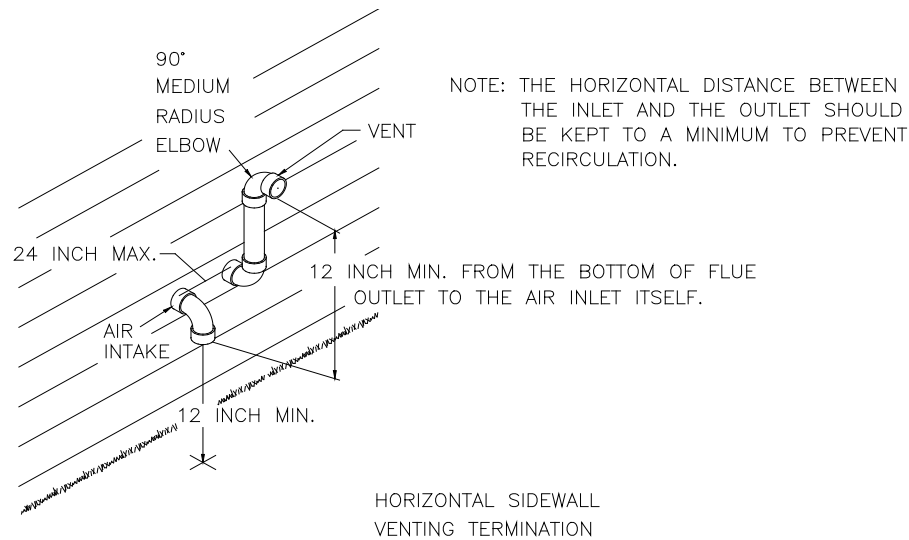


**Figure 2: Proper Direct Vent Terminations (RH & LH views) and Vent Termination Only w/o Outside Combustion Air Intake (RH view)**

**NOTICE:** If exterior sidewall building materials are subject to degradation from contact with flue gases or moisture, a minimum 24-inch diameter shield shall be fabricated from stainless steel or UV-resistant plastic sheet. The protective shield shall be installed around the vent pipe on the outside wall.

2. The exhaust vent termination elbow shall be installed in accordance with these instructions and any applicable local codes. Refer to Figures 2 and 3 for typical examples of proper terminations.
  - a. The exhaust vent termination must be installed in the same atmospheric pressure zone (i.e. on the same wall) as the air intake termination.
  - b. The bottom edge of the vent termination elbow must be installed at least 12-inches above the outlet of intake termination elbow.
  - c. The horizontal distance between the inlet and exhaust terminations should be minimized, when possible, and should never exceed 24-inches.
  - d. The vent and intake systems should utilize the same numbers of elbows and approximately the same length of straight pipe to reach the outside termination.

**All installations and services must be performed by qualified service personnel.**

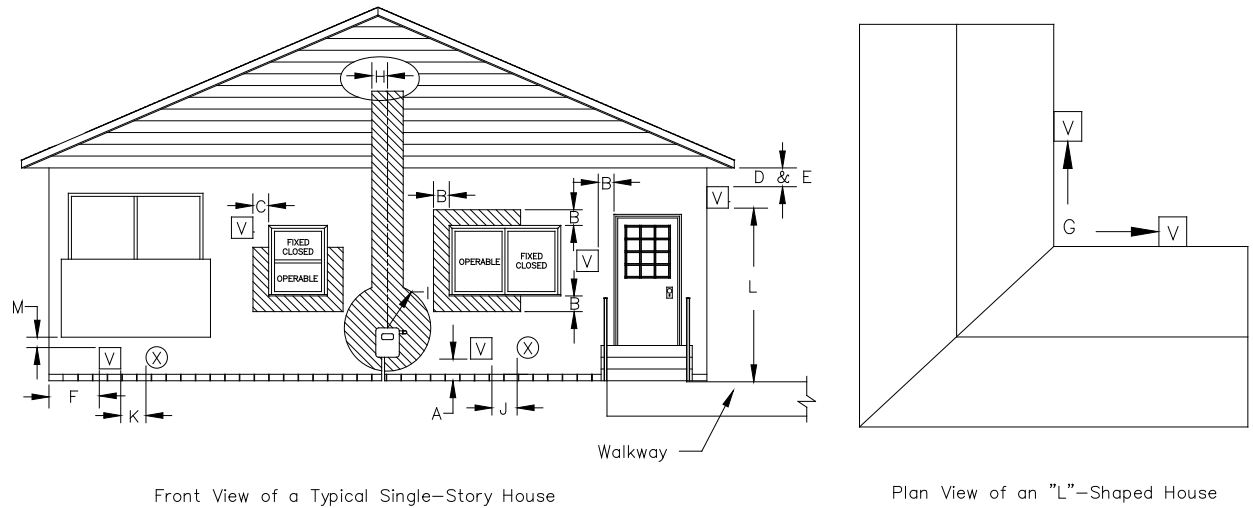


**Figure 3: Typical Relative Locations of Direct Vent Terminations When Sidewall Venting**

### 3. Exhaust Vent Terminal Location Clearance Requirements

- a. The vent terminal shall be located at least 3-feet above any forced air inlet located within 10-feet. Refer to Figure 4 for a depiction of the minimum required clearances between vent terminations and building features according to the National Fuel Gas Code (NFGC).
- b. The vent terminal shall be at least 12-inches below, 12-inches horizontally from, or 12-inches above, any door, window, or gravity air inlet into a building. The bottom of the vent terminal shall be located at least 12-inches above grade.
- c. The vent terminal shall **not** be located:
  - over public walkways or over an area where wetting of surfaces by condensate, or water vapor, could create a nuisance or hazard,
  - near soffit vents, crawl space vents, or other areas where condensate or water vapor could create a nuisance, hazard, or cause property damage, and
  - where wetting of components by condensate, or water vapor, could be detrimental to the operation of pressure regulators, relief valves, or any other equipment.
- d. The vent terminal shall be installed a minimum of 14-inches from any obstruction and 3-feet from an inside corner of an L-shaped structure.

**All installations and services must be performed by qualified service personnel.**



LEGEND

V = Vent terminal  
X = Air supply inlet  
 = Vent terminal installation prohibited within this region

Dimension	Clearance Definition	Requirement for US Installations*
A	Distance above grade, veranda, porch, deck, or balcony	12 inches
B	Distance to window or door that may be opened	12 inches **
C	Distance to permanently closed window	12 inches ***
D	Distance to ventilated soffit located above the terminal within a horizontal distance of 2 feet from the centerline of the terminal	24 inches ***
E	Distance to unventilated soffit	24 inches ***
F	Distance to outside corner	24 inches ***
G	Distance to inside corner	3 feet ***
H	Distance to each side of centerline extended above meter/regulator assembly	4 feet ***
I	Distance to service regulator vent outlet	4 feet ***
J	Distance to nonmechanical air supply inlet to building or the combustion air inlet to any other appliance	12 inches **
K	Distance to mechanical air supply inlet	3 feet above, if within 10 feet horizontally
L	Distance above paved sidewalk or paved driveway located on public property	7 feet ****
M	Distance below veranda, porch, deck, or balcony	24 inches ***

\* In accordance with the current edition of the National Fuel Gas Code, ANSI Z223.1/NFPA 54.

\*\* In non-direct vent applications (i.e. sidewall venting only), the required clearance is 4 feet below or to the side of the opening; 1 foot above opening.

\*\*\* Clearance in accordance with local installation codes, the requirements of the gas supplier, and the manufacturer's installation instructions.

\*\*\*\* In direct vent applications, clearance in accordance with local installation codes, the requirements of the gas supplier, and the manufacturer's installation instructions. In non-direct vent applications (i.e. sidewall venting only), the required clearance is 7 feet.

**Figure 4: NFGC Minimum Clearances Between the Vent Terminal and Various Building Features**

#### 4. Vent Terminal Location Guidelines

## All installations and services must be performed by qualified service personnel.

**⚠CAUTION:** *Bushes, shrubs, or any vegetation that may restrict the flow of flue products must be kept away from vent and air intake terminations. Terminations must also be kept clear of any leaves, weeds, combustible materials, snow, and ice build-up. Avoid locating the vent terminal over areas where dripping of condensate, or small pools of acidic condensate, could create a problem.*

In addition to following any local code requirements, when possible, utilize the guidelines below in locating the vent terminal to help insure trouble-free operation of a sidewall vented furnace:

- Avoid locating the vent terminal on a wall facing prevailing winds and wide-open areas. When impractical, choose a location that protects the vent from strong winds, such as behind a fence or hedge.
- In geographical areas with considerable snowfall, it is advisable to locate the vent terminal much higher than the minimum 12-inches above ground to prevent blockage by snow accumulation or drifting.
- The vent and combustion air terminations shall be checked periodically, at least at the start of each heating season, for restriction or blockage from foreign material in the exhaust vent or in the air intake piping. Clean the air intake and vent terminations when necessary.

### E1. Single-Pipe (Sidewall) Venting Option

**NOTICE:** When possible, we recommend all furnace of the model series CHB1 / CDB1 be installed to utilize outside combustion air. The use of outside combustion air usually results in the most energy efficient, nuisance free, and long-lived operation of the furnace.

**NOTICE:** Heat exchanger failure accelerated by contaminated combustion air will void the furnace heat exchanger limited lifetime warranty.

This furnace may be **horizontally**, i.e. sidewall, vented using an exhaust vent pipe alone without drawing in outside combustion air. When single-pipe, sidewall venting a furnace, combustion air is drawn from the indoor space. This type of installation is **not** classified as a direct vent installation. However, the same exhaust venting guidelines apply as for a direct vent installation, except the exhaust termination will be similar to the air intake of the "two- pipe", direct vent installation. Refer to depictions of proper intake terminal installations in Figures 2 and 3. Referring to the left-hand (LH) sketch in Figure 2, vent termination will consist of one (1), 90° elbow, opening downward.

When indoor air is used for combustion, measures should be taken to prevent drawing in corrosive chemicals vapors or gases with the combustion air supply. Such chemicals include, but are not limited to, chlorinated and/or fluorinated hydrocarbons such as found in refrigerants, aerosol propellants, dry cleaning fluids, degreasers and removers. Other harmful compounds may come from bleaches, air fresheners or mastics. Vapors from such products can form reactive acid producing chemical species when burned in a gas flame. The life of the furnace could be reduced should acidic compounds form within the furnace.

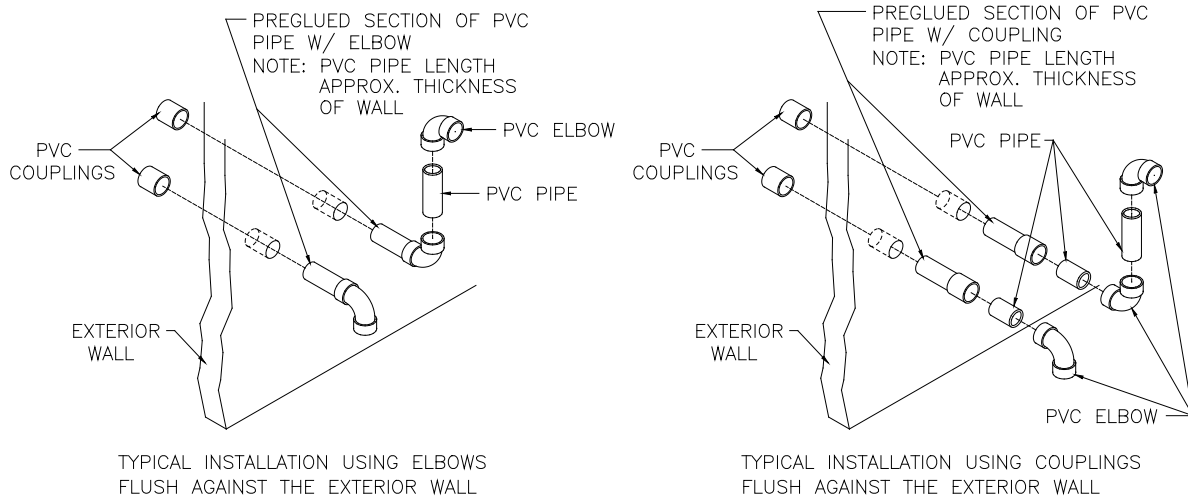
### F. Installation Of Outside Exhaust / Intake Terminations

1. After determining appropriate installation locations (suitable locations must observe all clearances specified in this manual), mark and cut two (2) holes in the outside wall of the following sizes for the outdoor terminal(s),
  - **2-3/8 inch diameter**, for furnace models **CHB1 / CDB1-50** and **CHB1 / CDB1-75**, or
  - **3-1/2 inch diameter**, for the furnace models **CHB1 / CDB1-100** and **CHB1 / CDB1-125**.

**All installations and services must be performed by qualified service personnel.**

2. Measure and cut two (2), 2-inch diameter thermoplastic pipes 1-1/2 inches longer than the depth of the wall. (Cutting the pipe longer leaves a 3/4 inch connection allowance at both ends of the pipe.) For 3-inch diameter PVC pipe, leave a 3-inch allowance for end connections. Using PVC pipe cement, glue a PVC elbow or coupling fitting to one (1) end of each pipe.

Before inserting the pipe through the wall, mark the other end of the pipe so the elbow orientation can be determined. Also, if a protective shield (refer to Section E., passage 1. of this manual) will be used on the exterior surface of the wall, it should be installed at this time. From the inside, glue a coupling fitting to each pipe, using PVC pipe cement, while being careful to maintain the proper orientation of the termination elbow(s). Complete the assembly of the outlet and inlet as shown in Figure 5, making sure that the spacing between the inlet and outlet complies with that noted in Figure 3.



**Figure 5: Typical Construction Details of Sidewall Vent and Air Intake Terminations**

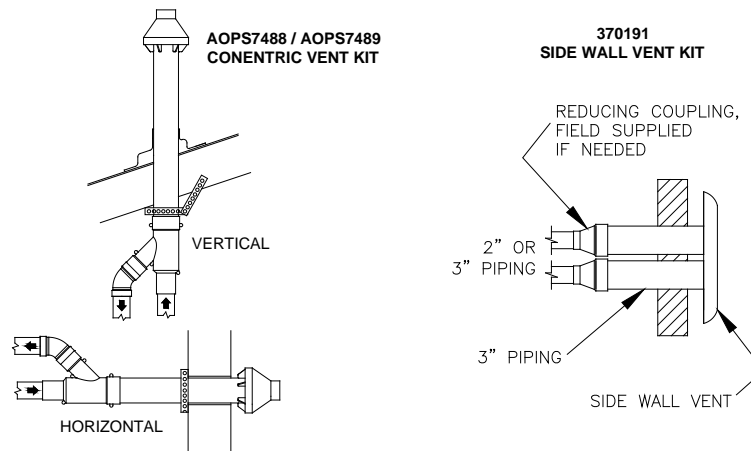
3. Finish the vent installation by caulking the annulus to seal around the two (2) holes where the thermoplastic pipes pass through the wall.
4. To prevent foreign material, insects, or small animals from entering the pipes, an optional vent or intake terminal (stainless steel) screen is available from Thermo Products under part no. 320226 for 3" vent and 320219 for 2" vent.
5. **Optional Direct Vent Terminations**

Three optional vent kits are available for direct vent terminations, refer to Figure 6.

- The concentric vent kits (Thermo Products p/n AOPS7488 & AOPS7489) provide a means for the vent and intake to be installed through a single opening in the roof or exterior wall. Kit p/n AOPS7488 requires a 4" inch diameter hole and is used on furnace models CHB1/CDB1-50 & 75. Kit p/n AOPS7489 requires a 5" inch diameter hole and is used on furnace models CHB1/CDB1-100 & 125.
- The sidewall vent cap (Thermo Products part no. 370191) is a cover installed over the exhaust vent and air intake pipes on the exterior of the building. For horizontal sidewall vent applications only. This kit may be used on any size furnace in the CHB1/CDB1 family.

Install these optional kits according to the instructions provided with each kit. The location and clearance requirements are identical to those of the standard vent terminations described in this manual.

**All installations and services must be performed by qualified service personnel.**



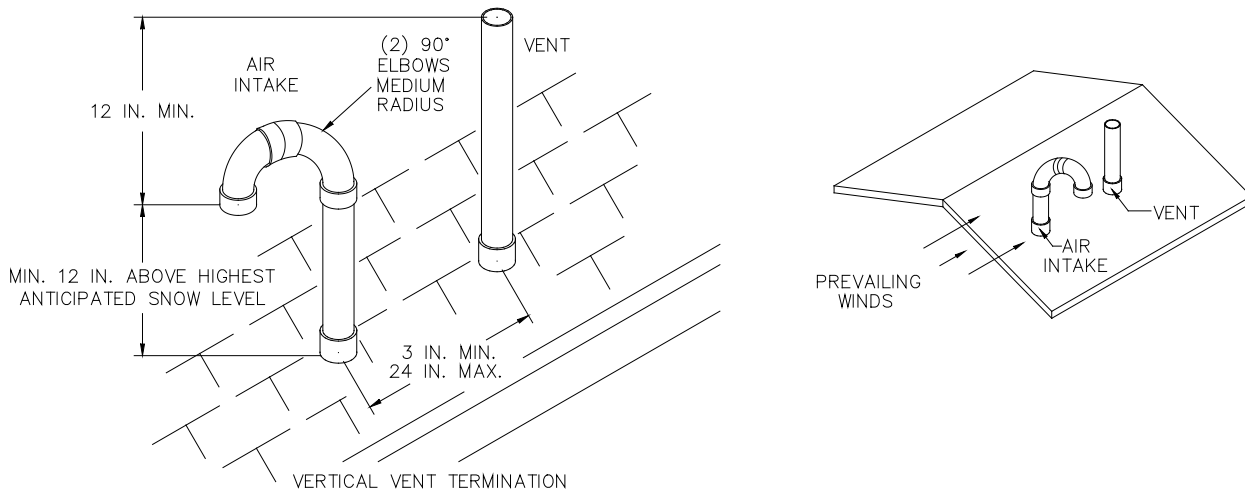
**Figure 6: Optional Direct Vent Kits for the CHB1 / CDB1 Model Series of Furnaces**

**G. Connecting The Furnace To Roof Exhaust / Intake Terminations**

If it is not desirable, or feasible, to vent the furnace through a sidewall, it may be vertically vented through the roof. Installation shall conform to the following guidelines, which are illustrated in Figure 6A, below.

1. The outlet of the exhaust vent and the inlet of the combustion air intake, i.e. the terminations, shall be a minimum of 12-inches above highest anticipated snow level.
2. The exhaust vent outlet must be installed a minimum of 12-inches above the air intake inlet.
3. Where exposed to prevailing winds, the combustion air intake shall be installed upwind of the vent outlet.
4. The exhaust vent and combustion air intake shall be a minimum of 3-inches and a maximum of 24 inches apart.

**NOTICE: When the vent termination is installed correctly, a draft should NOT be present in the system during the furnace off-cycle.**

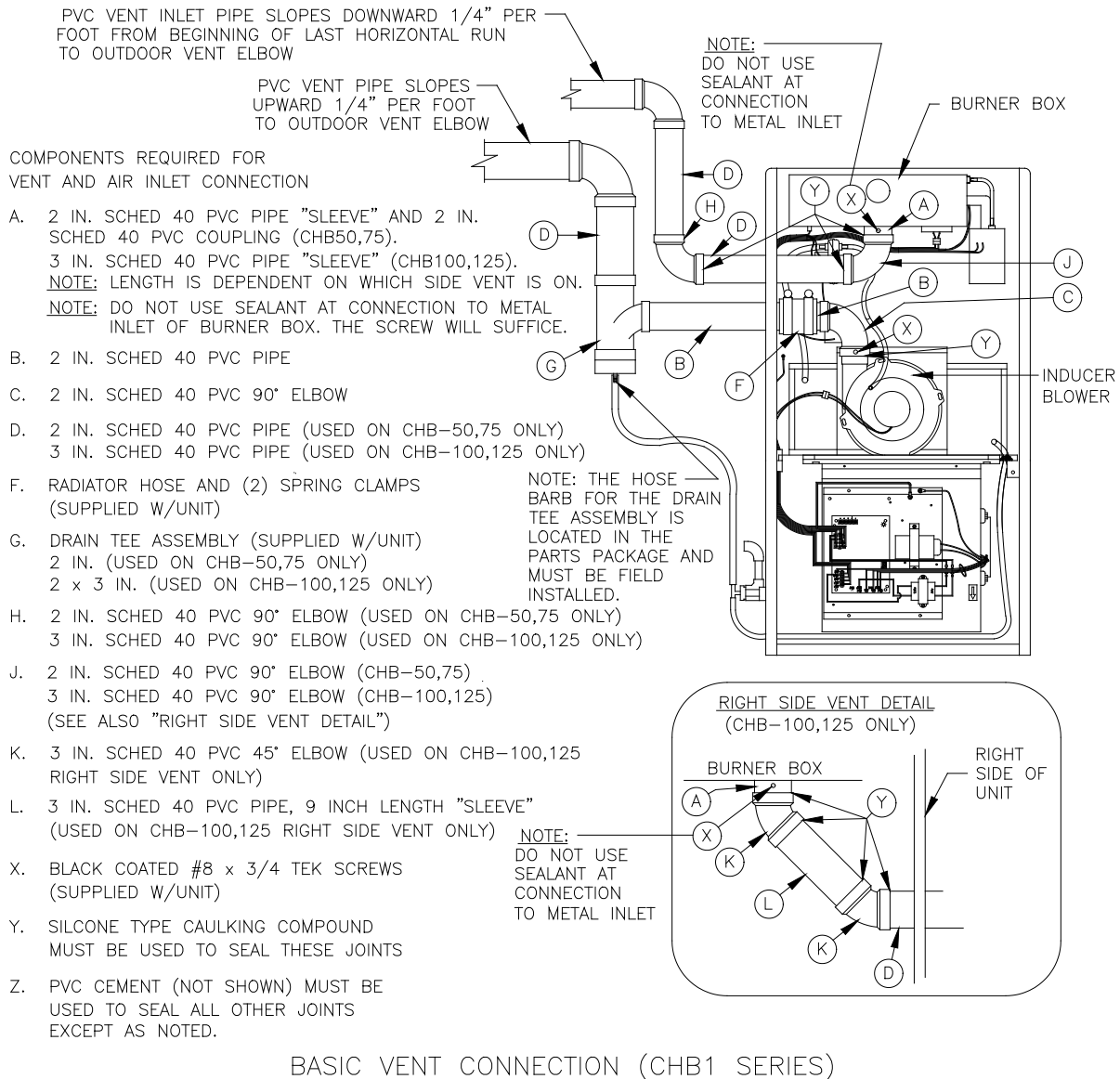


**Figure 6A: Typical Rooftop Vent and Air Intake Termination Construction Details**

**All installations and services must be performed by qualified service personnel.**

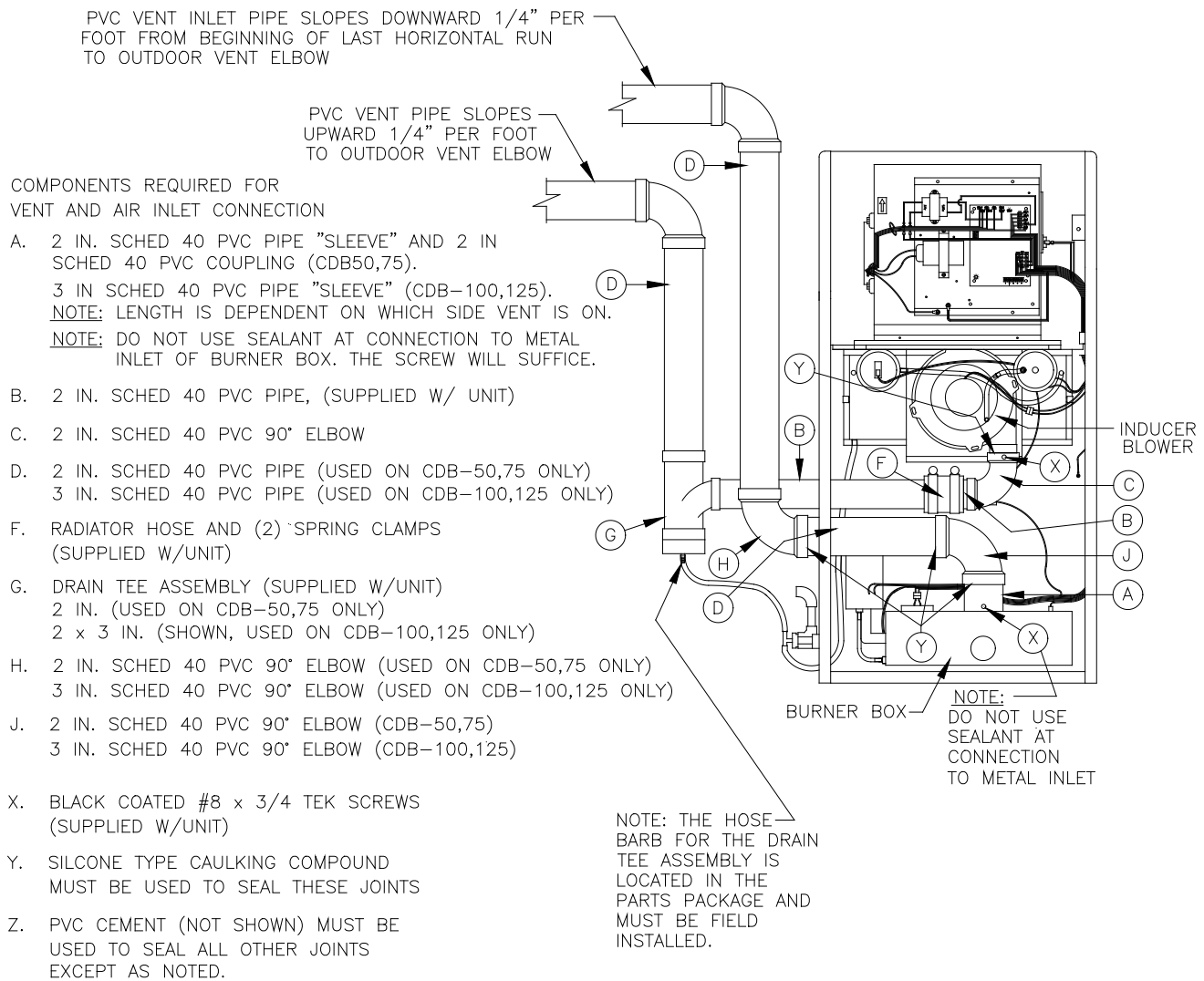
**H. Exhaust / Intake Piping And Condensate Drain Connections At Furnace**

1. Figures 6B, 7, and 8 follow depicting typical exhaust vent and air intake connections for the furnace model series CHB1 and the CDB1, respectively, as well as a list of required parts to correctly install each system.



**Figure 6B: Required Exhaust Vent and Air Intake Piping for CHB1 Furnace**

**All installations and services must be performed by qualified service personnel.**



BASIC VENT CONNECTION (CDB1 SERIES)

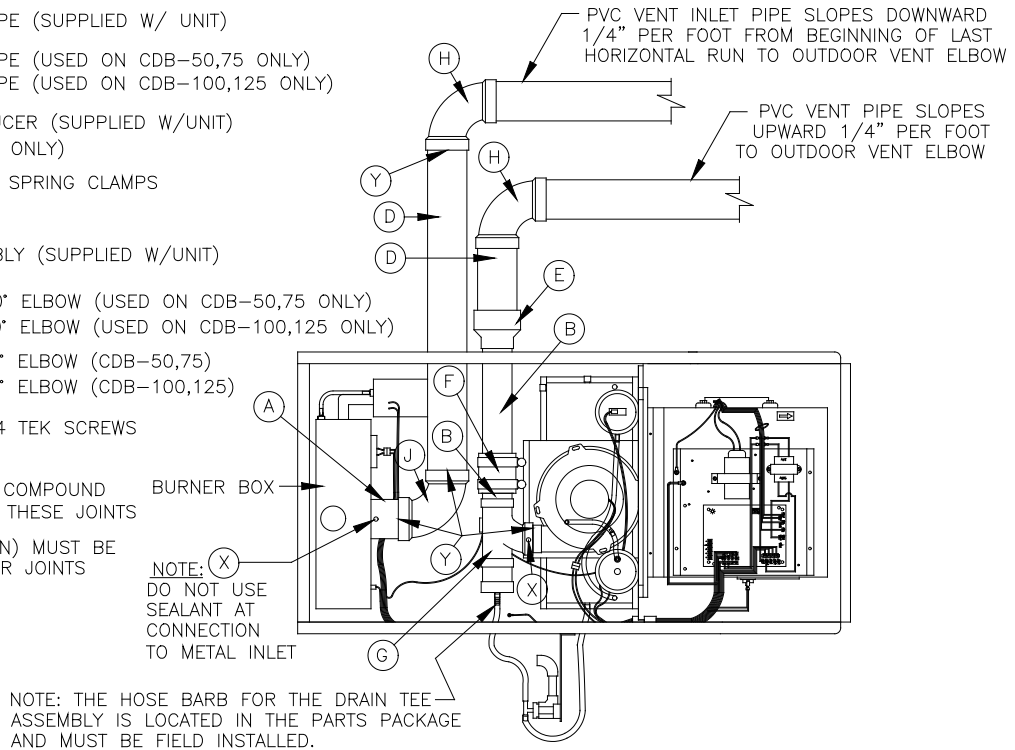
**Figure 7: Required Exhaust Vent and Air Intake Piping for CDB1 Furnace in Downflow Applications**



**All installations and services must be performed by qualified service personnel.**

COMPONENTS REQUIRED FOR  
VENT AND AIR INLET CONNECTION

- A. 2 IN. SCHED 40 PVC PIPE "SLEEVE" AND 2 IN SCHED 40 PVC COUPLING (CDB-50,75).  
3 IN SCHED 40 PVC PIPE "SLEEVE" (CDB-100,125).  
NOTE: LENGTH IS DEPENDENT ON WHICH SIDE VENT IS ON.  
NOTE: DO NOT USE SEALANT AT CONNECTION TO METAL INLET OF BURNER BOX. THE SCREW WILL SUFFICE.
- B. 2 IN. SCHED 40 PVC PIPE (SUPPLIED W/ UNIT)
- D. 2 IN. SCHED 40 PVC PIPE (USED ON CDB-50,75 ONLY)  
3 IN. SCHED 40 PVC PIPE (USED ON CDB-100,125 ONLY)
- E. 2 IN. X 3 IN. PVC REDUCER (SUPPLIED W/UNIT)  
(USED ON CDB-100,125 ONLY)
- F. RADIATOR HOSE AND (2) SPRING CLAMPS  
(SUPPLIED W/UNIT)
- G. 2 IN. DRAIN TEE ASSEMBLY (SUPPLIED W/UNIT)
- H. 2 IN. SCHED 40 PVC 90° ELBOW (USED ON CDB-50,75 ONLY)  
3 IN. SCHED 40 PVC 90° ELBOW (USED ON CDB-100,125 ONLY)
- J. 2 IN. SCHED 40 PVC 90° ELBOW (CDB-50,75)  
3 IN. SCHED 40 PVC 90° ELBOW (CDB-100,125)
- X. BLACK COATED #8 x 3/4 TEK SCREWS  
(SUPPLIED W/UNIT)
- Y. SILICONE TYPE CAULKING COMPOUND  
MUST BE USED TO SEAL THESE JOINTS
- Z. PVC CEMENT (NOT SHOWN) MUST BE USED TO SEAL ALL OTHER JOINTS EXCEPT AS NOTED.



BASIC VENT CONNECTION  
(CDB1 SERIES SHOWN IN A RIGHT SIDE HORIZONTAL APPLICATION)

**Figure 8: Required Exhaust Vent and Air Intake Piping for CDB1 Furnace in Horizontal Applications.**

2. Connecting The Exhaust Vent To The Inducer

- a. Slip the end of the 2-inch diameter PVC elbow (for the model CDX1 in horizontal applications, the 2-inch diameter PVC tee assembly) over the outlet of the inducer blower assembly. Measure the length of 2-inch diameter thermoplastic pipe needed to clear the furnace side casing, while allowing for installation of a 2-3/8 inch length of reinforced rubber hose, used as a coupling, within the casing of the furnace. Cut the measured lengths of 2-inch diameter PVC pipe being sure to allow a sufficient length of pipe for connections. Refer to Figures 9, 10 and 11 for assembly details.

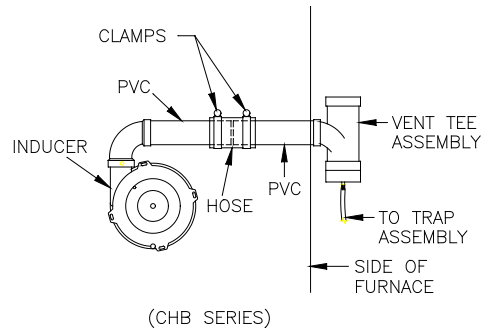
**NOTICE:** For the models CDB1-50 / -75, a length of 2-inch diameter PVC pipe and a 2-inch diameter PVC tee assembly are supplied with each furnace. For the models CDB1-100 / -125, a 3-inch x 2-inch diameter PVC reducer is also supplied.

**All installations and services must be performed by qualified service personnel.**

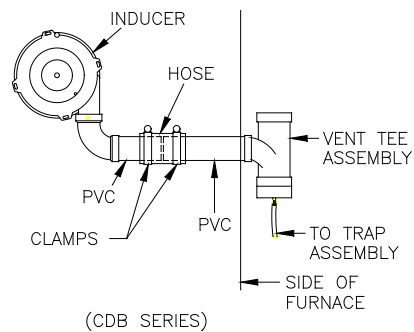
**NOTICE: For models CDB1-100 and CDB1-125 used in horizontal applications,** immediately transition from 2-inch to 3-inch diameter pipe by installing the 3-inch x 2-inch diameter PVC reducer just outside the furnace casing. The remainder of the venting system leading away from the furnace **must** be composed of 3-inch diameter PVC pipe and pipefittings **only**. Refer to item E in Figure 8.

- b. After preparation of the internal 2-inch diameter PVC pipe sections, put a thin bead of a silicone rubber type sealant around the outlet flange of the inducer. Slip the 2-inch diameter PVC elbow (for the model series CDB1 in horizontal applications, a 2-inch diameter PVC tee) over the inducer outlet flange. Drive one (1) #8 x 3/4 inch sheet metal screw with black protective coating (supplied with furnace) through the elbow and into the outlet flange of the inducer to secure the elbow in place.

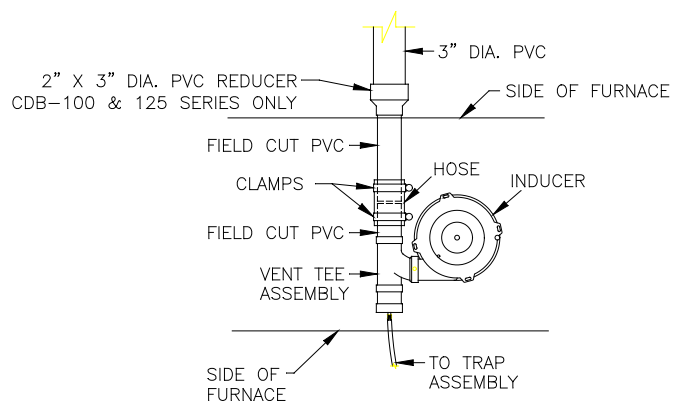
**Figure 9: Typical Internal Vent Piping Arrangement for the Furnace Model Series CHB1.**



**Figure 10: Typical Internal Vent Piping Arrangement for the Furnace Model Series CDB1-100 / -125.**



**Figure 11: Typical Internal Vent Piping Arrangement for the Furnace Model Series CDB1-100 / -125 in RH Horizontal Applications.**



(CDB SERIES IN A RIGHT HAND HORIZONTAL APPLICATION)

- c. Using PVC cement, glue the pre-cut 2-inch diameter thermoplastic pipe, from step (a) above, to the 2-inch diameter PVC elbow (for the model series CDB1 in horizontal applications, the 2-inch diameter

**All installations and services must be performed by qualified service personnel.**

PVC tee). Couple the drain tee assembly to the pre-cut 2-inch diameter PVC pipe using the reinforced rubber hose and the two (2) band clamps supplied.

**NOTICE: All PVC thermoplastic pipe must be supported beginning directly over the exhaust vent tee assembly, then every 4-feet thereafter, and at every joint.** Trial fit the entire exhaust vent and air intake piping systems, making sure the slope and length of the piping are correct, before permanently assembling the pipe components.

If the vent piping is run through an unconditioned space, it must be insulated with 1-inch thick foil-faced fiberglass insulation, or an equivalent product.

3. Connecting The Combustion Air Intake Piping

**⚠CAUTION:** *Outside combustion air must NOT be drawn from an area directly adjacent to a pool, hot tub or spa. Measures should be taken to prevent the entry of corrosive chemicals or vapors into the combustion air supply. Such chemicals include, but are not limited to, chlorinated and/or fluorinated hydrocarbons such as found in refrigerants, aerosol propellants, dry cleaning fluids, degreasers and removers. Other harmful compounds may come from bleaches, air fresheners or mastics. Vapors from such products can form reactive acid producing chemical species when burned in a gas flame. Should acidic compounds form in the furnace they may significantly reduce the useful life of the furnace.*

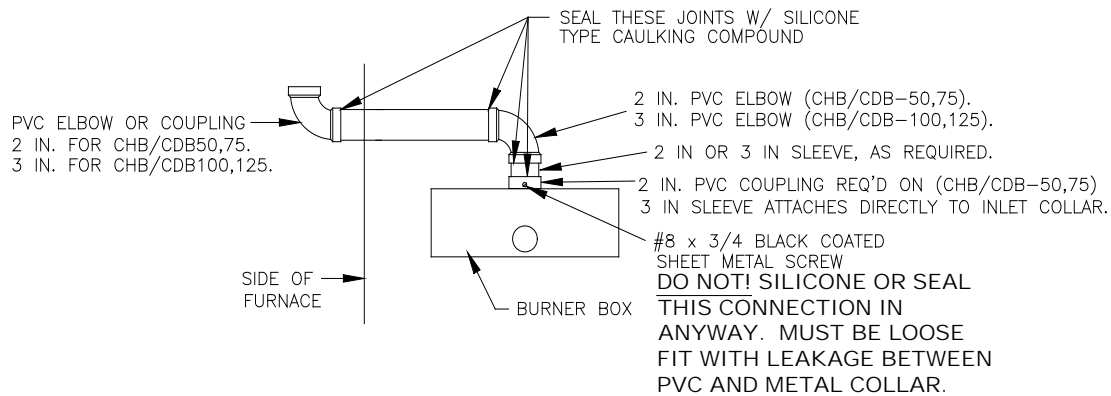
- a. For the models CHB1-50 / -75 and CDB1-50 / -75, install a 2-inch PVC elbow with sleeve and coupling (for models CHB1-100 / -125 and CDB1-100 & -125, a 3-inch PVC elbow with sleeve) on the inlet of the burner box. Measure the length of pipe needed to clear the casing. Be sure to allow sufficient length to account for insertion of the pipe into the elbow at the burner box and the elbow, or coupling fitting, on the end. Cut the pipe to length.
- b. After preparation of the thermoplastic pipe, drive one (1) #8 x 3/4 inch sheet metal screw with black protective coating (supplied with furnace) through the PVC coupling, or sleeve, into the metal collar of the burner box to secure the piping in place.

**NOTICE: DO NOT apply silicone rubber type sealant or PVC cement to the joint at the thermoplastic piping connection to the metal burner box collar. Attach the PVC elbow to the sleeve and then to the coupling where required, using silicone rubber type sealant, refer to Figure 12.**

- c. Insert the precut 2-inch (or 3-inch) thermoplastic pipe into the elbow at the burner box and to the elbow, or coupler, just outside the furnace using a silicone rubber type sealant. To properly make these seals, run a thin bead of silicone type sealant around the circumference of the PVC pipe, about 3/8 inch from either end. Insert the straight pipe section into the appropriate couplings and elbows and rotate 1/4 turn. Silicone rubber type sealants remain pliable after the initial setup period has passed allowing for relatively easy disconnection of the air intake system, should the burner assembly require removal at a later date, refer to Figure 12.

**NOTICE: When applying silicone sealants, ensure that no excess sealant is pushed into the inside opening of the pipe. This may cause flow restriction within the piping. If possible, always apply the sealant to the male component of the piping joint.**

**All installations and services must be performed by qualified service personnel.**

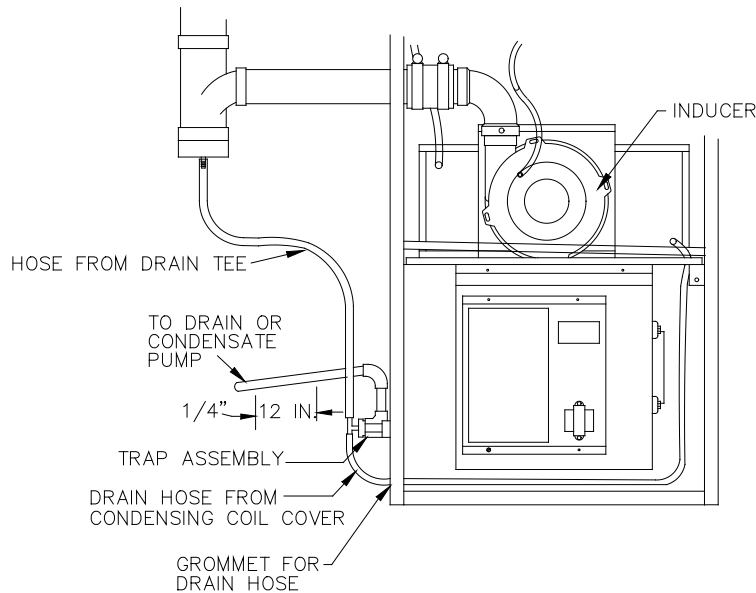


**Figure 12: Typical Internal Air Intake Piping Arrangement for All Furnace Models**

- d. After trial fitting the entire combustion air intake system, use a PVC cement to glue all connections in place, **except the length of pipe between the combustion air fitting on the burner box and the first fitting.**
- e. If the combustion air piping is installed in a warm, humid place, such as a laundry room or above a suspended ceiling, it must be insulated with a 1-inch thick, foil-faced fiberglass insulation, or an equivalent product, to help prevent the outside surface of the pipe from sweating.

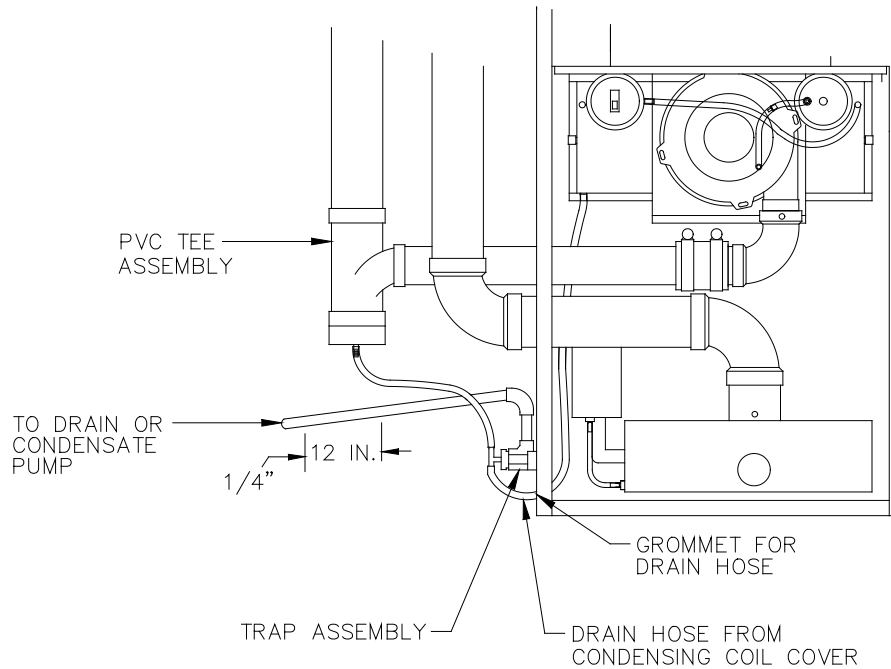
### I. Condensate Drain Line And Trap Assembly

1. The following diagrams depict typical condensate drain and trap connections for the furnace models series CHB1 and CDB1, refer to the illustrations in Figures 14, 15, and 16.

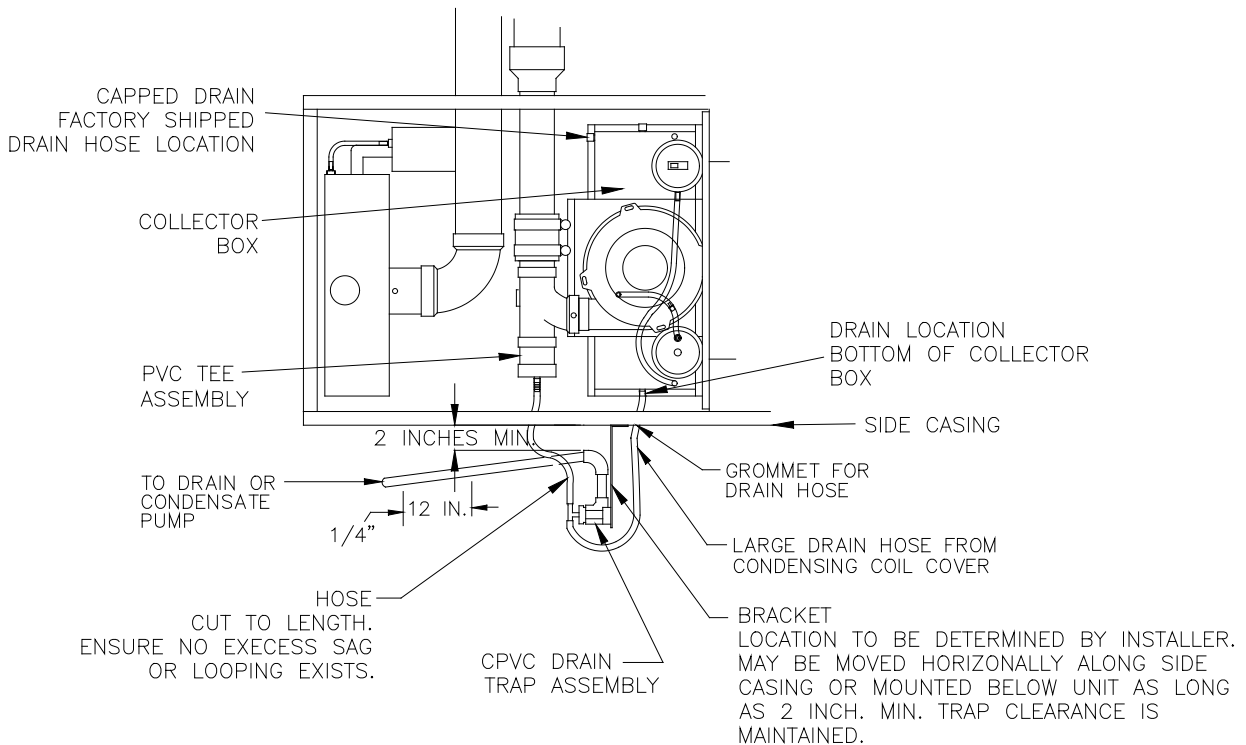


**Figure 14. Condensate Trap Assembly Mounted On the Model Series CHB1**

**All installations and services must be performed by qualified service personnel.**



**Figure 15. Condensate Trap Assembly Mounted On the Model Series CDB1 In a Downflow Application**



**Figure 16. Condensate Trap Assembly Mounted On The Model Series CDB1 In RH Side Horizontal Application**

2. Determine from which side of the furnace the condensate disposal line will be run.

## All installations and services must be performed by qualified service personnel.

**NOTICE:** On the model series CHB1 / CDB1 the condensate disposal line **must** be on the same side as the flue outlet or, in the case of a horizontal application, the bottom of unit.

Drive two (2) #8 x 3/4 inch sheet metal screws with black protective coating (supplied with furnace) to attach the condensate trap to the furnace casing. Pilot holes are provided on both sides of the casing for mounting the trap.

**NOTICE: When the CDB1 series unit is used in a horizontal application,** the connection of the drain hose to the collector box must be changed from the standard, factory-supplied location to a lower location on the collector box to permit proper drainage of condensate from the furnace. A knockout has been provided in the furnace side casing for the drain hose to exit. The connection change can be accomplished as follows. Refer to Figure 16 for a depiction of a properly completed relocation.

- a) Locate and disconnect the drain hose from the standard connection location at the collector box.
  - b) Locate and uncap the drain at the bottom (with the furnace lying on a side) of the collector box.
  - c) Connect the drain hose from Step (a) to the uncapped bottom drain from Step (b).
  - d) Close off the previous drain connection from Step (a) with the cap removed in Step (b).
3. Attach one (1) drain hose (a length of 11/16 inch O.D. clear, colorless tubing) to the front connection (on the model series CHB1) or the bottom connection (on the model series CDB1) of the condensing coil cover plate.

Insert the snap-in-place plastic bushing, provided in the furnace parts package, into the proper hole in the furnace casing to prevent cuts in the drain tubing. Route the drain tubing through the bushing. When making connections with the clear tubing, carefully route the tubing in a manner to prevent kinking or abrasion of the tubing.

Slip the free end of the drain hose over the hose barb on one (1) side of the plastic hose barb tee provided in the CPVC (chlorinated polyvinyl chloride) thermoplastic condensate trap assembly. Secure the drain hose with the spring-type hose clamp provided in the parts package.

4. Trial fit the second drain hose (a length of 11/16 inch O.D. clear, colorless tubing provided in the furnace parts package) from the hose barb on the bottom of the PVC exhaust vent drain tee to the plastic hose barb tee provided in the condensate trap assembly. Make sure the hose is long enough not to kink or be otherwise restricted once installed. Mark the minimum length of drain hose required for the application. Remove any extra length from the drain hose. Attach the drain hose to the hose barb on the other side of the condensate trap tee. Slip the other end of the drain hose on to the hose barb of the PVC drain tee assembly; refer to Figure 15 for an illustration. Use the spring-type hose clamp(s) provided in the parts package to secure all connections.
5. Plan, source, and install a condensate drain line using 1/2 inch diameter CPVC (chlorinated polyvinyl chloride) thermoplastic pipe and pipefittings. Route the line in the shortest possible manner to reach a nearby drain. Secure all joints using CPVC cement. For gravity drainage, the condensate drain line must maintain a minimum 1/4 inch per foot downward slope toward the drain. The drain line must be watertight, supported, and secured such that it cannot be easily moved.

**NOTICE:** If an air conditioning condensate drain line is combined with the furnace condensate drain line, the air conditioning evaporator coil must have a separate trap installed ahead of the connection joint.

## All installations and services must be performed by qualified service personnel.

6. A condensate pump may be required when,
  - a suitable drain is not present,
  - the drain is above the trap outlet level on the furnace, or
  - the drain line cannot be sloped downward its full length to the drain.

If gravity drainage of the condensate from the furnace to a drain is impractical for any of these reasons, a condensate pump (part # 350225) is available from Thermo Products. Follow the pump manufacturer's instructions for proper installation.

7. **CAUTION: Continual exposure to condensate may injure plants and damage certain building materials, including many metals, wood, stone, and concrete.**

Flue gas condensate is slightly acidic with a pH of about 3.5. (A pH level of 7.0 is considered neutral. Carbonated cola drinks with a pH of 3.1 are actually slightly more acidic than condensate.) If local codes require an acid neutralizing kit, a kit is available from Thermo Products under part no. 320095. Follow the instructions enclosed with the neutralizing kit for proper installation.

8. The condensate piping in the furnace and the drain system should be flushed out at the start of every heating season. This will ensure trouble free operation and will keep the acidity level well above a pH of 3.4, i.e. more towards neutral.

To flush the condensate drain system, follow these steps.

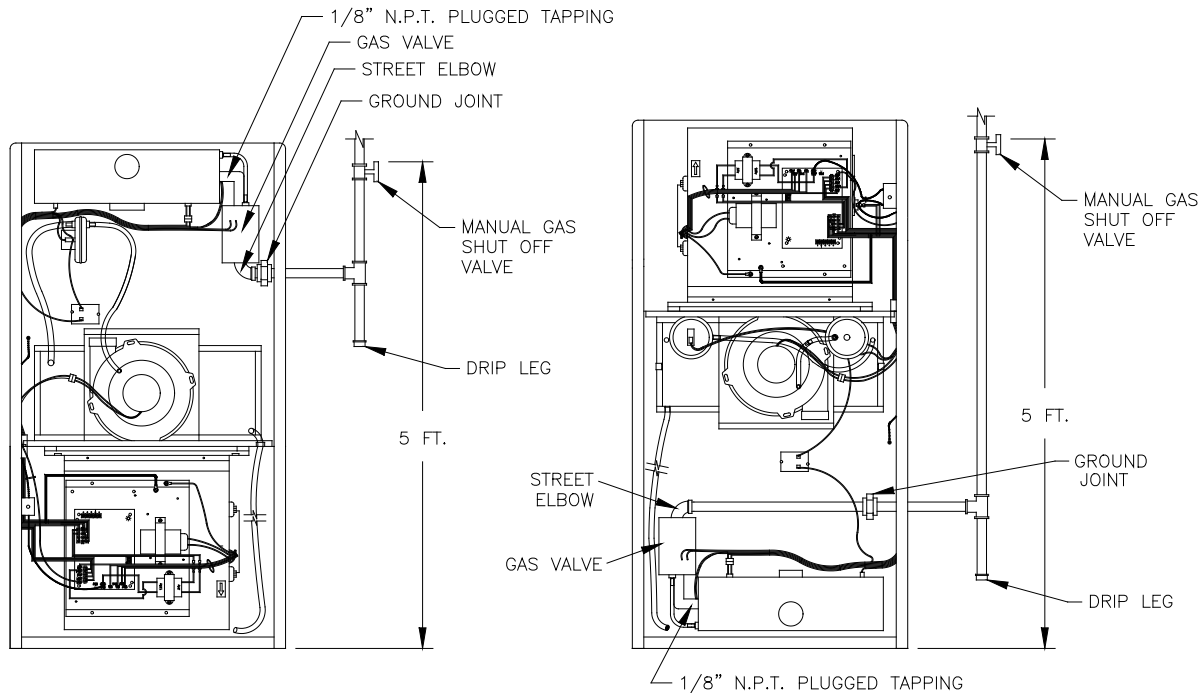
- a. Turn off electrical power to the furnace at the disconnecting switch and adjust the room thermostat to "OFF", or to the lowest temperature setting.
- b. Flush the drain system by removing the drain hose from the secondary heat exchanger coil drain nipple and running tap water into the open end of the tubing. Run at least a quart of water through the drain system or more, until the water leaving the drain system is clear and colorless in color and free of any particulate matter.
- c. Replace the drain tubing by pushing it firmly onto the nipple. Make sure the spring-type hose clamp is returned to the original position to prevent leaks.
- d. If any of the electrical controls are inadvertently wetted during the flushing process, dry them with a soft cloth and wait 24 hours before operating the furnace.
- e. Adjust the room thermostat to the "HEAT" position, or to the desired temperature, and restore electrical power to the furnace.

## J. GENERAL GAS PIPING

**⚠WARNING:** *Because of the potential of odorant fade, a gas leak may not be detected by smell. If this furnace is installed below grade, contact your gas supplier for a gas detector.*

1. Left and right gas supply piping - These furnaces are set-up to be gas piped through either the left or right side by using a street elbow and a straight pipe. For the purposes of service, it is recommended that the gas union be located inside the furnace, when possible.

**All installations and services must be performed by qualified service personnel.**



**Figure 18**

2. A drip leg must be used on both LP and natural gas installations prior to the furnace in order to trap oil, condensate and other impurities which might otherwise lodge in the gas valve or plug the burner orifice. A drip leg shall be provided at the outlet of the gas meter when there is excessive condensation between the gas meter and the furnace. Failure to install a drip leg may void the limited warranty on the furnace.

**⚠WARNING:** All gas piping must be leak tested using a soap and water solution (when the gas is turned on) following the procedure outlined in Section III, J, of this manual. A final test for gas leakage must be made after purging the gas line (refer to Section IV, B, of this manual). This test must be conducted with the unit operating and should include the furnace piping and gas valve. Never use an open flame to check for a gas leak.

**⚠CAUTION:** Care must be taken not to wet electronic components during leak test. Wetting the primary ignition module may damage its circuitry and cause a hazardous situation. Dry moisture from all leads and terminals if wetting occurs. Wait at least 24 hours for the circuit to fully dry before energizing the burner circuit.

## **J1. REQUIREMENTS AND SIZING OF DUCT WORK**

The duct system must be sized and installed by a qualified installer or service person, following the design standards of the Air Conditioning Contractors of America (ACCA) or ASHRAE.

1. When it is located in the same room as the furnace, a return air register must be installed a minimum of 20 feet away from the furnace.
2. The return air duct shall also be sealed to the furnace and also terminate outside of the furnace space, if supply ducts carry circulated air to areas outside the space containing the furnace.
3. The return air duct system must equal the supply air duct system in its capabilities. Use a supplier's catalog for proper sizing of outlet and return air registers and grills to ensure that they meet the CFM requirements of the run to which they are connected.



**All installations and services must be performed by qualified service personnel.**

4. If the furnace is used in connection with an air conditioning evaporator coil, the furnace must be installed parallel with or on the upstream side of the coil, to prevent condensation in the heat exchanger. If the evaporator coil is installed with a parallel flow arrangement, dampers or other means to control flow of air should be installed to prevent chilled air from entering the furnace. If such a device is manually operated, it must be equipped with a means to prevent operation of either the furnace or air conditioner unless it is in the full heat or cool position.

We recommend that the outlet duct be equipped with a removable access panel to allow for visual inspection of the heat exchanger to check for leakage or to allow for insertion of a probe sampler in the air stream. This removable access cover should be attached to ensure there is no air leakage.

5. The duct system shall be sized for the maximum CFM requirement of the installation whether it is for heating or cooling. Two common rules for heating and cooling follow:

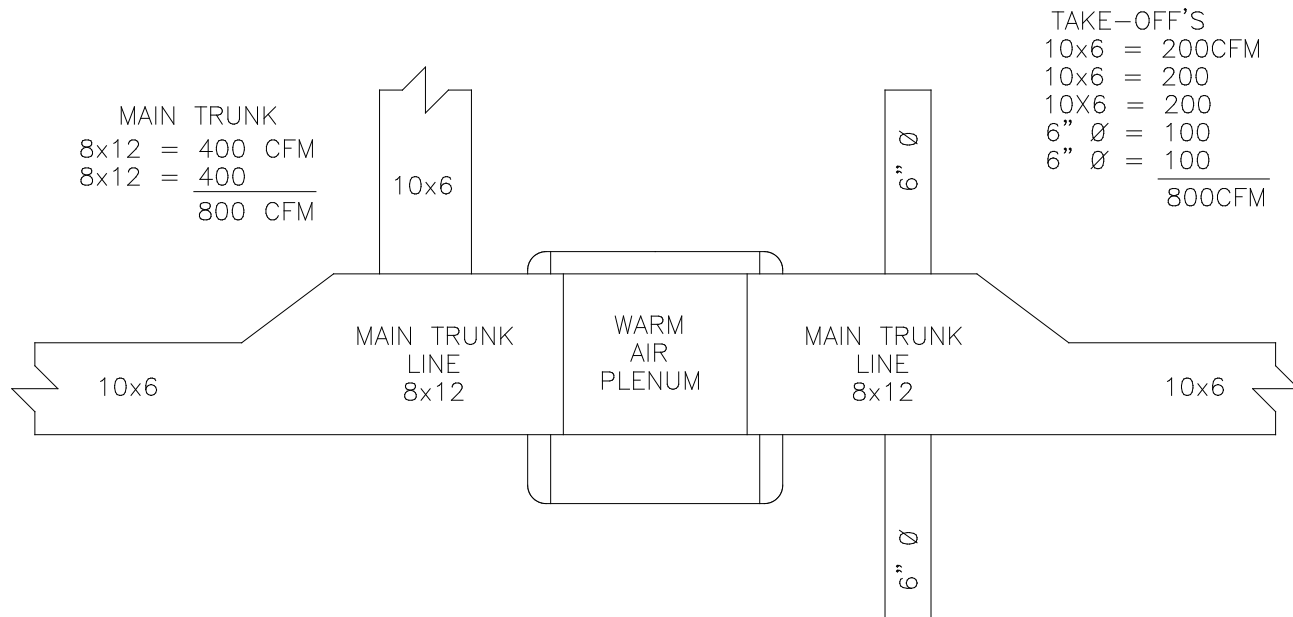
A. 400 CFM (1200 BTU's) per ton of cooling is required.

B. 14 CFM of heating per 1000 BTU's of furnace output based on its steady state efficiency and a 55° to 85° temperature rise.

**EXAMPLE:** Heating output of a furnace is 100,000 BTU/HR

$$\frac{100,000 \text{ BTU} \times 14 \text{ cfm}}{1000 \text{ BTU}} = 1400 \text{ CFM}$$

Air conditioning installed is 4 tons x 400 CFM = 1600 CFM or 48,000 BTU's. NOTE: The duct system must be sized for the larger CFM requirement for cooling. If only 3 tons 36,000 BTUs of cooling x 400 CFM = 1200 CFM was installed, the duct would have to be sized for the 1400 Cfm heating requirement.



**Figure 18A**

All trunk lines, take-offs, registers and grill-free areas must be figured when determining the air handling capacity of a duct system. One can obtain the necessary duct system size by utilizing the chart below. (For example, see Figure 18A.) Use a supplier's catalog for proper sizing of outlet and return air registers to insure that the register will meet the CFM requirements of the run to which it is connected.

The main trunk lines, take offs, registers and grills of the supply return air duct system must have an adequate square inch area to move the desired CFM in order to achieve proper movement. The following chart shows the CFM air handling capability based on a 0.1" SP loss in the supply duct system. The total external static pressure should not exceed .2 inches water column.

**All installations and services must be performed by qualified service personnel.**

**DUCT SIZES FOR HOMES, QUIET OFFICES, OR SIMILAR INSTALLATIONS**

CFM	DIA.	SQ.”	RECTANGULAR DUCT DIMENSIONS ... INCHES							
45	4	12.5								
65	5	19.6								
100	6	28							6x6	9x4
150	7	38							8x6	12x4
200	8	50							10x6	14x4
250	9	63						8x8	12x6	18x4
300	9	63						10x8	14x6	20x4
400	10	78						12x8	16x6	25x4
500	12	113					10x10	14x8	19x6	30x4
600	12	113					12x10	16x8	22x6	38x4
700	12	113					14x10	18x8	26x6	
800	14	154				12x12	15x10	20x8	28x6	
900	14	154				14x12	17x10	22x8	32x6	
1000	16	201				15x12	18x10	24x8	34x6	
1100	16	201			14x14	16x12	20x10	26x8	40x6	
1200	16	201			15x14	17x12	22x10	28x8	42x6	
1300	16	201			16x14	18x12	22x10	30x8	46x6	
1400	18	255			16x14	19x12	24x10	32x8	48x6	
1500	18	255			17x14	20x12	26x10	34x8	50x6	
1600	18	255		16x16	18x14	22x12	26x10	36x8	54x6	
1700	18	255		17x16	20x14	22x12	28x10	38x8	58x6	
1800	18	255		18x16	20x14	24x12	30x10	40x8	62x6	
1900	20	314		18x16	22x14	26x12	32x10	44x8	64x6	
2000	20	314		20x16	22x14	26x12	34x10	46x8		
2200	20	314	18x18	20x16	24x16	28x12	36x10	48x8		

**TABLE 2A**

Each of the system components (trunk lines, take offs, runs and register and grill-free areas) must be properly sized and matched together to ensure the necessary air handling capacity of a duct system. A 12" x 8" duct with a 400 CFM capacity for example will not flow 400 CFM if the register(s) to which it connects only flow a total of 200 CFM.

The speed of the blower motor may have to be changed to obtain the proper 55°F to 85°F (35°F to 65°F CHB1-75) temperature rise for heating when an air conditioning coil is installed. This depends on the static resistance of an individual duct system and the size of the air conditioner.

**All installations and services must be performed by qualified service personnel.**

## **K. FILTERS**

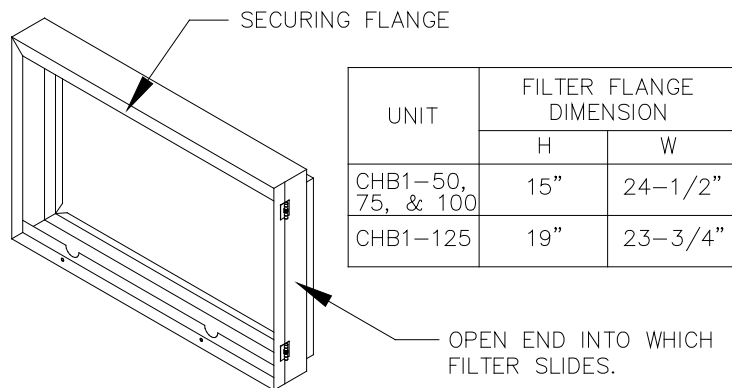
### **1. CHB1 MODELS: HIGHBOYS**

It is necessary to cut the return air opening in the bottom or side casing depending upon the needs of the specific installation.

**NOTICE:** If your CHB1 will require air delivery above 1800 CFM, it is advisable that both sides, a combination of 1 side and the bottom, or the bottom only be used for return air. (If a return is cut in the bottom, it should be as large as the return opening in the equivalent CDB1 model. (See specification sheet in beginning of this manual).

This CHB1 furnace has been factory supplied with a high quality re-usable filter rated for air velocities up to 600 ft/min. An optional Thermo Products filter rack assembly (part no. AOPS7547 for CHB1-50 thru 100 and AOPS7375 for CHB1-125) is available which is sized for the filter provided.

If an optional Thermo Pride filter rack AOPS7547 (figure 19) is used with the furnace, it will serve as a template to scribe a mark for the return air opening on the casing. Place the filter rack on the casing one inch up from the bottom of the furnace and centered from side to side. Place the securing flange against the casing for locating the return air opening.



**Figure 19**

**PLEASE NOTE:** While scribing the return air opening, the filter rack can be held into position by tape or similar means.

Position the open end of the filter rack so that it is accessible for filter replacement. Once the filter rack is positioned correctly, scribe a line along the inside of the securing flange of the filter rack on three of the sides. To scribe a line on the fourth side, on the open end, use the open end support for a guide.

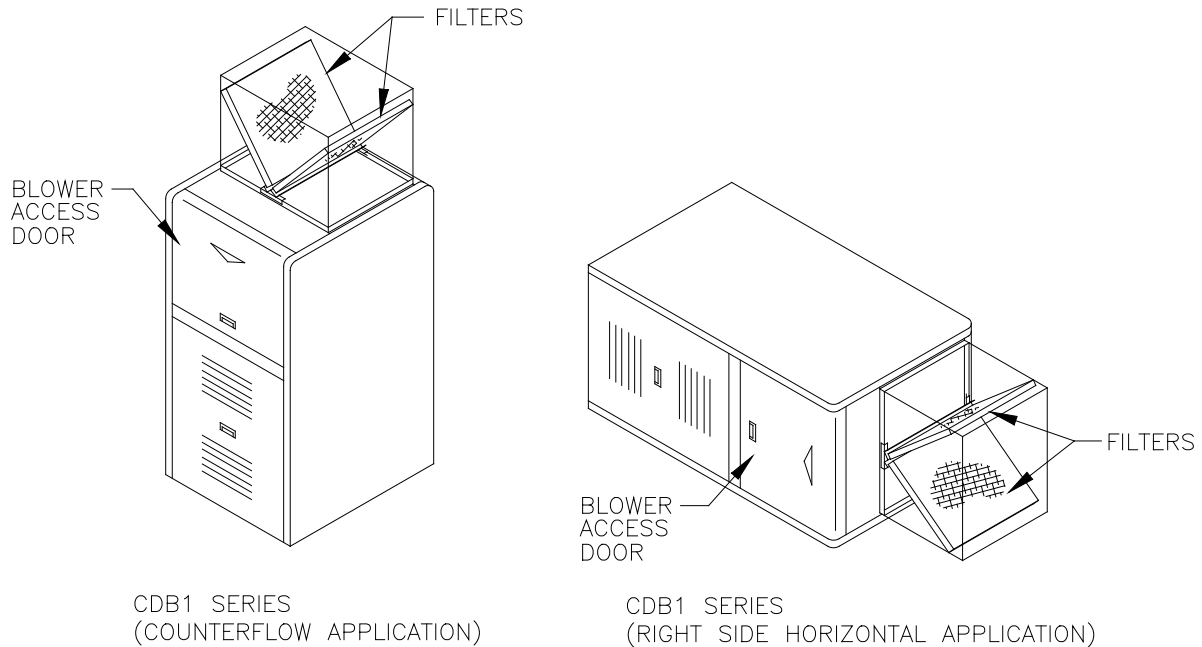
Remove the filter rack and cut the return air opening in the casing. Now the filter rack can be permanently attached to the furnace with screws or pop-rivets along the securing flange.

Connect the return plenum to the filter rack and slide the filter into place.

### **2. CDB1 MODELS: COUNTERFLOWS**

This CDB1 furnace has been factory supplied with two high quality reusable filters rated at 600 ft/min. These filters are designed to be mounted on the return air plenum opening on the top of the furnace in the double "vee" style rack provided (see Figure 20). If feasible, it is recommended that slits be cut in the return front to allow for easier access of the filters.

**All installations and services must be performed by qualified service personnel.**



**Figure 20**

**3. USE OF NON-THERMO PRIDE FILTER RETENTION MEANS**

If a method other than the Thermo Pride filter rack is selected for retention of the filter and/or use of a different filter type is desired, see Table 3 for minimum size guidelines for selecting a filter system for the CHB1 or CDB1 furnaces.

**MINIMUM FILTER AREA REQUIRED (LENGTH X WIDTH, SQ. IN.)**

**TABLE 3**

FILTER TYPE	MAXIMUM RATE AIR VELOCITY	REQUIRED CFM/(FILTER VELOCITY RATING X 144)= FILTER (IN <sup>2</sup> )			
		FURNACE MODEL			
		CHB1,CDB1-50	CHB1,CDB1-75	CHB1,CDB1-100	CHB1,CDB1-125
*THERMO PRODUCTS SUPPLIED PERMANENT FILTER	600 FT./MIN.	172 IN. <sup>2*</sup>	254 IN. <sup>2*</sup>	328 IN. <sup>2*</sup>	402 IN. <sup>2*</sup>
STANDARD PERMANENT FILTER	500 FT./MIN.	208 IN. <sup>2</sup>	304 IN. <sup>2</sup>	394 IN. <sup>2</sup>	484 IN. <sup>2</sup>
DISPOSABLE TYPE FILTER	300 FT./MIN.	344 IN. <sup>2</sup>	506 IN. <sup>2</sup>	656 IN. <sup>2</sup>	804 IN. <sup>2</sup>

\* The Thermo Products supplied filter can be cut to size to fit other filter retention systems as long as the minimum size requirement is met. NOTICE: Any internal stiffeners used in the filter must not be removed, although they can be cut to size as needed.

**NOTICE:** The filter areas in table 3 are the **minimum** areas required based on the CFM generated by the furnace for standard heating speeds only. The following formula can be used to determine the minimum filter area required for cooling if the unit is equipped with cooling. This value should then be compared to the value shown in table 3 and the larger of the two should then be used for determining the minimum filter area required for that installation.

## All installations and services must be performed by qualified service personnel.

FORMULA:

$$\frac{(\text{tons of cooling}) \times (400 \text{ CFM per ton}) (144 \text{ square inches per foot})}{(\text{max. air velocity of filter from table 3 for the filter type})} = \text{filter area sq.inches}$$

= length x width of  
filter in inches

EXAMPLE: If you had a CHB1-100 furnace and 4 tons of cooling and a standard permanent filter.

$$\frac{4 \text{ tons} \times 400 \text{ CFM} \times 144}{500} = 460 \text{ square inches for cooling}$$

For heating a CHB1-100 needs 394 square inches of filter. The filter system must be designed for the larger CFM requirement determined for cooling of 460 square inches. A filter would have to be sized so that the area (length X width) was at least 460 sq. in.

### L. WIRING

All wiring shall be performed by a qualified electrician or service person. The wiring must comply with local codes, the instructions in this manual, and in the absence of codes with the National Electrical Code (ANSI/NFPA-70 or latest edition).

1. The following items are guidelines to complete the wiring portion of the installations.
  - a. A separate power supply circuit with over current protection and a disconnect switch must be provided. See furnace specifications or furnace rating label for maximum fuse size.
  - b. All CHB1 and CDB1 Series furnaces are supplied with a fuse disconnect switch box to be mounted on the outside surface of the right or left side casing so a fuse disconnect can be mounted on the furnace. Make the 115 volt supply connection in this junction box. A green screw and a strain relief are provided in order to connect the power supply ground wire and provide strain relief for the 115 volt power leads from the furnace in the fuse disconnect box. A disconnect switch can be field mounted on the 2x4 box provided. If not, the disconnect switch must be located reasonably close to and within sight of the furnace.

**NOTICE:** The hot surface igniter and operation of this furnace depends on correct polarity. The hot leg of the supply circuit must be connected to the **black** line lead and the common leg to the white line lead in the field mounted junction box. The hot leg must pass through the disconnect switch in all cases to prevent the hazard of electrical shock when servicing.

**IMPORTANT:** The furnace must be grounded in accordance with local codes and with the National Electrical Code (ANSI/NFPA NO. 70 or latest edition) when an external electrical source is utilized.

### 2. ELECTRONIC AIR CLEANER (EAC) AND HUMIDIFIER INSTALLATION

The ignition module on this furnace has designated terminals to control the operation of an electronic air cleaner and/or humidifier. These terminals provide line voltage (110-20VAC) for the control of these accessories. (See Figure 21). **NOTICE:** It is important to confirm that the operating voltage of the humidifier or EAC being installed matches the output of this control. If not, a field supplied relay or transformer may be necessary to provide the proper control and supply voltage for the accessory being installed. See the manufacturers instructions for the humidifier or EAC for additional instructions.

### 3. THERMOSTAT ANTICIPATOR SETTING

Proper control of the indoor temperature can only be achieved if the thermostat is calibrated to the heating and/or cooling cycle. A vital consideration of this calibration is related to the thermostat heat anticipator.

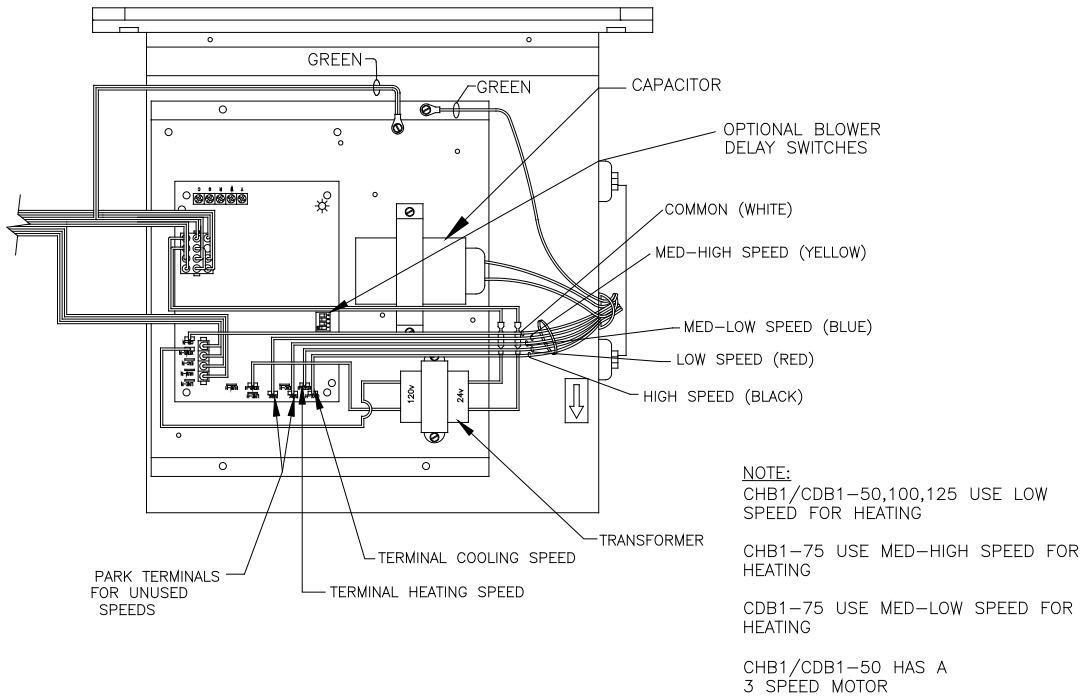
The proper thermostat heat anticipator setting is 0.8 AMPS for furnace operation only. To increase length of cycle, increase setting of heat scale; to decrease length of cycle, decrease setting of heat scale.

Anticipators for the cooling operation are generally pre-set by the thermostat manufacturer and require no adjustment.

**All installations and services must be performed by qualified service personnel.**

Anticipators for the heating operation are of two types, pre-set and adjustable. Those that are pre-set will not have an adjustment scale and are generally marked accordingly.

#### 4. BLOWER MOTOR SPEED WIRING



**Figure 21**

**⚠WARNING:** *TURN OFF THE ELECTRICAL POWER to the furnace before attempting to change blower speed wiring.*

- A. The furnace is factory wired to the ignition control with standard heating and cooling speeds. When changing motor speeds, simply switch the needed speed to either the heating or cooling terminal as applicable on the module to obtain the desired CFM. The unused speeds should then be reconnected to the module in the “park” positions.
- B. The optional blower delay switches on the W/R integrated control (figure 21) are used to determine the length of the heat delay-to-fan-on and delay -to-fan-off periods. The following tables show the time periods that will result from the various switch positions.

**All installations and services must be performed by qualified service personnel.**

**BLOWER DELAY SETTINGS**

<b>To delay fan turn-on by:</b>	<b>Set Switch</b>	
	<b>#1</b>	<b>#2</b>
15 sec.	Off	Off
30 sec.	Off	On
*45 sec.	On	Off
60 sec.	On	On

<b>To delay fan turn-off by:</b>	<b>Set Switch</b>	
	<b>#3</b>	<b>#4</b>
60 sec.	On	On
90 sec.	Off	On
*120 sec.	On	Off
180 sec.	Off	Off

\*Factory Settings For Optimal Performance

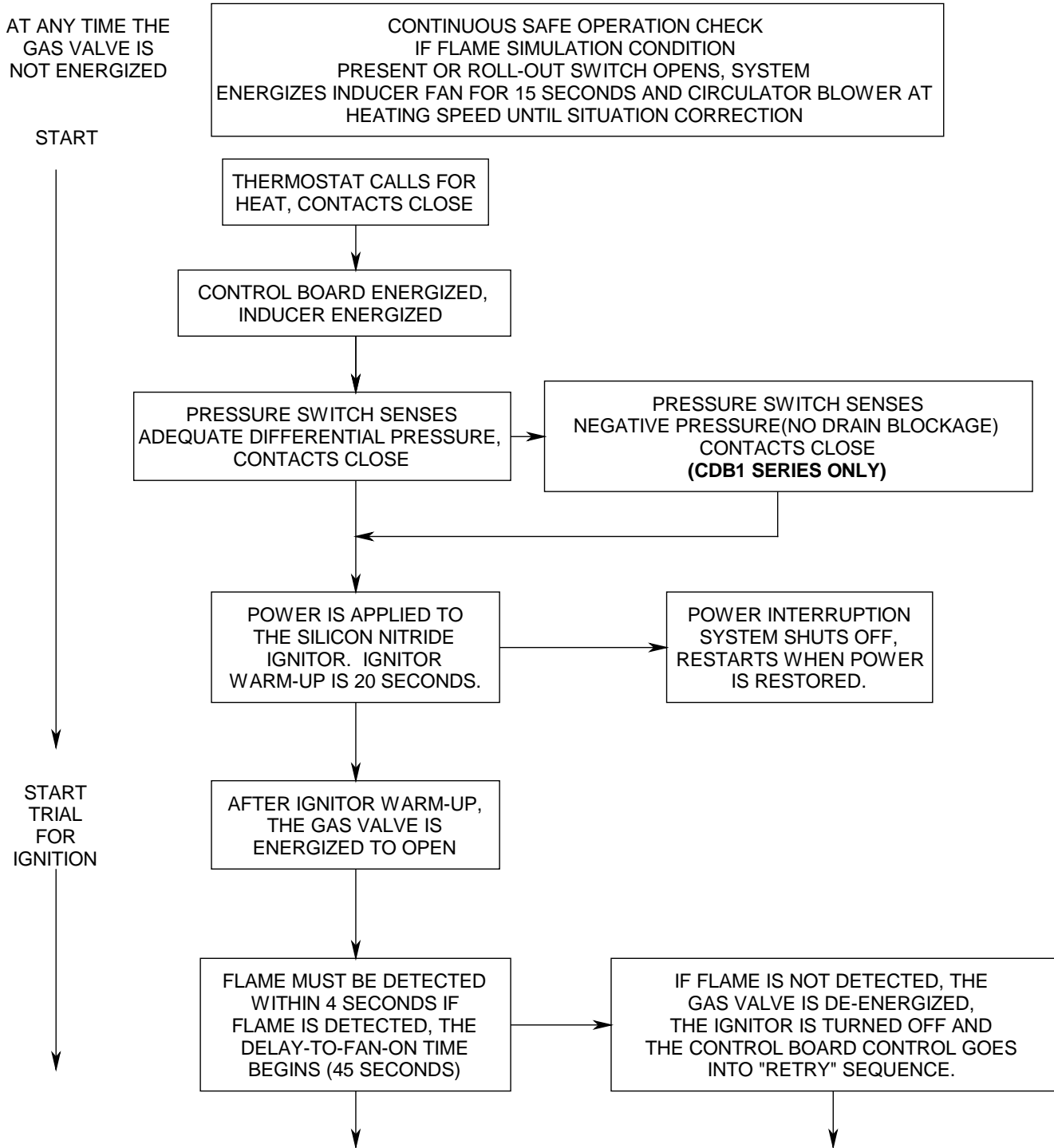
**5. FIELD WIRING AND REPLACING WIRING**

Field wiring between the furnace and devices not attached to the furnace shall conform with the temperature limitation for Type T wire [63°F rise (35°C)] when installed with the manufacturers instructions. If any of the original factory supplied furnace wiring is replaced or a separate device other than the thermostat is wired internal to the unit 105°C thermoplastic or equivalent wire must be used.

**All installations and services must be performed by qualified service personnel.**

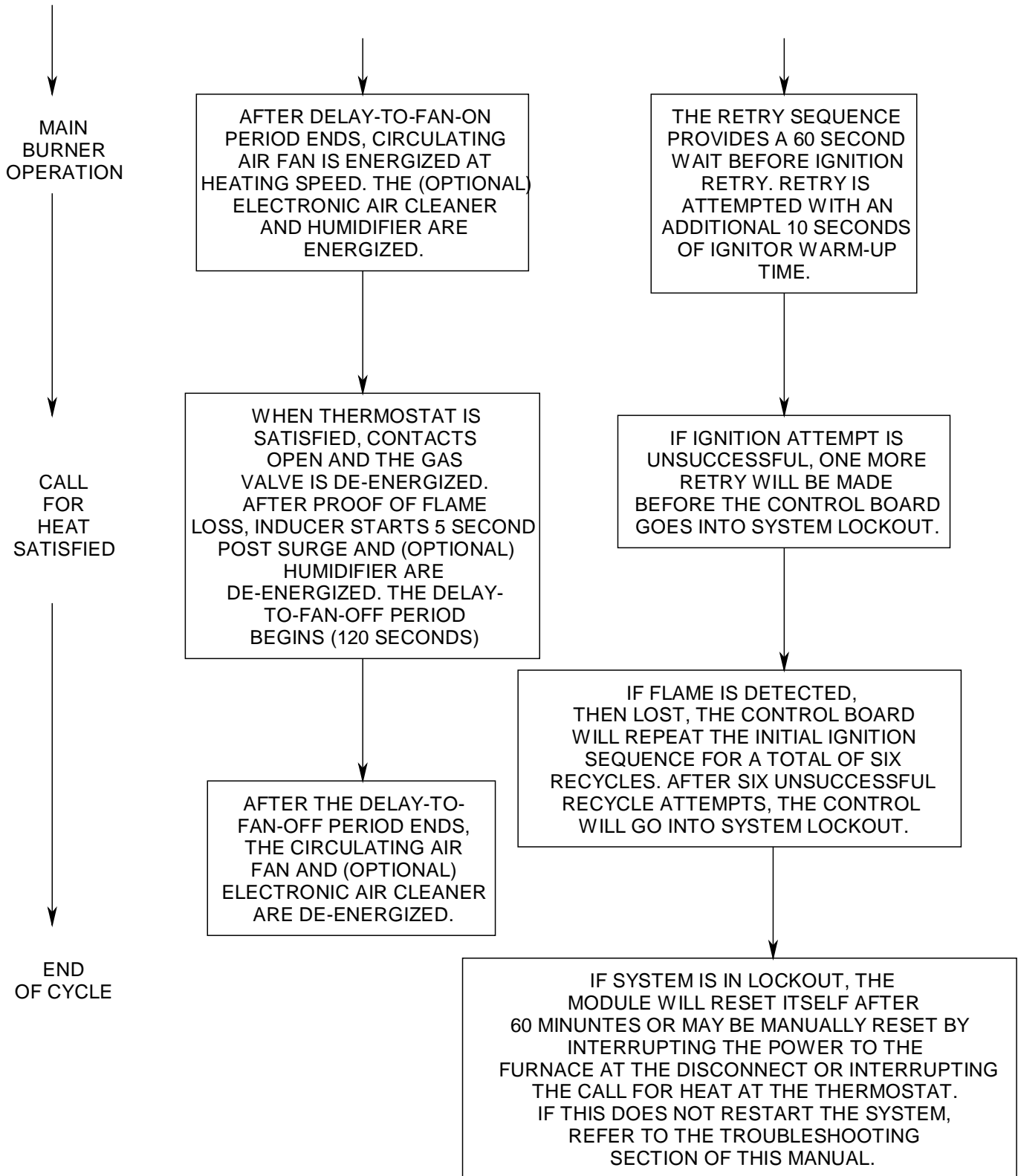
IV. STARTING THE UNIT

A. SEQUENCE OF OPERATIONS





**All installations and services must be performed by qualified service personnel.**



## All installations and services must be performed by qualified service personnel.

### B. INITIAL START UP:

This furnace does not have a pilot. It is equipped with a hot surface igniter, which automatically lights the burner. Do not attempt to light the burner by hand. Check the following items before the initial start-up.

1. Check all wiring for loose connections and proper hook up.
2. Leak test gas piping connections.
3. Check all tubing to the pressure switch and drains to make sure they are connected firmly at all their connection points.
4. Check flue pipe, combustion air inlet and all PVC connections for tightness and to make sure there is no blockage.
5. Make sure air filter is in place.
6. Make sure the outside vent and air intakes are installed according to instructions and that they are free from blockage.
7. Make sure that the drain trap is properly connected to the furnace and to the buildings drain system.

### OPERATING INSTRUCTIONS:

**⚠WARNING:** *Turn off power to furnace before it is placed into service. The gas piping system must have been leak tested by a qualified heating contractor. (See Section III, J, of these instructions on the installation of gas piping).*

**⚠WARNING:** *It may be necessary to purge the air out of the gas line for initial start-up of the furnace after installation. This should be done by a qualified heating contractor. If excessive gas escapes when purging the gas supply at the union, allow the area to ventilate for at least 15 minutes before attempting to start the furnace. LP gas is especially dangerous because the specific gravity of LP gas allows it to accumulate at floor level at a dangerous concentration. For remainder of operating instructions, reference Users Information Manual.*

**⚠WARNING:** *Heat exchanger oil will burn off on initial firing creating an unpleasant odor. To prevent this odor from occurring more than once, it is suggested that:*

1. *A window(s) be opened.*
2. *The thermostat be set at highest setting.*
3. *The furnace remain running at conditions 1&2 for 30 minutes or until odor has dissipated.*

### C. ADJUSTMENT OF BTU INPUT RATE

The Orifice for this furnace was sized: 1) for natural gas having a heating value of 1025 BTU per cubic foot and a specific gravity of .65, or 2) for liquefied propane gas with a heating value of 2500 BTU per cubic foot and a specific gravity of 1.55. The information plate inside the furnace vestibule will specify which gas your furnace is orificed for. If the furnace is installed at an altitude that is more than 2,000 feet above sea level, it is mandatory that the input to the burner be reduced 4.0% for every 1,000 feet that it is above sea level. If the furnace is installed at an elevation of 5,000 feet, its input must be reduced 20.0%. Example: a furnace rated at 100,000 BTU at sea level must be reduced to a firing rate of 80,000 ( $100,000 \times .80 = 80,000$ ) at an elevation of 5,000 feet. If the furnace is installed at an elevation of 2,000 feet or less, no reduction in input is required. Your gas supplier will supply you with the correct orifice sizing information.

To check the input of your natural gas furnace, allow the unit to operate for 10 to 15 minutes and proceed as follows:

- a. Call your gas supplier and ask for the BTU content (heating value) of one cubic foot of the gas, supplied to the installation area. An alternate approach is to assume a value of 1025 BTU/Cu Ft, which is the national average.
- b. With all other gas appliances turned off and using a stopwatch, clock the time required for the (small) dial on the gas meter to make one full revolution. The meter will state how many cubic feet is flowed for one revolution usually one, two or five. The unit must have been in operation at least 10 minutes before clocking.

**All installations and services must be performed by qualified service personnel.**

FORMULA: BTU/CU FT X NUMBER OF CU FT X 3600 SECONDS = INPUT BTU/HR

EAMPLE: 1025 BTU/CU FT X 2 CU FT X 3600 = 98,633 BTU INPUT 74.8 SECONDS

Check for the model number of this furnace, its input, the type of gas and the manifold pressure on the information plate located on the vestibule panel behind the upper front panel. If using the above example, the furnace was a CHB-100 model and the 98,663 BTUinput would be acceptable because it was within 2% of the listed input of 100,000.

Make sure that the gas supply pressure to the furnace falls within the maximum range of 4 1/2" to 14" wc pressure on natural gas and 11.0" to 14.0" w.c. on Propane gas. The pressure to the furnace must be checked while the furnace burner and any other gas appliances on the same supply system are operating, using the 1/8" in. plugged tap shown in Section III, J, Fig. 18 of this manual.

**GAS PRESSURE CHART FOR ALL CHB1 MODEL FURNACES**  
**TABLE 4**

	SUPPLY PRESURE	MANIFOLD PRESSURE
NAT	MAX 14" WC MIN 4.5" WC	3.5" ±.3" WC
LP	MAX 14" WC MIN 11" WC	10.0" ± .3" WC

This gas furnace is equipped with a fixed orifice sized for the manifold pressure shown on the information plate. The input can only be increased or decreased by adjusting the manifold pressure. Remove the 1/8" threaded pipe plug located on the top right side of the gas valve.

Use a U tube manometer or pressure gage to measure the pressure. To adjust the pressure, remove the screw from the regulator on the outlet side of the gas valve and using the adjustment allen screw, decrease the pressure by turning the screw counterclockwise or increase it by turning the screw clockwise. ADJUSTMENTS TO THE LISTED PRESSURE MUST NOT EXCEED 0.3" w.c. A 0.3" w.c. Adjustment will increase or decrease the input approximately 4.0%. Replace screw (cap) when adjustment is complete.

The correct input can be assumed if the furnace manifold pressure is the same as that shown on the information label if a gas meter is not available for natural gas or the unit is installed on liquefied petroleum gases which are not metered.

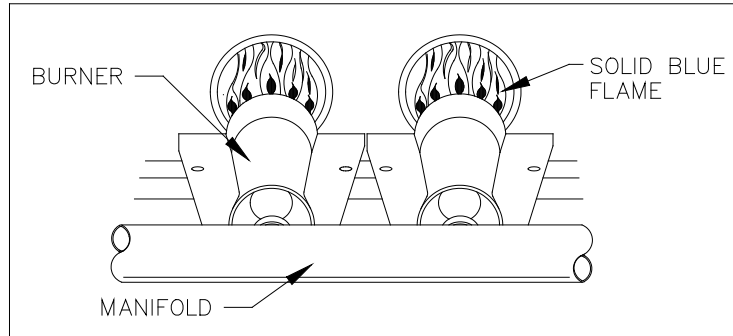
Shut off the gas supply to the furnace. Remove the pressure gage and re-install the pipe plug using a thread compound resistant to the action of Liquefied Petroleum gases.

If the rated input cannot be obtained with the present orifice at the correct pressure, your local gas supplier will assist in sizing the proper orifice. Our Engineering Department will gladly assist in sizing the orifice if you provide them with the heating value in BTU per cubic foot and the specific gravity of the gas.

**D. BURNER ADJUSTMENT**

This unit is designed to not require any burner adjustment. The flames should be checked by looking through the sight glass located on the burner box. Burner flames should be clear, blue and almost transparent in color. (See Figure 23). **NOTE:** It is not unusual to have orangish flames visible in the tube for Propane gas.

**All installations and services must be performed by qualified service personnel.**



**Figure 22**

**⚠CAUTION:** *The CHB1/CDB1 furnace models are an in-shot burner design, which does not require an air shutter adjustment (air shutters are not used) for proper flame characteristics. Burner box access cover must always be secured with all screws in place and tightened before operating furnace.*

### **E. FURNACE CHECKOUT PROCEDURE**

Before any system of gas piping is finally put into service, it shall be carefully tested to assure that it is gas tight as indicated in the manual.

**NOTICE:** All controls on the unit should be checked for proper functioning prior to the qualified service personnel leaving the job site. Specifically the following should be checked:

With furnace in normal heating operation, check to make certain blower will start and stop automatically under control of integrated fan control.

1. Check safety limit control as follows:
  - a. Shut off incoming power.
  - b. Block return air opening or disconnect blower motor leads.
  - c. Restore power to furnace.
  - d. Set thermostat above room temperature calling for heat.
  - e. When temperatures are reached in furnace at limit control setting with blower out of operation, burner should shut off.
  - f. Shut off electrical power.

**IMPORTANT:** Remove blockage or reconnect blower motor and restore power.

2. Make certain thermostat will automatically start and stop furnace.
3. Block the flue pipe outlet gradually with a flat piece of metal, until the pressure switch functions shutting off the main burners.
4. Block the PVC pipe inlet gradually with a flat piece of metal until pressure switch functions shutting off the main burners.

**IMPORTANT:** Remove flue air inlet blockage when done.

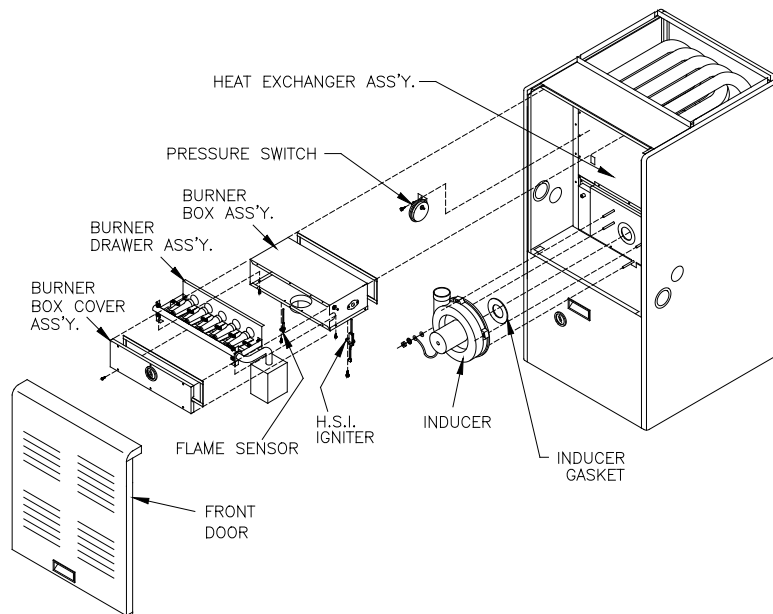
5. Remove the blower compartment access door with the furnace operating. The door interrupt switch is in the 120 volt circuit and will shut down the entire system. Replace the blower door and the furnace start-up cycle will begin.

**All installations and services must be performed by qualified service personnel.**

#### **V. INSTALLER'S INSTRUCTIONS TO USER:**

After completing the installation, the installer shall inform and/or demonstrate to the homeowner:

1. The location of all the instructions in the furnace and that these instructions and the users information manual must be kept along with instructions for any accessories in the plastic pouch on the inside of the furnace.
2. The location and use of the manual gas shut off valve and furnace electrical disconnect switch. Instruct user to always shut off gas before shutting off electric power.
3. The sequence of operation of the furnace.
4. The correct operation and maintenance of the appliance as outlined in the users information manual.
5. That failure to maintain and operate this furnace in accordance with these instructions could result in hazardous conditions, bodily injury, property damage and may void the limited warranty on the furnace.
6. Review with and encourage the user to read the label reproductions and all warnings and instructions outlined on the front cover and in sections I, II and III of this manual and in the Users Information Manual.
7. Recommend that the user have a qualified heating contractor inspect the furnace at the start of each heating season. Inform the user of the frequency of inspection required for each item in Section III of the Users Manual.



**Figure 23**

**All installations and services must be performed by qualified service personnel.**

## VI. TROUBLESHOOTING

**NOTICE:** BEFORE TROUBLESHOOTING, FAMILIARIZE YOURSELF WITH THE START UP AND CHECKOUT PROCEDURE.

ALL INSTALLATION AND SERVICES MUST BE PERFORMED BY QUALIFIED HEATING CONTRACTORS.

To assist you in troubleshooting this furnace, it is equipped with an integrated ignition control with diagnostics. These diagnostics evaluate what control system has experienced a failure and will activate a flashing light on the control in different sequences to help pinpoint the failure which has occurred.

**IMPORTANT:** For your convenience, Thermo Products has installed a sight glass in the blower door of this furnace. The number of flashes in groups should be observed through this sight glass and recorded before turning off power to the furnace. Otherwise power to the furnace will be when turning off power or removing the blower door which is equipped with door interlock switch, which will reset the control. Should this occur, it will be necessary to restart the furnace and have the failure occur again.

### DIAGNOSTIC FEATURES

The 50A65 control continuously monitors its own operation and the operation of the system. If a failure occurs, the LED will indicate a failure code as shown below. **If the failure is internal to the control, the light will stay on continuously. In the case, the entire control should be replaced, as the control is not field-repairable.**

If the sensed failure is in the system (external to the control), the LED will flash in the following flash-pause sequences to indicate failure status (each flash will last approximately 0.25 seconds, and each pause will last approximately 2 seconds).

1 flash, then pause	System lockout
2 flashes, then pause	Pressure switch stuck closed
3 flashes, then pause	Pressure switch stuck open
4 flashes, then pause	Open limit switch or rollout switch
6 flashes, then pause	115 Volt AC power reversed
7 flashes, then pause	Low flame sense signal
8 flashes, then pause	Check ignitor or improper grounding
Continuous flashing (no pause)	Flame has been sensed when no flame should be present (no call for heat)

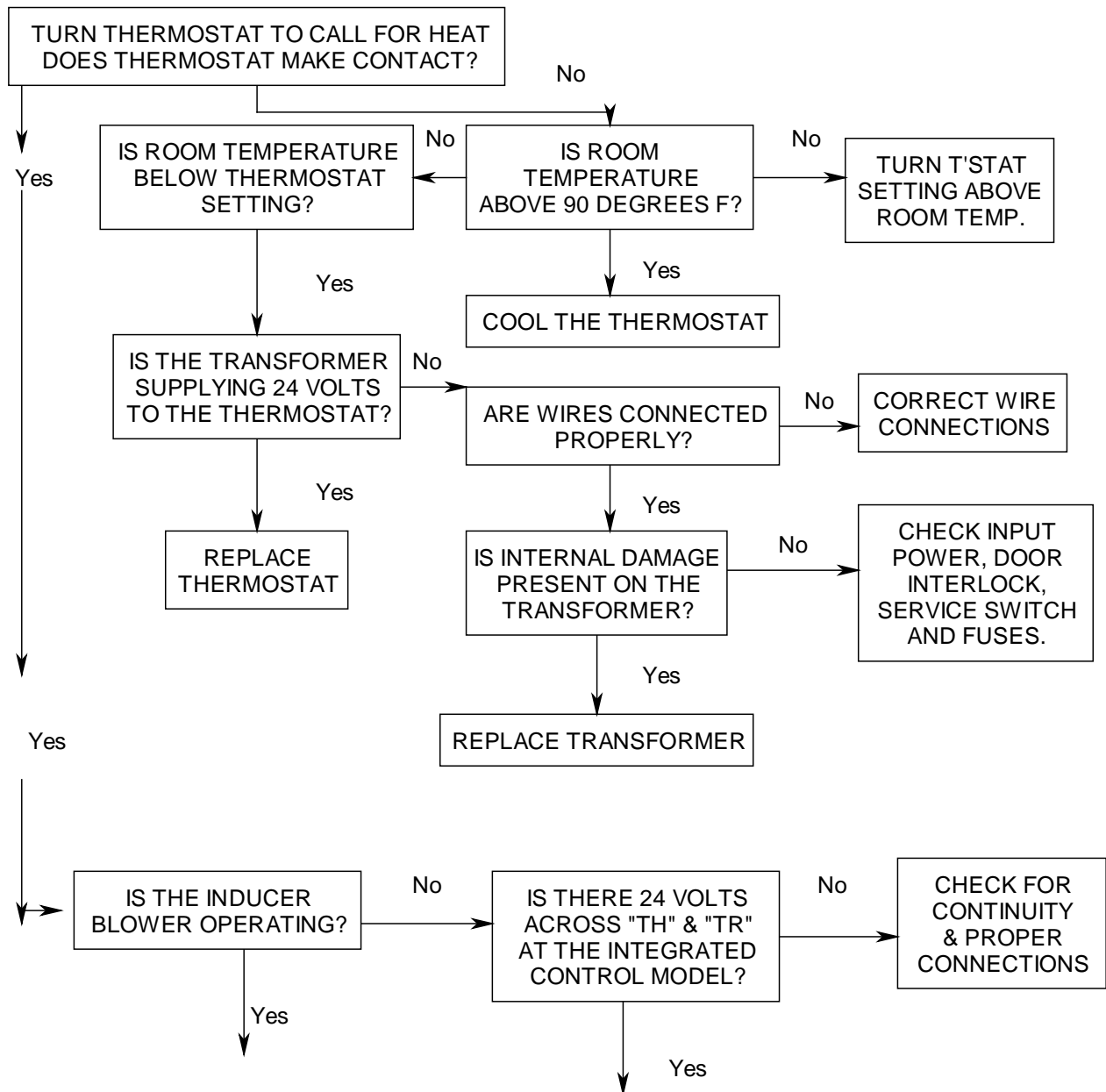
**The LED will also flash once at power-up.**

**⚠WARNING:** *Power must be disconnected before servicing.*

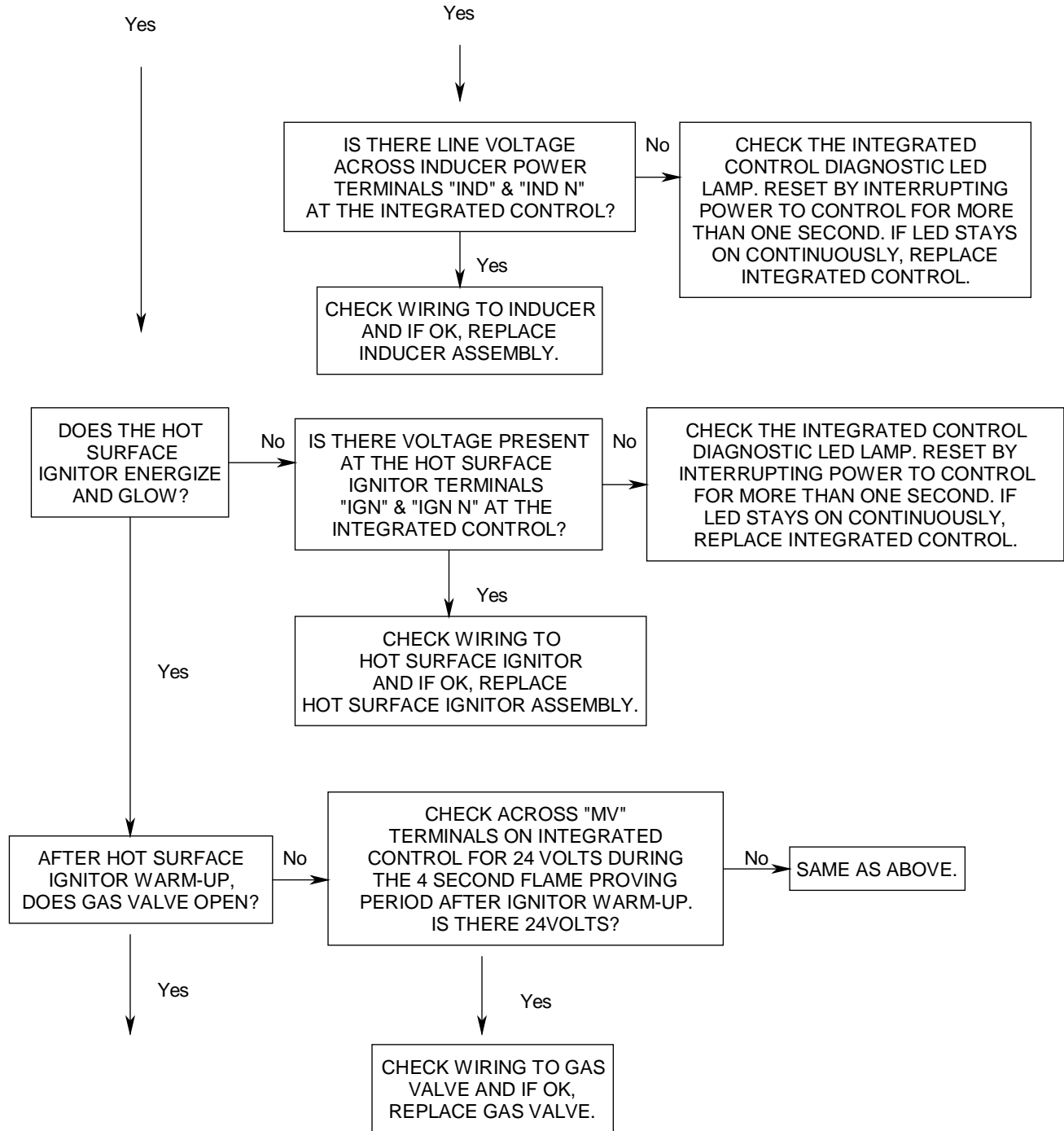
**All installations and services must be performed by qualified service personnel.**

TROUBLESHOOTING GUIDE  
 THE SYSTEM IS STARTED BY SETTING THE THERMOSTAT TO CALL FOR HEAT. THE FOLLOWING SHOULD HELP ESTABLISH THE TYPE OF MALFUNCTION OR DEVIATION FROM THE NORMAL OPERATION.

TO USE THIS DIAGRAM, YOU JUST NEED TO FOLLOW THE INSTRUCTIONS IN THE BOXES.

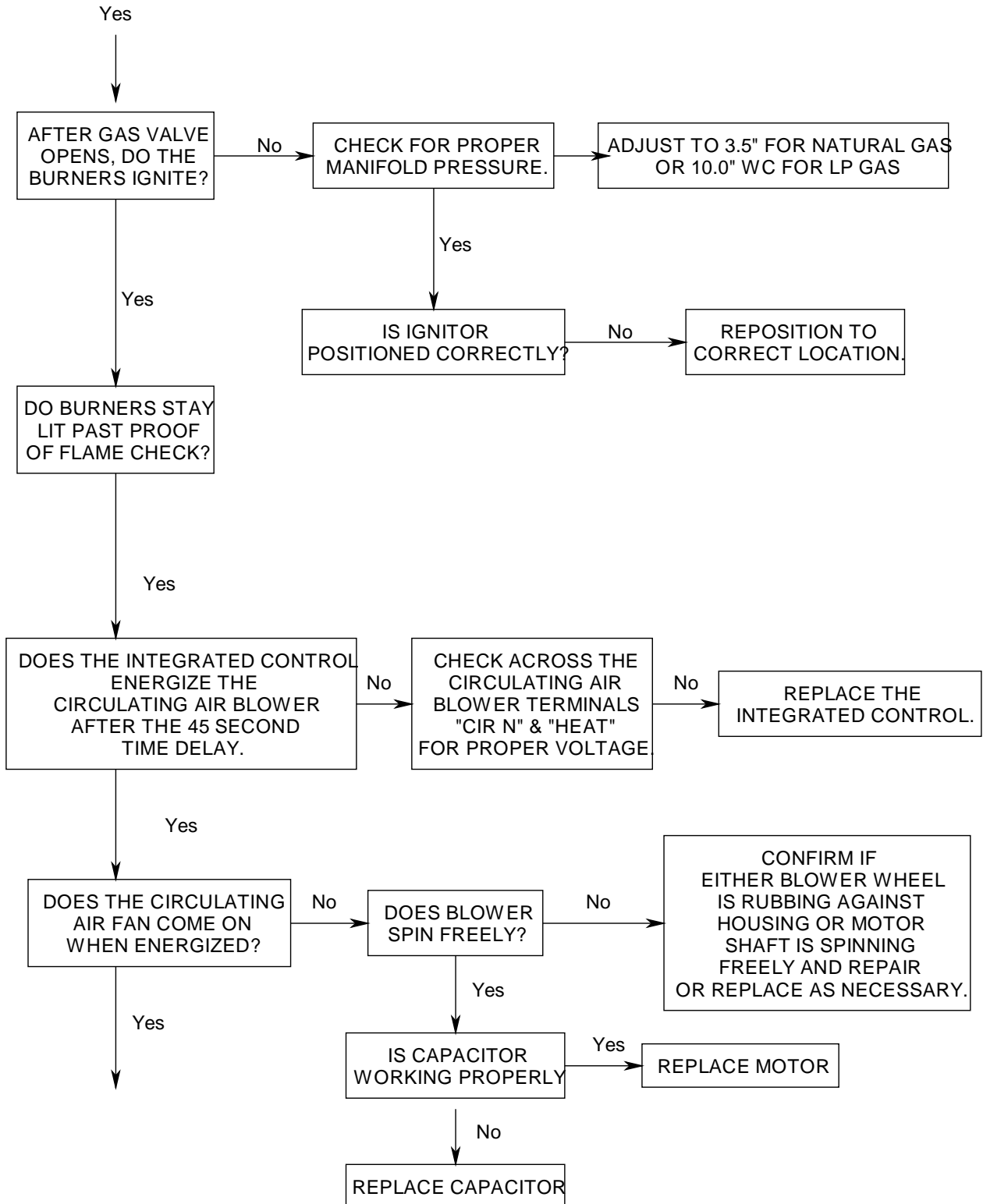


**All installations and services must be performed by qualified service personnel.**

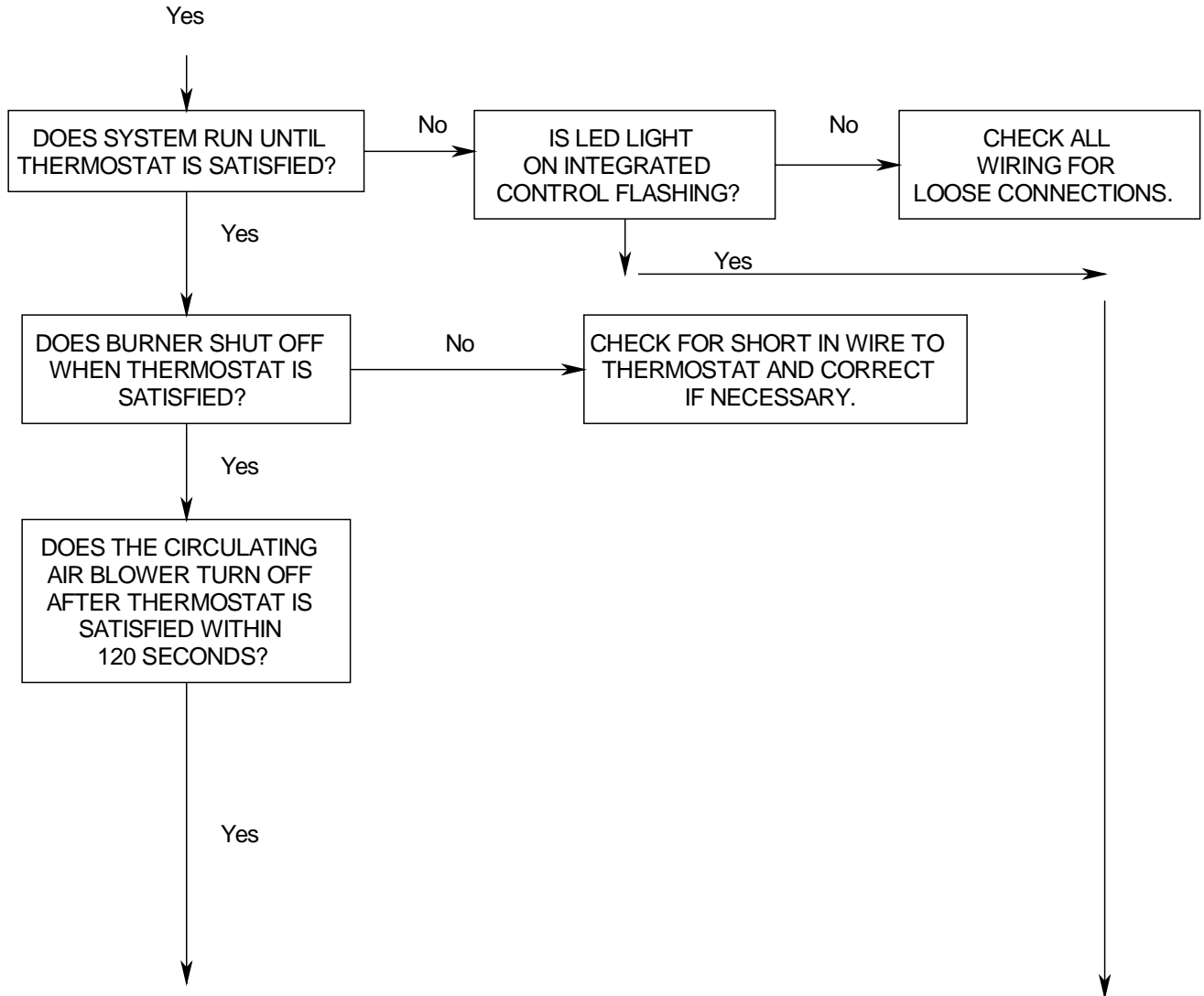




**All installations and services must be performed by qualified service personnel.**



**All installations and services must be performed by qualified service personnel.**



**All installations and services must be performed by qualified service personnel.**

Yes



Yes



IF LED LIGHT FLASHES:

- |                                   |  |
|-----------------------------------|--|
| 1 FLASH, THEN PAUSE               | SYSTEM LOCKOUT   |
| 2 FLASHES, THEN PAUSE             | PRESSURE SWITCH STUCK CLOSED   |
| 3 FLASHES, THEN PAUSE             | PRESSURE SWITCH STUCK OPEN   |
| 4 FLASHES, THEN PAUSE             | OPEN LIMIT SWITCH OR ROLLOUT SWITCH  |
| 6 FLASHES, THEN PAUSE             | 115 VOLT AC POWER REVERSED   |
| 7 FLASHES, THEN PAUSE             | LOW FLAME SENSE SIGNAL   |
| 8 FLASHES, THEN PAUSE             | CHECK IGNITOR OR IMPROPER GROUNDING  |
| CONTINUOUS FLASHING<br>(NO PAUSE) | FLAME HAS BEEN SENSED WHEN<br>NO FLAME SHOULD BE PRESENT (NO<br>CALL FOR HEAT) |

THE LED WILL ALSO FLASH ONCE AT POWER-UP.

CHECK COMPLETE SYSTEM OUT.

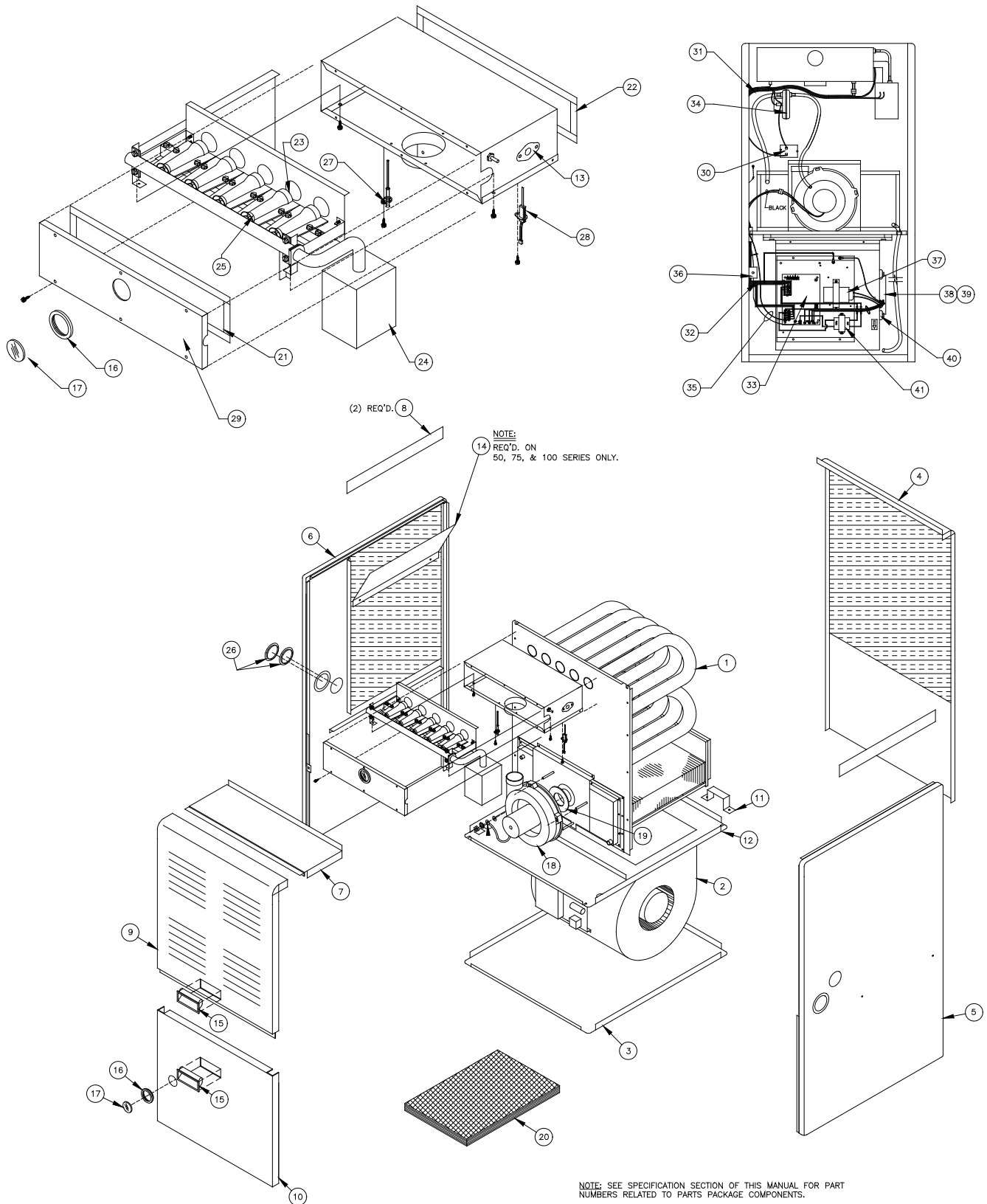
LED LIGHT STAYS ON CONTINUOUSLY,  
COMPLETE FAILURE - REPLACE  
INTEGRATED CONTROL.

TROUBLESHOOTING COMPLETE.

All installations and services must be performed by qualified service personnel.

Appendix –A Replacement Parts List

1. Replacement parts list for CHB1-50, CHB1-75, CHB1-100 and CHB1-125.



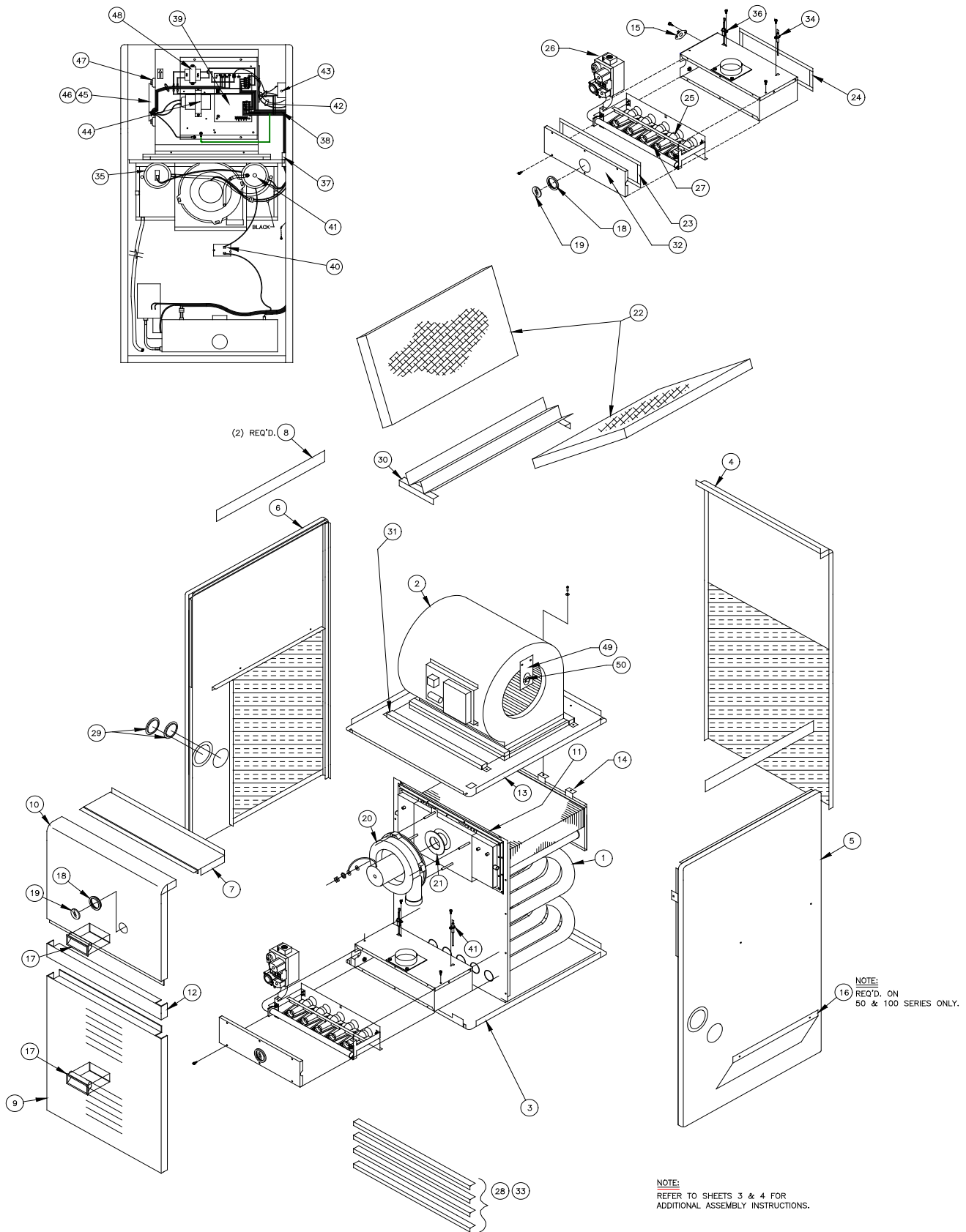
**All installations and services must be performed by qualified service personnel.**

ITEM	UNIT PARTS DESCRIPTION		CHB1-50		CHB1-75		CHB1-100		CHB1-125	
			PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.
1	HEAT EXCHANGER		38137	1	38138	1	38139	1	38140	1
2	BLOWER ASSEMBLY		SOOS4419	1	SOOS4420	1	SOOS4421	1	SOOS4422	1
3	BASE		10926	1	10926	1	10720	1	10721	1
4	CASING BACK		610925	1	610925	1	610772	1	610773	1
5	SIDE CASING (RIGHT)		620105	1	620105	1	620105	1	620105	1
6	SIDE CASING (LEFT)		620104	1	620104	1	620104	1	620104	1
7	TOP CENTER PANEL		610929	1	610929	1	610952	1	610953	1
8	PLENUM STRIPS		613382	2	613382	2	613382	2	613382	2
9	FRONT DOOR		610933	1	610933	1	610769	1	610770	1
10	BLOWER ACCESS DOOR		620927	1	620927	1	620717	1	620718	1
11	HEAT EXCHANGER SUPPORT		12394	1	12394	1	12394	1	12394	1
12	BLOWER PAN		18363	1	18363	1	18364	1	18365	1
13	LIMIT SWITCH (ROLLOUT)		350485	1	350485	1	350485	1	350485	1
14	SIDE CASING (ANGLE) BAFFLE		14329	1	14329	1	14329	1	—	
15	DOOR PULL		320157	2	320157	2	320157	2	320157	2
16	SIGHT GLASS GASKET		330135	1	330135	1	330135	1	330135	1
17	SIGHT GLASS		15887	1	15887	1	15887	1	15887	1
18	INDUCER W\ GASKET		AOPS7416	1	AOPS7416	1	AOPS7416	1	AOPS7416	1
19	INDUCER GASKET		330137	1	330137	1	330137	1	330137	1
20	FILTER		(16x25x1) 370023	1	(16x25x1) 370023	1	(16x25x1) 370023	1	(20x25x1) 370051	1
21	SILICONE SPONGE GASKET (1/2 IN. WIDE)		330141	23.25"	330141	28.50"	330141	33.75"	330141	39.50"
22	SILICONE GASKET TAPE (1" WIDE)		330140	21"	330140	26.50"	330140	32.25"	330140	38"
23	BURNER TUBE		380595	2	380595	3	380595	4	380595	5
24	GAS VALVE w/ LP KIT		AOPS7674	1	AOPS7674	1	AOPS7674	1	AOPS7674	1
25	ORIFICE	NAT.	380600	2	380600	3	380600	4	380600	5
		L.P.	380039		380039		380039		380039	
26	BUTTON PLUG		350046	2	350046	2	350046	2	350046	2
27	SENSOR		350759	1	350759	1	350759	1	350759	1
28	IGNITER		380650	1	380650	1	380650	1	380650	1
29	COVER		15922	1	15923	1	15924	1	15925	1
30	LIMIT SWITCH		350473	1	350473	1	350473	1	350473	1
31	HARNESS (VESTIBULE)		350778	1	350778	1	350778	1	350778	1
32	HARNESS (BLOWER)		350466	1	350466	1	350466	1	350466	1
33	CONTROL, INTEGRATED FAN		350836	1	350836	1	350836	1	350836	1
34	PRESSURE SWITCH		350498	1	350498	1	350498	1	350498	1
35	HARNESS (SUPPLY)		350704	1	350704	1	350704	1	350704	1
36	DOOR INTERLOCK SWITCH		350139	1	350139	1	350139	1	350139	1
37	CAPACITOR		350073 10/370	1	350073 10/370	1	350073 10/370	1	350077 15/440	1
38	MOTOR W\ CAPACITOR		AOPS7357 1/5 H.P. (7126-3710)	1	AOPS7655 1/3 H.P. (HE3J191N)	1	AOPS7652 1/2 H.P. (HE3L092N)	1	AOPS7358 3/4 H.P. (7126-3533)	1
39	MOTOR MOUNT BRACKET		AOPS7670	1	AOPS7670	1	AOPS7670	1	AOPS7670	1
40										
41	TRANSFORMER 24v		350464	1	350464	1	350464	1	350464	1
42	L.P. CONVERSION KIT		AOPS7677	1	AOPS7678	1	AOPS7679	1	AOPS7664	1
43	FILTER RACK KIT		AOPS7547	1	AOPS7547	1	AOPS7547	1	AOPS7375	1
44	CONCENTRIC VENT KIT		370171	1	370171	1	370171	1	370171	1
45	NAT CONVERSION KIT		AOPS7665	1	AOPS7665	1	AOPS7665	1	AOPS7665	1
46	SIDEWALL VENT KIT		370191	1	370191	1	370191	1	370191	1

OPTIONAL ITEMS  
(NOT SHOWN)

All installations and services must be performed by qualified service personnel.

2. Replacement parts list for CDB1-50, CDB1-75, CDB1-100 and CDB1-125.



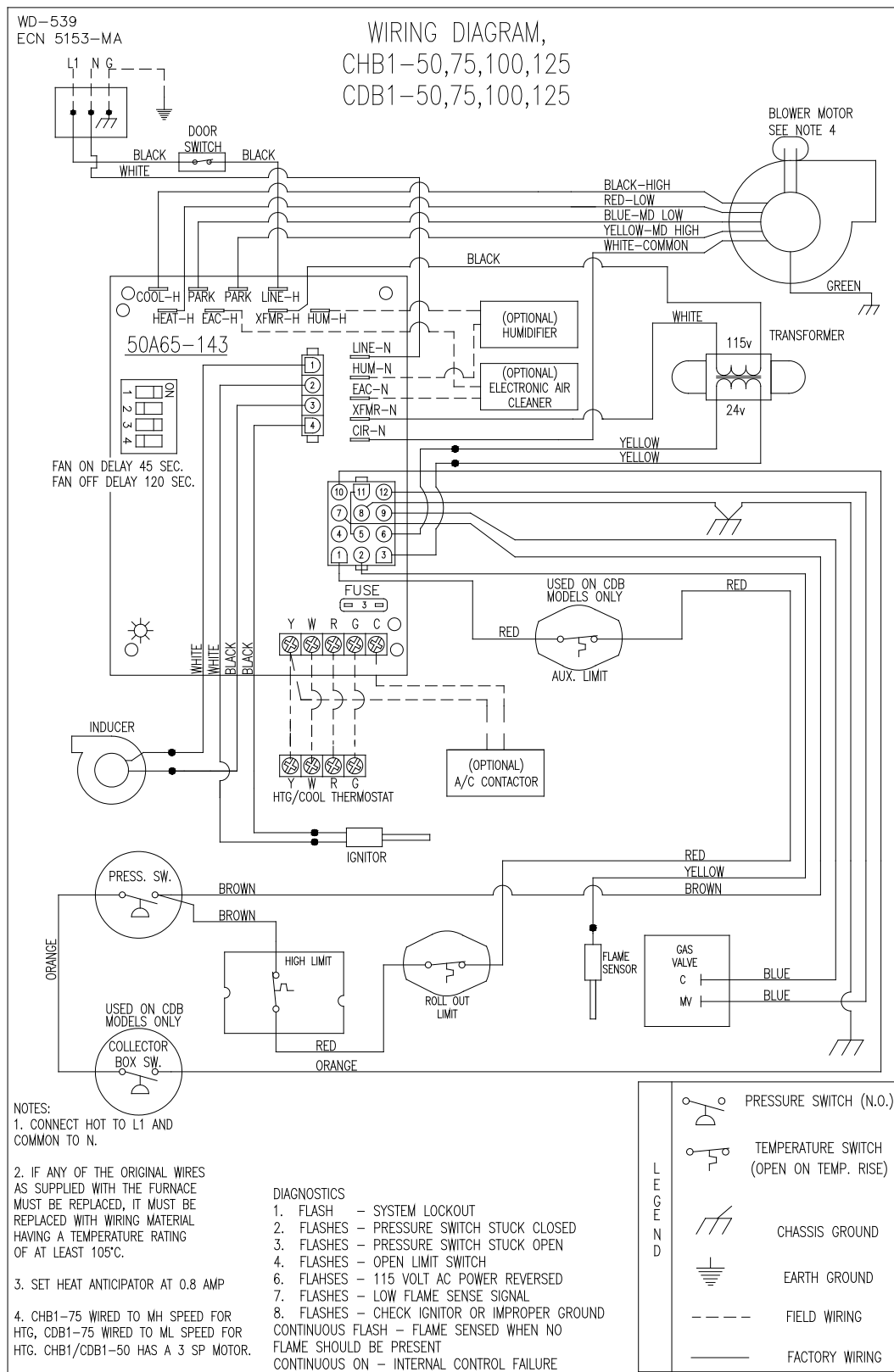
**All installations and services must be performed by qualified service personnel.**

ITEM	UNIT PARTS DESCRIPTION		CDB1-50		CDB1-75		CDB1-100		CDB1-125	
			PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.
1	HEAT EXCHANGER		38141	1	38142	1	38143	1	38144	1
2	BLOWER ASSEMBLY		S00S4430	1	S00S4431	1	S00S4432	1	S00S4433	1
3	BASE		18121	1	18121	1	10775	1	10776	1
4	CASING BACK		610931	1	610931	1	610732	1	610733	1
5	SIDE CASING (RIGHT)		620107	1	620107	1	620107	1	620107	1
6	SIDE CASING (LEFT)		620106	1	620106	1	620106	1	620106	1
7	TOP CENTER PANEL		618124	1	618124	1	610737	1	610738	1
8	PLENUM STRIPS		613403	2	613403	2	613403	2	613403	2
9	FRONT DOOR		620932	1	620932	1	620728	1	620730	1
10	BLOWER ACCESS DOOR		610930	1	610930	1	610727	1	610729	1
11	TRIM PLATE (TOP)		18172	1	18172	1	18174	1	18175	1
12	FRONT CENTER PANEL		610928	1	610928	1	610753	1	610754	1
13	BLOWER PAN		28120	1	28120	1	28178	1	28179	1
14	COIL SUPPORT		22385	1	22385	1	22385	2	22385	2
15	LIMIT SWITCH (ROLLOUT)		350485	1	350485	1	350485	1	350485	1
16	SIDE CASING (ANGLE) BAFFLE		14329	1	—	1	14329	1	—	
17	DOOR PULL		320157	2	320157	2	320157	2	320157	2
18	SIGHT GLASS GASKET		330135	1	330135	1	330135	1	330135	1
19	SIGHT GLASS		15887	1	15887	1	15887	1	15887	1
20	INDUCER W\ GASKET		AOPS7416	1	AOPS7416	1	AOPS7416	1	AOPS7416	1
21	INDUCER GASKET		330137	1	330137	1	330137	1	330137	1
22	FILTER		(14x22x1) 370052	2	(14x22x1) 370052	2	(14x22x1) 370052	2	(14x22x1) 370052	2
23	SILICONE SPONGE GASKET (1/2 IN. WIDE)		330141	23.25"	330141	28.50"	330141	33.75"	330141	39.50"
24	SILICONE GASKET TAPE (1" WIDE)		330140	21"	330140	26.50"	330140	32.25"	330140	38"
25	BURNER TUBE		380595	2	380595	3	380595	4	380595	5
26	GAS VALVE w/ LP KIT		AOPS7674	1	AOPS7674	1	AOPS7674	1	AOPS7674	1
27	ORIFICE	NAT.	380600	2	380600	3	380600	4	380600	5
		L.P.	380039		380039		380039			
28	PLENUM STRIP		18122	2	18122	2	13412	4	13412	4
29	BUTTON PLUG		350046	2	350046	2	350046	2	350046	2
30	FILTER RACK		624803	1	624803	1	624803	1	624803	1
31	ANGLE, SEPARATOR		18372	1	18372	1	18373	1	18374	1
32	COVER		15922	1	15923	1	15924	1	15925	1
33	PLENUM STRIP		18123	2	18123	2	—		13413	2
34	SENSOR		350759	1	350759	1	350759	1	350759	1
35	PRESSURE SWITCH		350442	1	350442	1	350442	1	350442	1
36	IGNITER		380650	1	380650	1	380650	1	380650	1
37	HARNESS (VESTIBULE)		350780	1	350780	1	350780	1	350780	1
38	HARNESS (BLOWER)		350781	1	350781	1	350781	1	350781	1
39	CONTROL, INTEGRATED FAN		350836	1	350836	1	350836	1	350836	1
40	LIMIT SWITCH		350473	1	350473	1	350473	1	350473	1
41	PRESSURE SWITCH		350498	1	350498	1	350498	1	350498	1
42	HARNESS (SUPPLY)		350705	1	350705	1	350705	1	350705	1
43	DOOR INTERLOCK SWITCH		350139	1	350139	1	350139	1	350139	1
44	CAPACITOR		350073 10/370	1	350073 10/370	1	350073 10/370	1	350077 15/440	1
45	MOTOR W\ CAPACITOR		AOPS7357 1/5 H.P. (7126-3710)	1	AOPS7655 1/3 H.P. (HE3J191N)	1	AOPS7652 1/2 H.P. (HE3L092N)	1	AOPS7358 3/4 H.P. (7126-3533)	1
46	MOTOR MOUNT BRACKET		AOPS7670	1	AOPS7670	1	AOPS7670	1	AOPS7670	1
47										
48	TRANSFORMER 24v		350464	1	350464	1	350464	1	350464	1
49	LIMIT BRACKET		14149	1	14149	1	14149	1	14149	1
50	AUX. LIMIT SWITCH		350472	1	350472	1	350472	1	350472	1
51	L.P. CONVERSION KIT		AOPS7677	1	AOPS7678	1	AOPS7679	1	AOPS7664	1
52	CONCENTRIC VENT KIT		370171	1	370171	1	370171	1	370171	1
53	NAT CONVERSION KIT		AOPS7665	1	AOPS7665	1	AOPS7665	1	AOPS7665	1
54	SIDEWALL VENT KIT		370191	1	370191	1	370191	1	370191	1

OPTIONAL ITEMS  
(NOT SHOWN)

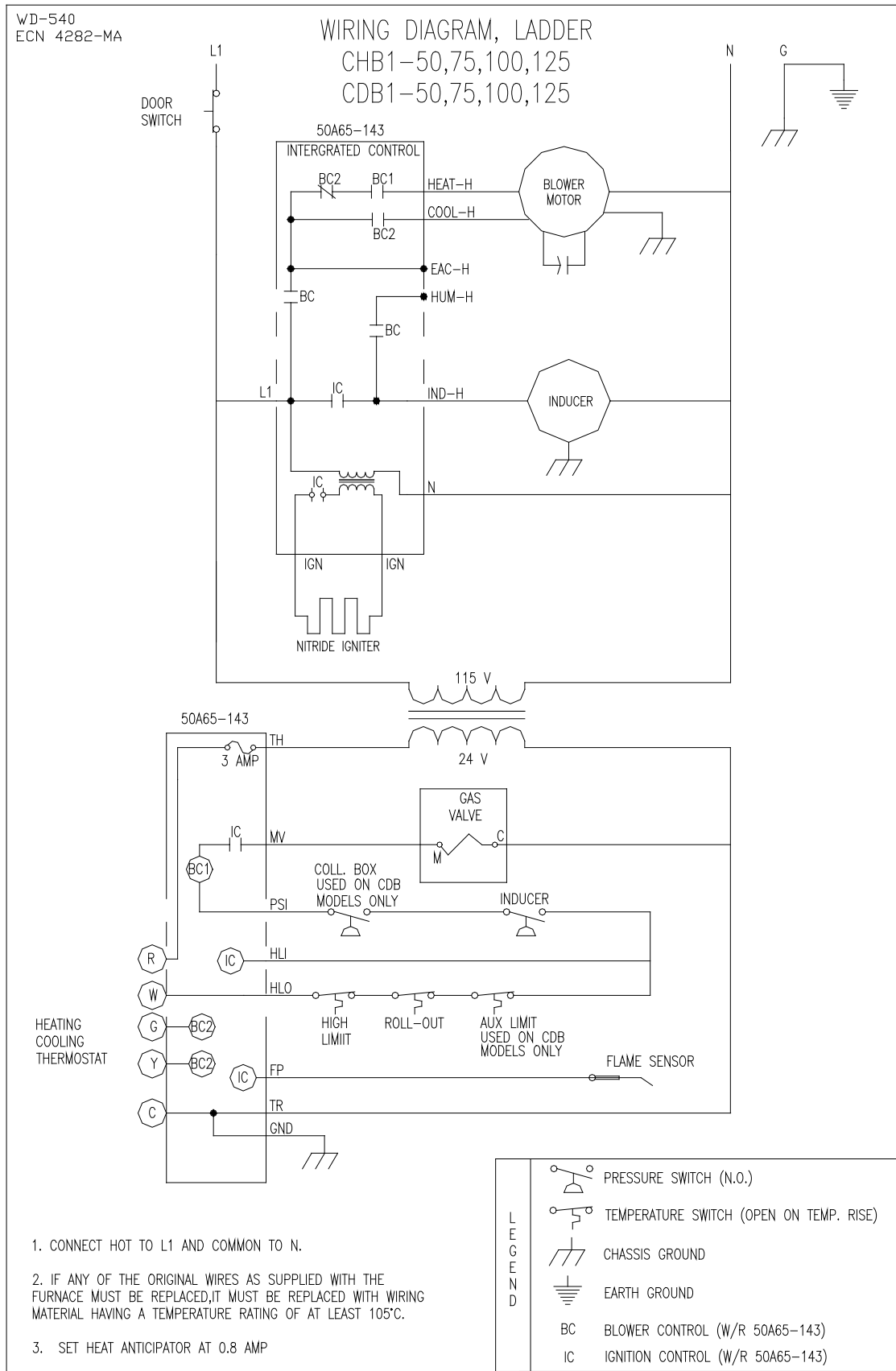
**All installations and services must be performed by qualified service personnel.**

Appendix – B Wiring Diagrams





**All installations and services must be performed by qualified service personnel.**



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