



TWO STAGE CONDENSING GAS FURNACE INSTALLATION AND OPERATION MANUAL

MODELS:

FOR USE WITH NATURAL GAS OR LP GAS (PROPANE)

CHX3-75N	CDX3-75N
CHX3-100N	CDX3-100N
CHX3-125N	CDX3-125N

⚠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
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PHONE: (574) 896-2133

MADE IN USA



MG-1035
ECN 5222-MA 110815

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

I. SAFETY INFORMATION



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

MODEL NO.

SERIAL NO.

DIRECT VENT FORCED AIR FURNACE
FOR INDOOR INSTALLATION IN BUILDING
CONSTRUCTED ON SITE.
CONFORMS TO
ANS Z21.47b - CSA 2.3b-2008 CENTRAL FURN
CATEGORY IV TYPE FSP
115V 1PH 60CY MAX TOTAL INPUT AMPS

BTUH HIGH FIRE
LOW FIRE

FACTORY EQUIPPED WITH #42 ORIFICES FOR NAT GAS.
SUITABLE FOR LP GAS WHEN EQUIPPED WITH 1.5 MM ORIFICES.
NORMAL MANIFOLD PRESS HIGH FIRE 3.5 IN WC(NAT) 10.0 IN WC(LP)
LOW FIRE 1.8 4.8
MIN GAS SUPPLY PRESS FOR INPUT ADJUSTMENT 4.5 IN WC (NAT)
MAX GAS SUPPLY PRESSURE 14.0 IN WC 11.0 IN WC (LP)
AIR TEMPERATURE RISE HIGH FIRE 55°F TO 85°F
LOW FIRE 45°F TO 75°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.

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

FOR INSTALLATION ON COMBUSTIBLE FLOORING.

THIS FURNACE REQUIRES A SPECIAL VENTING SYSTEM. REFER TO
INSTALLATION INSTRUCTIONS NO. MG- 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



390425, W 4577, 06,
1003-01 5090, 04

MODEL NO.

SERIAL NO.

DIRECT VENT FORCED AIR FURNACE
FOR INDOOR INSTALLATION IN BUILDING
CONSTRUCTED ON SITE.
CONFORMS TO
ANS Z21.47b - CSA 2.3b-2008 CENTRAL FURN
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BTUH HIGH FIRE
LOW FIRE

FACTORY EQUIPPED WITH #42 ORIFICES FOR NAT GAS.
SUITABLE FOR LP GAS WHEN EQUIPPED WITH 1.5 MM ORIFICES.
NORMAL MANIFOLD PRESS HIGH FIRE 3.5 IN WC(NAT) 10.0 IN WC(LP)
LOW FIRE 2.0 5.6
MIN GAS SUPPLY PRESS FOR INPUT ADJUSTMENT 4.5 IN WC (NAT)
MAX GAS SUPPLY PRESSURE 14.0 IN WC 11.0 IN WC (LP)
AIR TEMPERATURE RISE HIGH FIRE 55°F TO 85°F
LOW FIRE 45°F TO 75°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.

(INCHES)	TOP	FRONT	BACK	LS/RS	FLUE PIPE
	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. -BASE.

THIS FURNACE REQUIRES A SPECIAL VENTING SYSTEM. REFER TO
INSTALLATION INSTRUCTIONS NO. MG- 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.
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THERMO PRODUCTS, LLC.
P.O. BOX 217 - NORTH JUDSON, IN 46366

390425, W 4577, 06,
1003-01 5048, 04

⚠ WARNING

Hazardous flue gas.
Can cause personal injury
or loss of life.

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

390411

WARNING

THIS COMPARTMENT MUST BE
CLOSED EXCEPT WHEN SERVICING

THIS FURNACE MUST BE INSTALLED SO THERE ARE
PROVISIONS FOR VENTILATING AIR. 390410

REMOVE THIS PANEL FIRST IN ORDER
TO REMOVE BLOWER DOOR.

INSTALLATION AND USERS MANUALS
ARE LOCATED BEHIND BLOWER DOOR.

390289

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

390229

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 Two Stage Condensing Gas Furnaces. Please read and comply with the contents of these labels.

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

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.

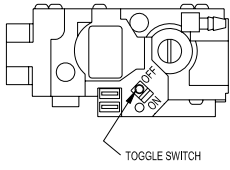
C. Use only your hand to move the gas control switch. Never use tools. If the switch will not move by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

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

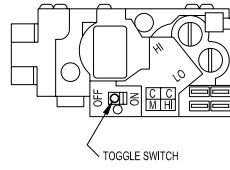
1. **STOP!** Read the safety information above on this label.
2. Set the thermostat to the lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with a hot surface igniter that automatically lights the burner. Do not try to light the burner by hand.
5. Move the 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

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.

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

390231

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

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 Two Stage 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 CHX3/CDX3 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 CHX3/CDX3 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.

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

II. FURNACE SPECIFICATIONS

CHX3 SERIES

MODEL NO.	CHX3-75	CHX3-100	CHX3-125
BTU/HR INPUT (High fire/ Low fire)	75,000 / 52,000	100,000 / 70,000	125,000 / 87,500
BTU/HR OUTPUT (High fire/ Low fire)	71,000 / 49,000	95,000 / 66,000	115,000 / 82,000
HEIGHT OF CASING	44-1/4"	44-1/4"	44-1/4"
WIDTH OF CASING	17"	21"	24"
DEPTH OF CASING	27-1/2"	27-1/2"	27-1/2"
WARM AIR OUTLET	15 x 18	19 x 18	22 x 18
RETURN AIR INLET	25 x 16	25 x 16	25 x 16
DIA. OF FLUE	2"	3"	3"
DIA. OF COMBUSTION AIR INTAKE	2"	3"	3"
CFM from .2" & .5" w.c. EXTERNAL STATIC PRESSURE	COOLING	COOLING	COOLING
@COOLING TAP A	1000	1200	1400
@COOLING TAP B	800	1000	1200
@COOLING TAP C	1200	1400	1600
@COOLING TAP D	1400	1600	2000
	HEATING	HEATING	HEATING
@HEATING TAP A (High fire/Low fire)	931 / 760	1243 / 1015	1556 / 1270
TEMPERATURE RISE	70 / 60	70 / 60	70 / 60
BLOWER MOTOR HP	.5	.75	1
POWER CHOKES	-	2.65 Mh	2.1 Mh
LARGEST RECOMMENDED AIR CONDITIONER	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 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.

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CDX3 SERIES

MODEL NO.	CDX3-75	CDX3-100	CDX3-125
BTU/HR INPUT (High fire / Low fire)	75,000 / 56,250	100,000 / 75,000	125,000 / 93,750
BTU/HR OUTPUT (High fire / Low fire)	71,000 / 52,000	94,000 / 69,000	116,000 / 87,000
HEIGHT OF CASING	46-1/4"	46-1/4"	46-1/4"
WIDTH OF CASING	17"	21"	24"
DEPTH OF CASING	27-1/2"	27-1/2"	27-1/2"
WARM AIR OUTLET	15 x 18	19 x 18	22 x 18
RETURN AIR INLET	15 x 22	19 x 22	22 x 22
DIA. OF FLUE	2"	3"	3"
DIA. OF COMBUSTION AIR INTAKE	2"	3"	3"
CFM from .2" & .5" w.c. EXTERNAL STATIC PRESSURE	COOLING	COOLING	COOLING
@COOLING TAP A	1000	1200	1400
@COOLING TAP B	800	1000	1200
@COOLING TAP C	1200	1400	1600
@COOLING TAP D	1400	1600	2000
	HEATING	HEATING	HEATING
@HEATING TAP C (High fire / Low fire)	1012 / 826	1340 / 1094	1673 / 1366
TEMPERATURE RISE	65 / 60	65 / 60	65 / 60
BLOWER MOTOR HP	.5	.75	1
POWER CHOKES	-	2.65Mh	2.1Mh
LARGEST RECOMMENDED AIR CONDITIONER	3.5 Ton	4 Ton	5 Ton
SIZE OF FILTERS	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 – CHX3-75

PARTS PACKAGE #S00S4413	DESCRIPTION	PART #	QUANTITY
	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	AOPS7682	1

INSTALLATION PARTS PACKAGES – CHX3-100-125

PARTS PACKAGE #S00S4414/4415	DESCRIPTION	PART #	QUANTITY
	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

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	PVC tee assembly, 2 x 3" dia.	320817	1
	CPVC XPVC adapter	320833	1
	Gas Conversion Kit	AOPS7683/7419	1

INSTALLATION PARTS PACKAGES – CDX3-75

PARTS PACKAGE #S00S4416	DESCRIPTION	PART #	QUANTITY
	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	AOPS7682	1

INSTALLATION PARTS PACKAGES – CDX3-100-125

PARTS PACKAGE #S00S4381	DESCRIPTION	PART #	QUANTITY
	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

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

	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 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	AOPS7683/7419	1

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

III. GENERAL INSTALLATION

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 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 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).
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

MODEL NO.	FROM SIDES OF FURNACE & REAR	FRONT	TOP OF PLENUM	FROM THE FLUE OR VENT	SIDE OF PLENUM
CHX3-75	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
CHX3-100	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
CHX3-125	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
CDX3-75	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
CDX3-100	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.
CDX3-125	0 IN.	6 IN.	0 IN.	0 IN.	1 IN.

The CHX3-75, 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 CDX3-75, 100 and 125 furnaces are to be installed on non-combustible flooring only. The non-combustible floor bases model no. 50 DA base for CDX3-75 model no. 100 CA base for the model no. CDX3-100 and model no. 125 CA base for CDX3-125 are available for the counterflow furnaces to allow their installations on combustible flooring.

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

These furnaces may be installed in an alcove or in a closet if the minimum clearances to combustible construction (listed previously) are met. The CDX3 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.

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. CDX3 HORIZONTAL APPLICATION

The CDX3-75, 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 CDX3 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 CDX3 series units, the hose from the single tap pressure switch (top switch) is already connected correctly (See Figure 1).

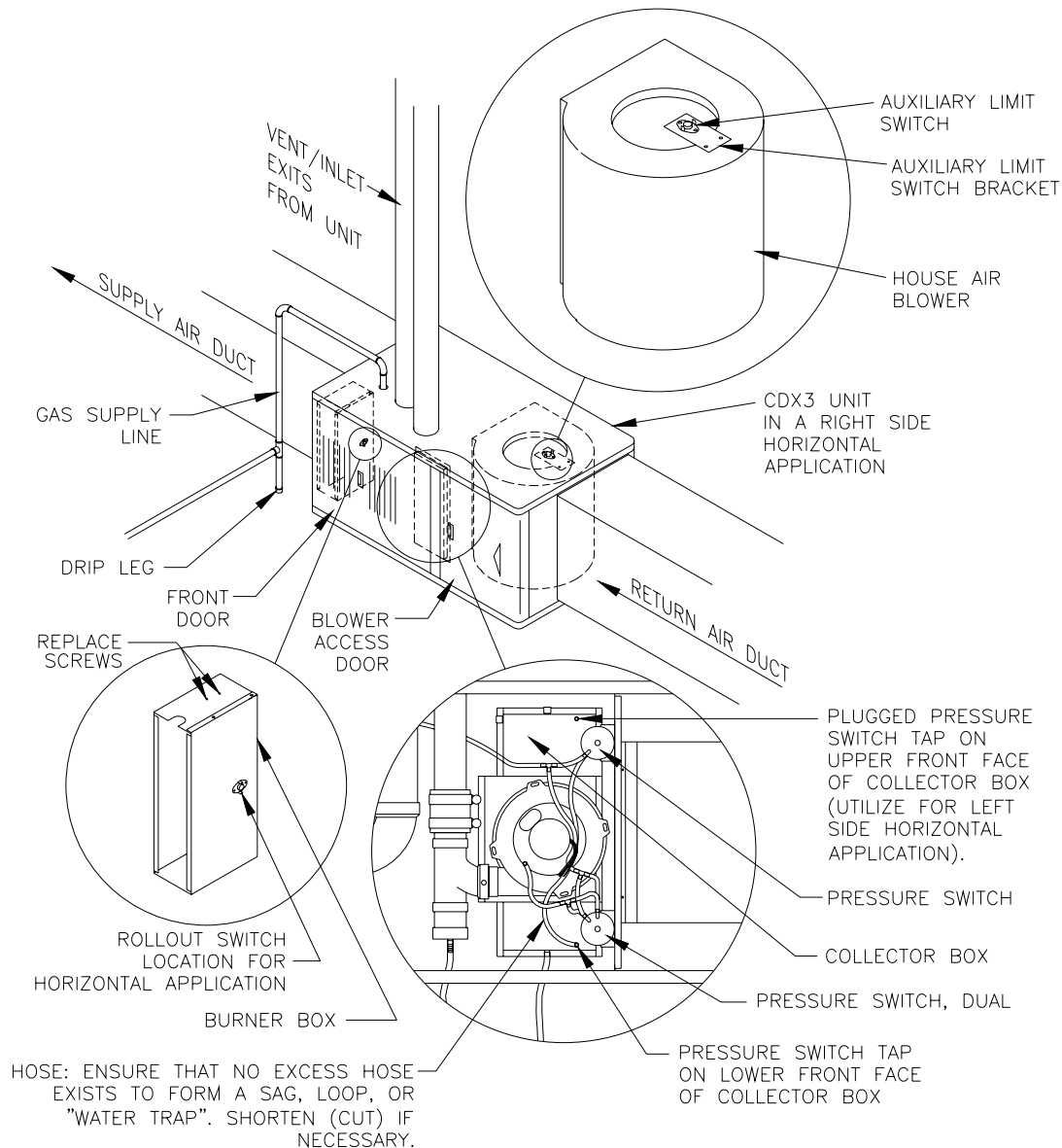
For a left side horizontal application of the CDX3 series units, the hose from the single tap pressure switch (bottom switch) must be moved to the lower front tap on the face of the collector box. Use the black cap removed from this tap to plug the original pressure switch tap.

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

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 CDX3 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 CDX3 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).



CDX3 UNIT SHOWN IN A RIGHT SIDE HORIZONTAL APPLICATION

Figure 1

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

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.*

D. General Requirements For Venting Models CHX3 / CDX3

The CHX3 / CDX3 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 pipe fittings 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 CHX3-75 & CDX3-75**, or
 - nominal **3-inch diameter IPS**, Schedule 40 series, PVC thermoplastic pipe, **for models CHX3-100 / -125 & CDX3-100 / -125.**
4. The furnace model series CHX3 / CDX3 shall **not** be common vented with any other appliance, including those burning solid fuels.

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

5. All horizontal runs of exhaust vent pipe shall slope upward at least ¼ inch per foot from the outlet of the furnace (for model CHX3), or the outlet of the drain tee (for the model CDX3), 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 intake systems must be considered. This includes all elbows, or equivalent pipe fittings, 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		
Furnace Model	Exhaust or Intake Straight Pipe Length (ft.)	Maximum Qty. of Exhaust Elbows ^{1,2}	Maximum Qty. of Intake Elbows ²	Exhaust or Intake Straight Pipe Length (ft.)	Maximum Qty. of Exhaust Elbows ^{1,2}	Maximum Qty. of Intake Elbows ²
CHX3 / CDX3-75	35	8	7	-	-	-
CHX3 / CDX3-100	Not Permitted			35	8	7
CHX3 / CDX3-125	Not Permitted			35	8	7

Superscripts:

¹ The drain tee supplied with the model series CHX3 / CDX3 furnaces is considered equivalent to one (1), 90° elbow.

² 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.

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

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.

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

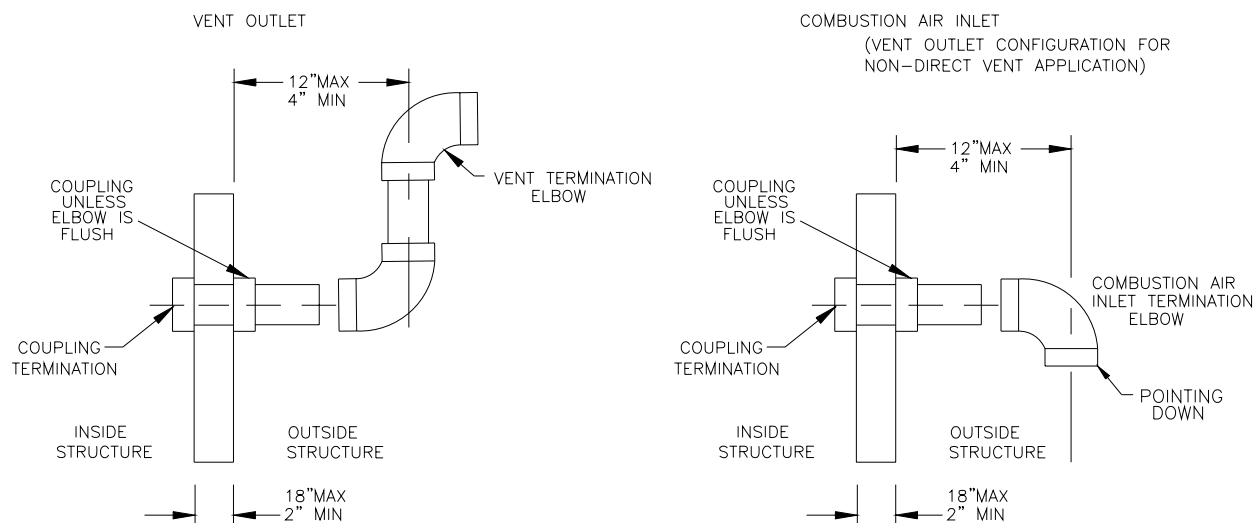
NOTICE: DO NOT use silicone caulk to seal the pipe sleeve or coupling to the metal air intake collar on the burner box. Securing the sleeve or coupling to the collar using a screw is sufficient.

10. 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.
11. 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.
12. No clearance is required from the outer surface of the thermoplastic piping to combustible materials for fire hazard prevention.
13. 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.

NOTICE: The CHX3 / CDX3 furnace models 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).

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

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.

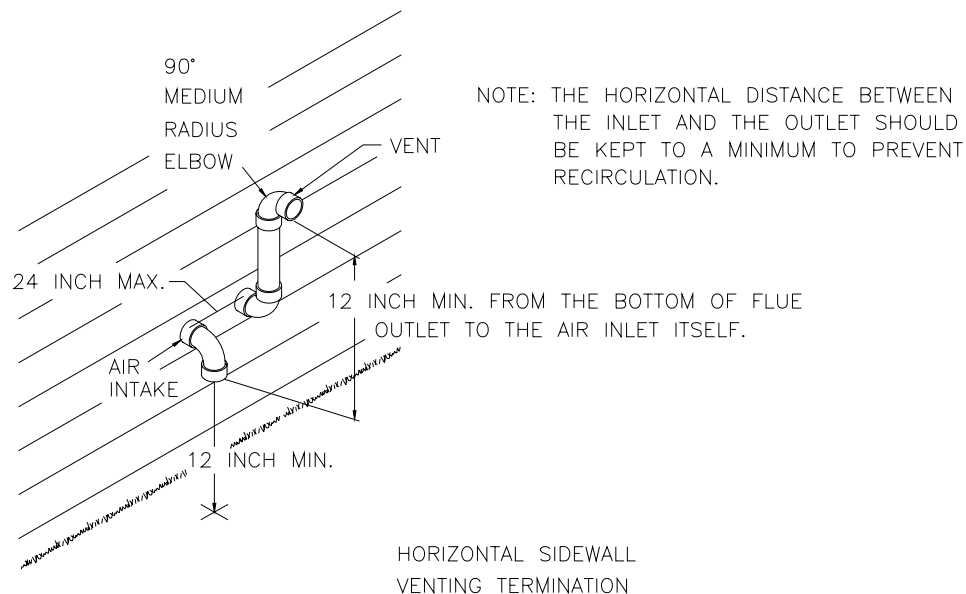


Figure 3: Typical Relative Locations of Direct Vent Terminations When Sidewall Venting.

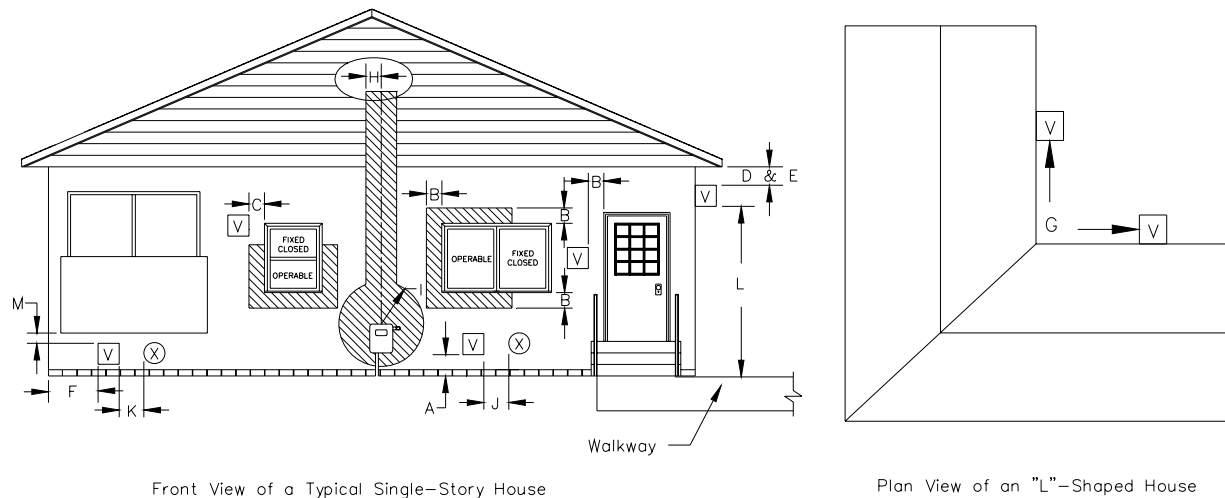
3. Exhaust Vent Terminal Location Clearance Requirements

- 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 required minimum 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,

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

- 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
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 model series CHX3 / CDX3 furnaces 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),
 - a. 2-3/8 inch diameter, for furnace models CHX3 / CDX3-75, or
 - b. 3-1/2 inch diameter, for the furnace models CHX3 / CDX3-100 and CHX3 / CDX3-125.

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.

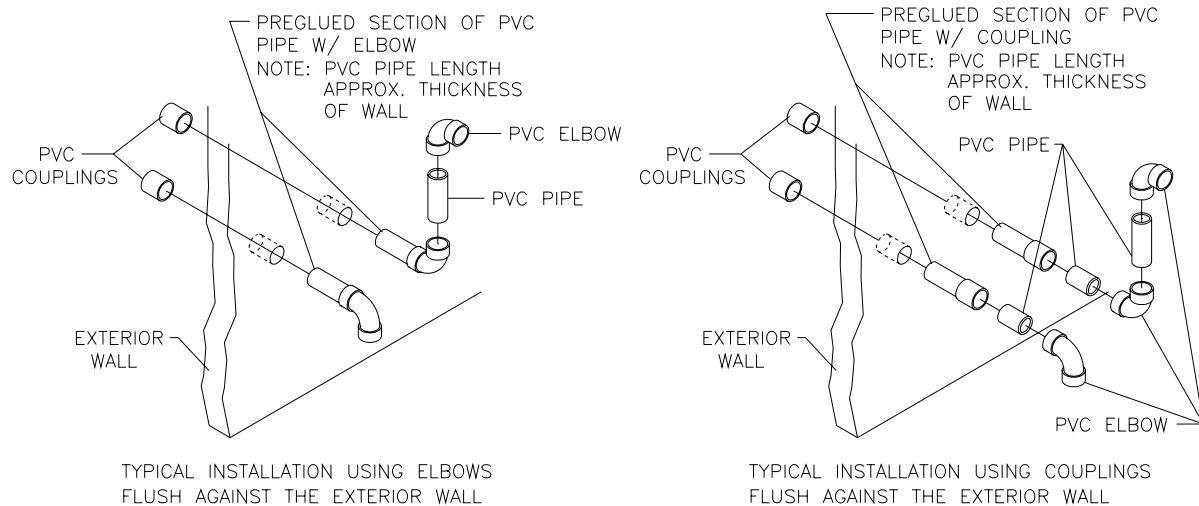


Figure 5: Typical Sidewall Vent and Air Intake Termination Construction Details

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, 3"-part no. 320226, 2"-part# 320219.

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 CHX3/CDX3-75. Kit p/n AOPS7489 requires a 5" inch diameter hole and is used on furnace models CHX3/CDX3-100 & 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 CHX3/CDX3 family.

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

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.

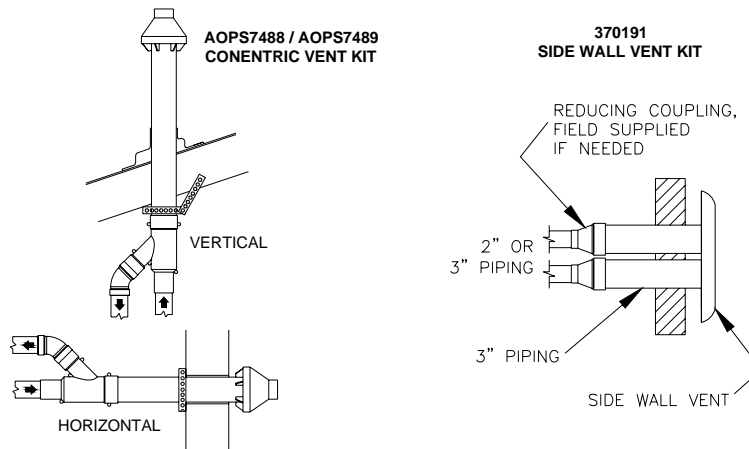


Figure 6: Optional Direct Vent Kits for the CHX3 / CDX3 Model Series of Furnaces

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 can 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.

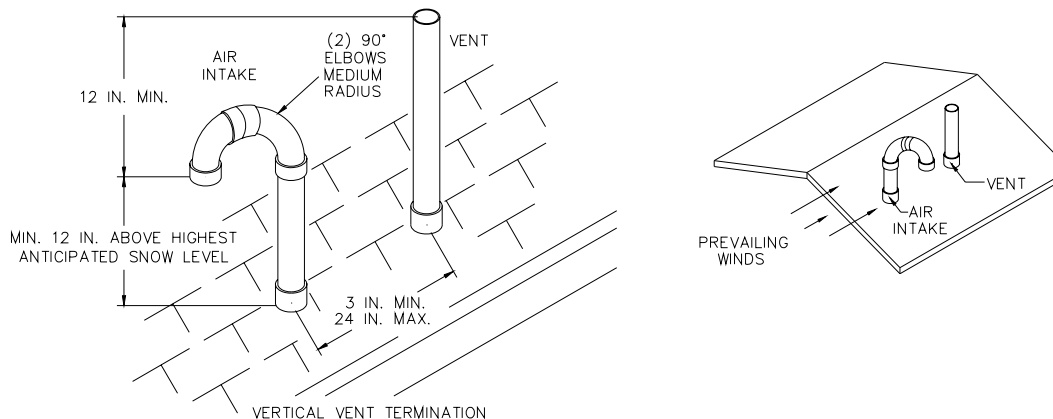
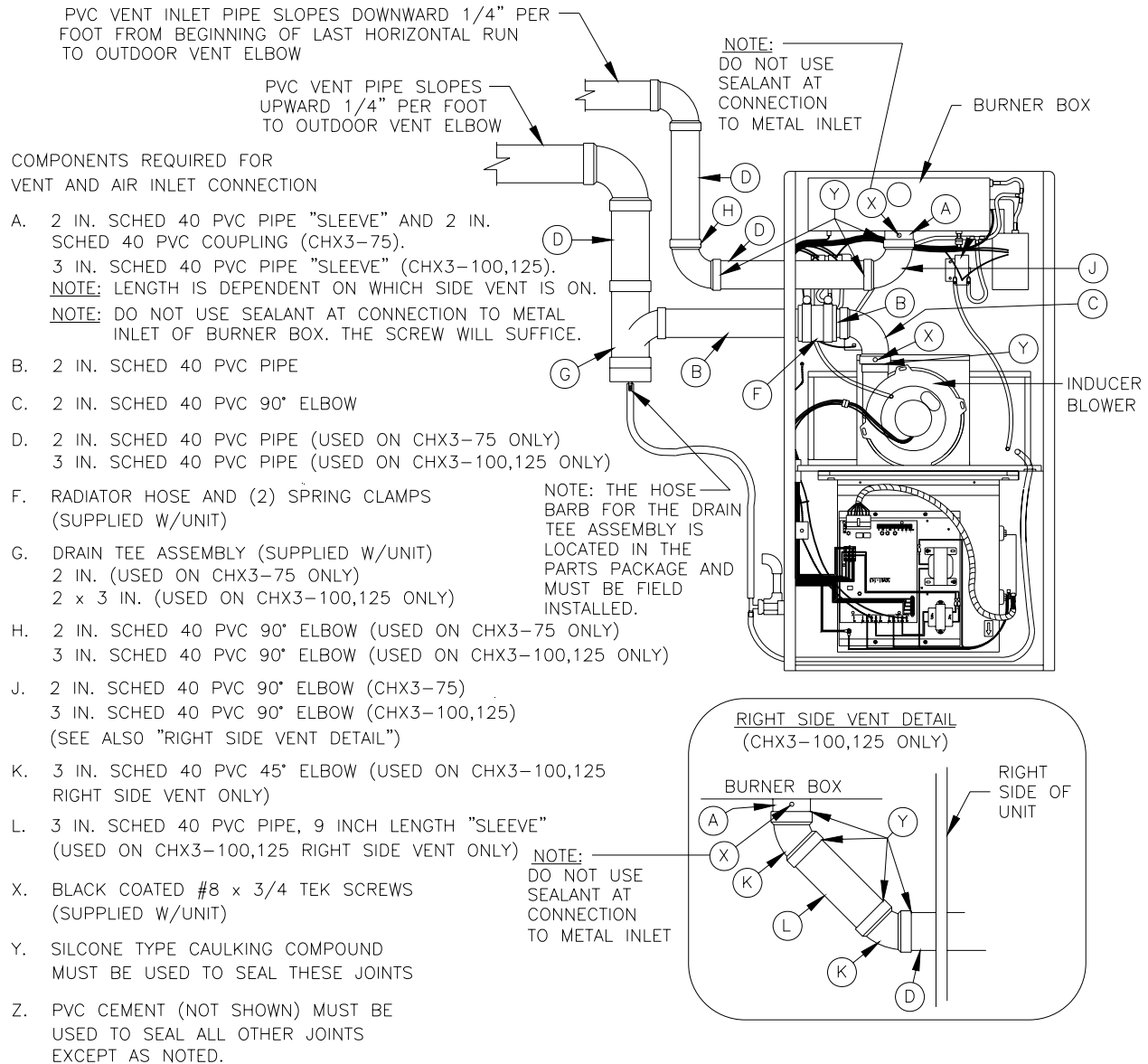


Figure 6A: Typical Rooftop Vent and Air Intake Termination Construction Details

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

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

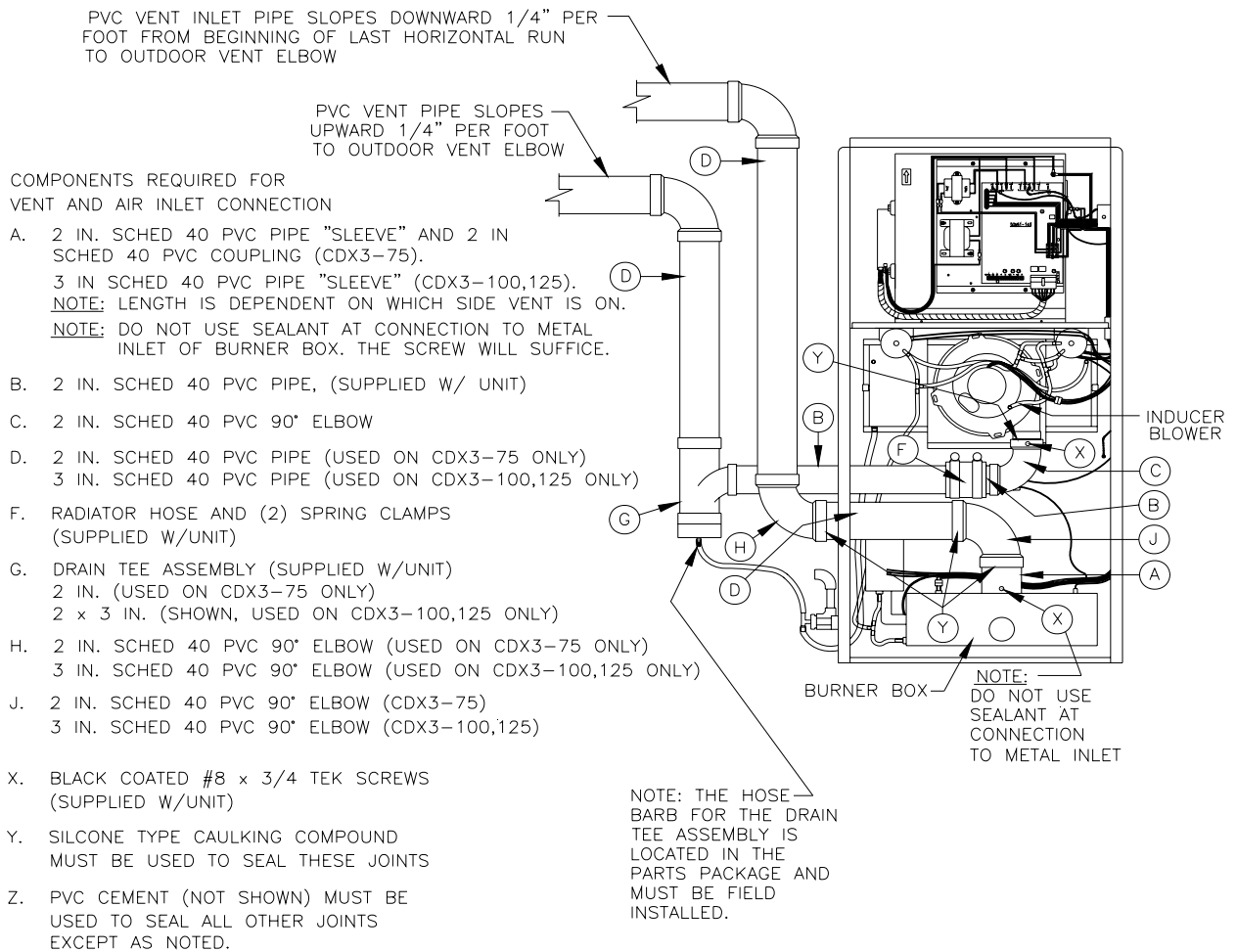
- Figures 6B, 7, and 8 follow depicting typical exhaust vent and air intake connections for the furnace model series CHX3 and the CDX3, respectively, as well as a list of required parts to correctly install each system.



BASIC VENT CONNECTION (CHX3 SERIES)

Figure 6B: Required Exhaust Vent and Air Intake Piping for CHX3 Furnace

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



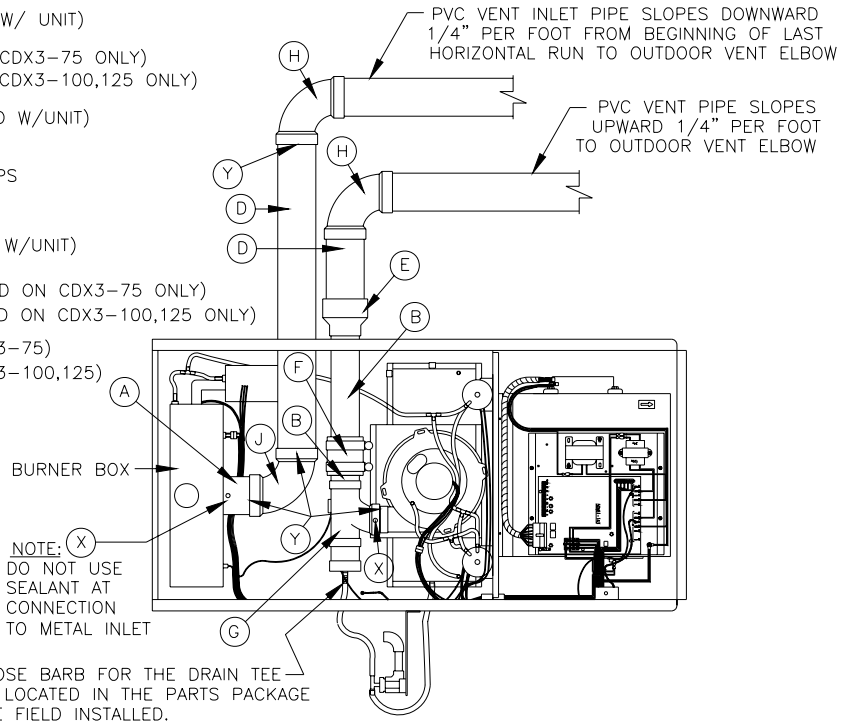
BASIC VENT CONNECTION (CDX3 SERIES)

Figure 7: Required Exhaust Vent and Air Intake Piping for CDX3 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 (CDX3-75).
3 IN SCHED 40 PVC PIPE "SLEEVE" (CDX3-100,125).
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 CDX3-75 ONLY)
3 IN. SCHED 40 PVC PIPE (USED ON CDX3-100,125 ONLY)
- E. 2 IN. X 3 IN. PVC REDUCER (SUPPLIED W/UNIT) (USED ON CDX3-100,125 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 CDX3-75 ONLY)
3 IN. SCHED 40 PVC 90° ELBOW (USED ON CDX3-100,125 ONLY)
- J. 2 IN. SCHED 40 PVC 90° ELBOW (CDX3-75)
3 IN. SCHED 40 PVC 90° ELBOW (CDX3-100,125)
- 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
(CDX3 SERIES SHOWN IN A RIGHT SIDE HORIZONTAL APPLICATION)

Figure 8: Required Exhaust Vent and Air Intake Piping for CDX3 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 CDX3 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 model CDX3-75, a length of 2-inch diameter PVC pipe and a 2-inch diameter PVC tee assembly are supplied with each furnace. For the models CDX3-100 and CDX3-125, a 3-inch x 2-inch diameter PVC reducer is also supplied.

NOTICE: For models CDX3-100 and CDX3-125 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

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

leading away from the furnace must be composed of 3-inch diameter PVC pipe and pipe fittings 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 CDX3 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 CHX3.

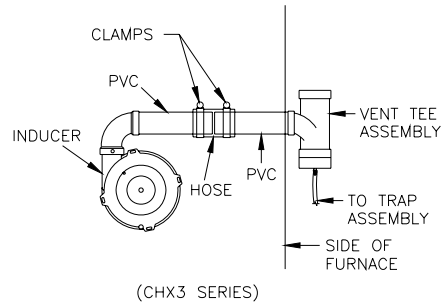


Figure 10: Typical Internal Vent Piping Arrangement for the Furnace Model Series CDX3-100 / - 125.

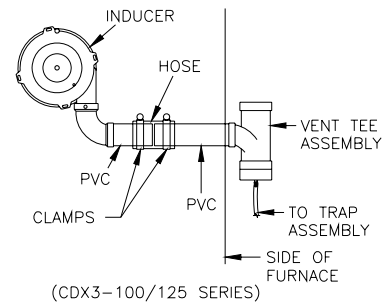
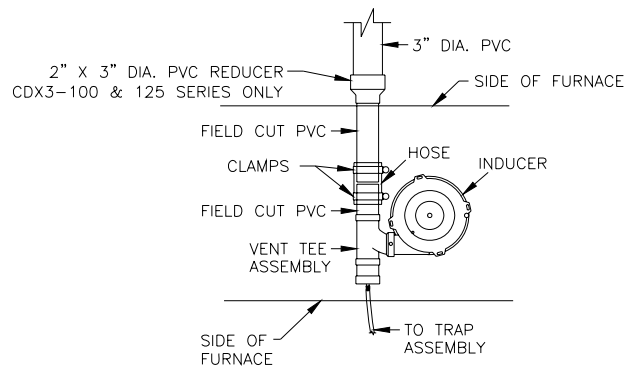


Figure 11: Typical Internal Vent Piping Arrangement for the Furnace Model Series CDX3-100 / - 125 in RH Horizontal Applications.



(CDX3-100/125 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 CDX3 in horizontal applications, the 2-inch diameter 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.

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

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 CHX3 / CDX3-75, install a 2-inch PVC elbow with sleeve and coupling (for models CHX3 / CDX3-100 & -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.

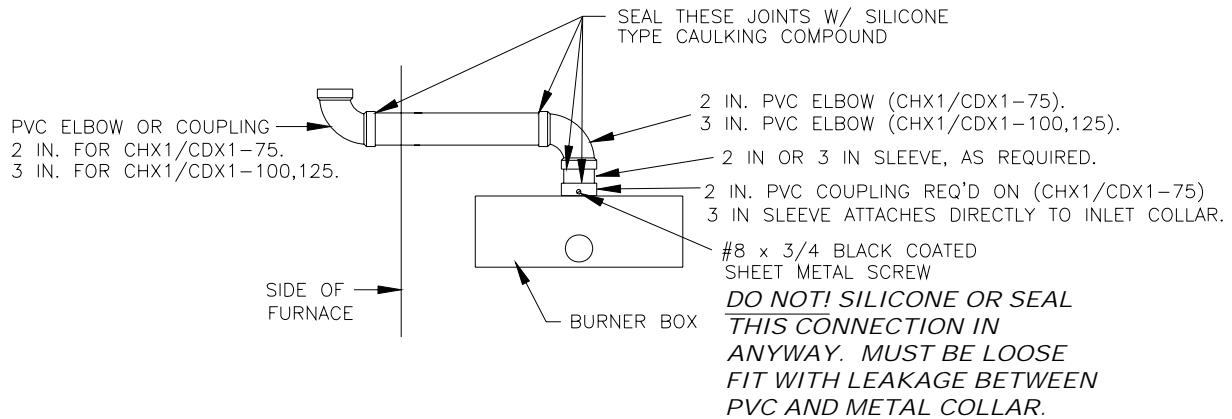


Figure 12: Typical Internal Air Intake Piping Arrangement for All Furnace Models

- 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 show the typical drain and trap connection for a CHX3 and CDX3 furnace.

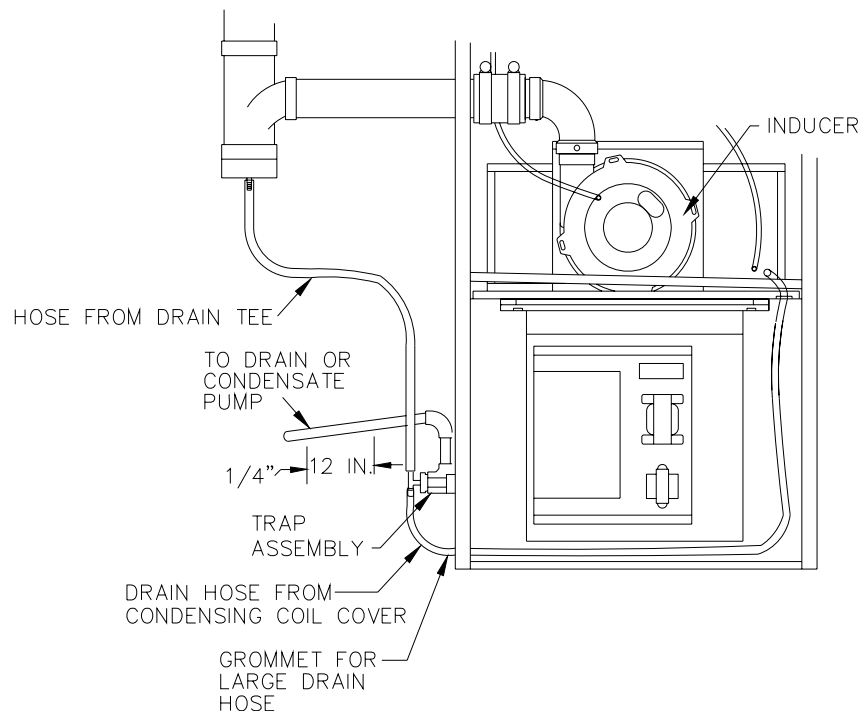


Figure 14. TRAP ASSEMBLY MOUNTED ON CHX3

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

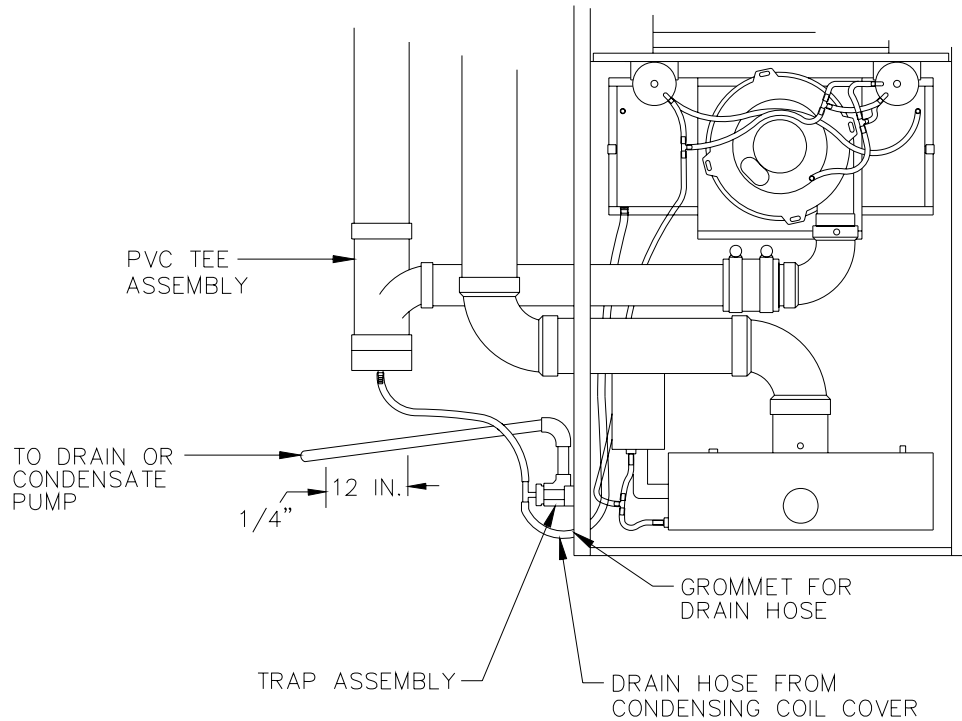


Figure 15. TRAP ASSEMBLY MOUNTED ON CDX3

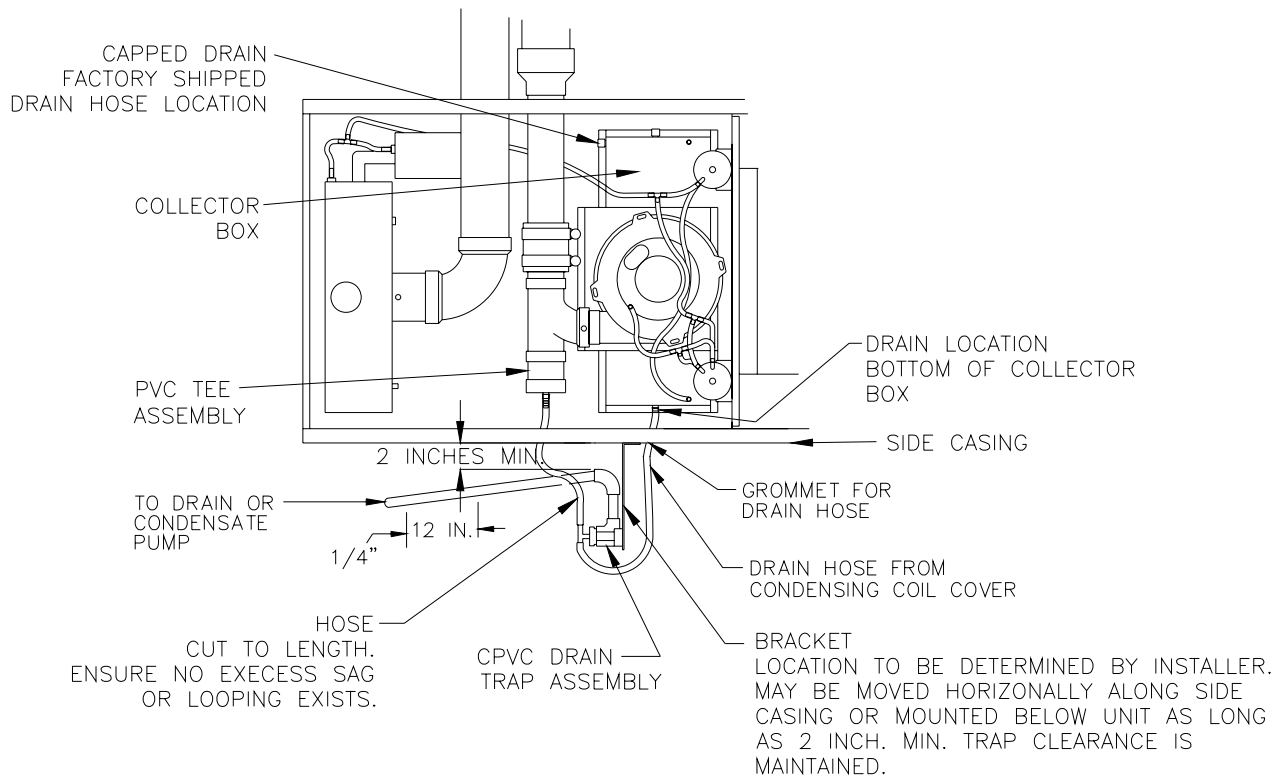


Figure 16. TRAP ASSEMBLY MOUNTED ON CDX3 RIGHT SIDE HORIZONTAL INSTALLATION

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

2. Determine on which side of furnace the condensate disposal line is to be run (NOTICE: On CHX3/CDX3's this must be the same side as the flue outlet or bottom of unit). Attach the condensate trap to the furnace casing using the #8x3/4" sheet metal screws provided in the parts package. Pilot holes are provided on both sides of the casing for mounting.

NOTE: When the CDX3 series unit is used in a horizontal application, the drain hose from the collector box will require a location change from it's factory shipped connection. A knockout has been provided in the unit side casing for the drain hose to exit. The connection change can be accomplished as follows: Refer to Figure 16.

- a) Locate and disconnect the drain hose at the collector box from its factory shipped connection location.
 - b) Locate and uncap the drain at the bottom (as it is oriented) of the collector box.
 - c) Connect the drain hose from **step a** to the uncapped bottom drain from **step b**.
 - d) Cap the previous drain connection from **step a** with the existing cap removed in **step b**.
3. Attach the drain hose (11/16" diameter clear tubing) from the front (CHX3) or bottom (CDX3) of the condensing coil cover plate to one side of the PVC tee provided in the trap assembly. Secure the drain hose (11/16" o.d. tubing) with the silver clamp provided in the parts package. Be careful to route the tubing through the proper hole in the furnace casing using the Heyco bushing provided. While making all connections with the clear tubing, be careful to route the tubing in a manner to prevent kinking or abrasion of the tubing.
 4. Measure the drain hose (11/16" o.d. clear tubing) provided and remove any extra length, making sure that the hose has sufficient length not to kink or otherwise be restricted once installed. Attach the drain hose (11/16" o.d. clear tubing) to the other side of the condensate trap tee. On CHX3/CDX3's, this hose is shipped in the parts package and it will be necessary to attach the other end to the PVC drain tee assembly (see Figure 15). Use the silver clamp(s) provided in the parts package to secure all connections.
 5. Install field supplied 1/2" CPVC drain pipe and elbows using CPVC cement to reach a nearby drain. A minimum 1/4" per foot downward slope toward the drain must be maintained. The drain line must be water tight, supported and secured so that it can't be moved. The length of the drain must be kept as short as possible.

IMPORTANT: If an air conditioning condensate drain line is combined with the furnace condensate drain line, it must have a separate trap ahead of the joint connection.

6. If a drain is not readily available or is above the trap outlet level on the furnace or the drain line cannot be sloped downward its full length to the drain, then a condensate pump (part #350225) can be ordered from the factory. Follow the pump manufacturers installation instructions.
7. The furnace condensate is slightly acidic with a pH of 3.5. Cola drinks with a pH of 3.1 are actually more acidic. If local codes require a neutralizing kit, the kit may be ordered using part no. 320095. Instructions included with the neutralizing kit must be followed for its proper installation.
8. The condensate piping in the furnace and the drain system must be flushed out at the start of every heating season. This will assure trouble free operation and will keep the acidity level well above 3.4 pH.

To flush the condensate drain system, turn off power to the furnace at the electrical disconnect switch and turn the thermostat to the lowest setting.

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

Remove the 11/16" diameter clear tubing from the coil drain nipple and run tap water into the open end of the tubing. This should keep the drain system clean. Replace the tubing by pushing it firmly onto the nipple. Make sure the spring clamp is returned to the original position to prevent leaks. If any of the electrical controls are exposed to water, dry with a soft cloth and wait 24 hours before operating the furnace. Set the room thermostat 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.

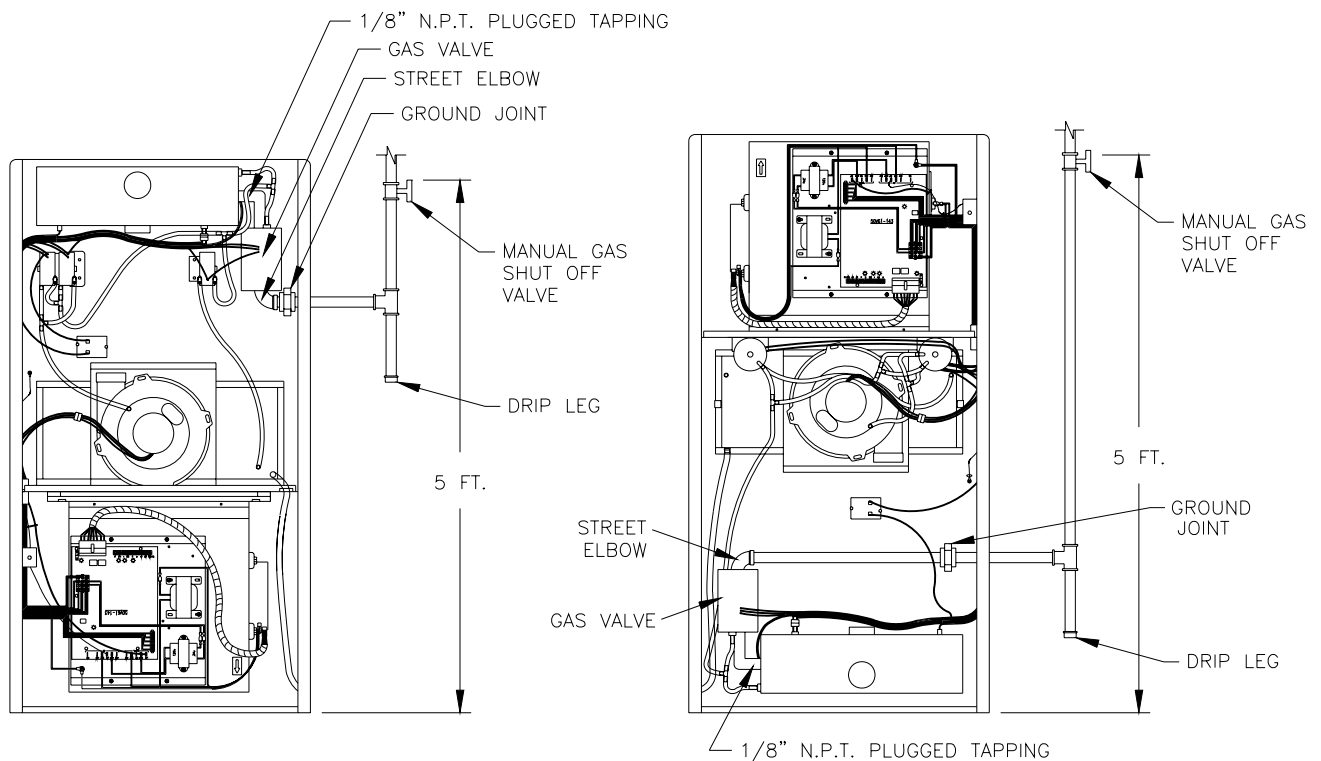


Figure 18

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.*

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

⚠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.
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.

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

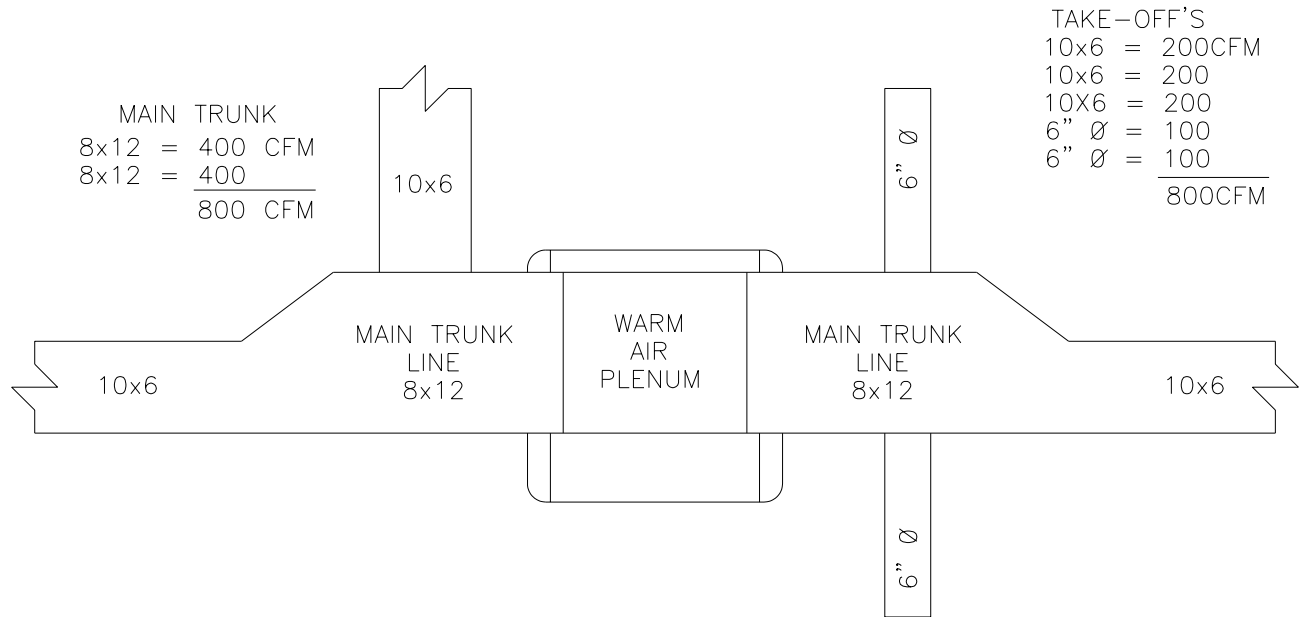


Figure 18A

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 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. CHX3 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 CHX3 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 CDX3 model. (See specification sheet in beginning of this manual).

This CHX3 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 CHX3-75 thru 100 and AOPS7375 for CHX3-125) 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.

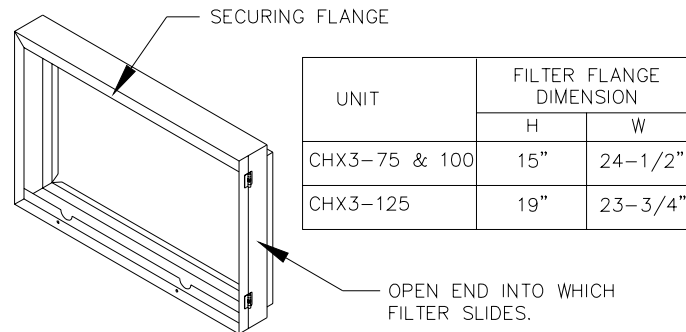


Figure 19

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. CDX3 MODELS: COUNTERFLOWS

This CDX3 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.

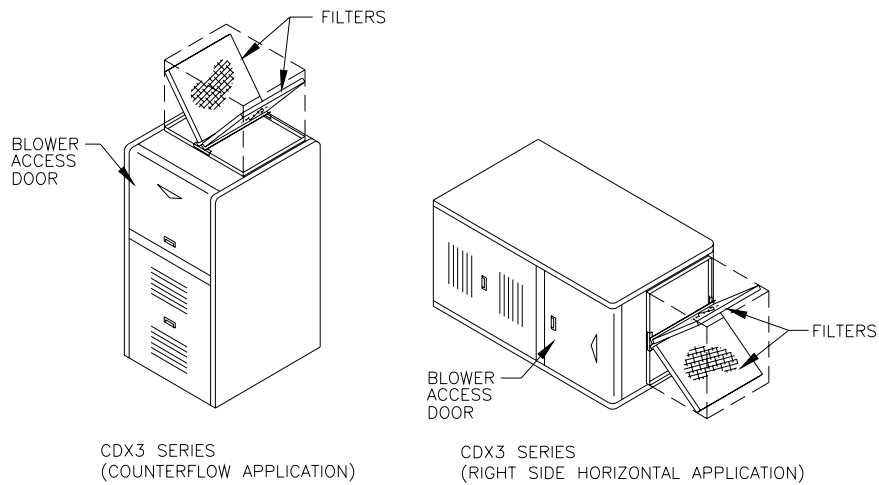


Figure 20

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 CHX3 or CDX3 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) = min. filter (in ²)		
		FURNACE MODEL		
		CHX3,CDX3-75	CHX3,CDX3-100	CHX3,CDX3-125
THERMO PRODUCTS SUPPLIED PERMANENT FILTER	600 FT./MIN.	254 IN. ^{2}	328 IN. ^{2*}	402 IN. ^{2*}
STANDARD PERMANENT FILTER	500 FT./MIN.	304 IN. ²	394 IN. ²	484 IN. ²
DISPOSABLE TYPE FILTER	300 FT./MIN.	506 IN. ²	656 IN. ²	804 IN. ²

* 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:

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

EXAMPLE: If you had a CHX3-100 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 CHX3-100 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. The minimum fuse or circuit breaker size is 20 amp.
 - b. All CHX3 and CDX3 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.

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

3. THERMOSTAT CONNECTIONS AND ANTICIPATOR SETTING

NOTICE: For two-stage thermostat wire connectors see wire diagram page 59.

For single-stage thermostat with two-stage operation connect W from thermostat to W1 on control. W2 on control board is not used. Thermostat dip switches S7-1 & S7-2 on control board (Fig. 21) will need to set at the desired setting per (Table 4B). In this configuration the furnace will light and burn on low fire. If thermostat has not been satisfied in set delay time for second stage the control will step up to high fire until thermostat is satisfied. The auto setting will allow the control to calculate the delay for second stage based on demand. The average calculated duty cycle chart below (Table 4A) shows how the control calculates staging based on demand.

Table 4A

Average Calculated Duty Cycle % Equals	or is less than	Low to High Stage Delay	Demand
0	38	12 Min	Light
38	50	10 Min	Light to Average
50	62	7 Min	Average
62	75	5 Min	Average to Heavy
75	88	3 Min	Heavy Light
88	100	1 Min	Heavy

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 0.4 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.

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.

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

4. BLOWER AND CONTROL PANEL WIRING

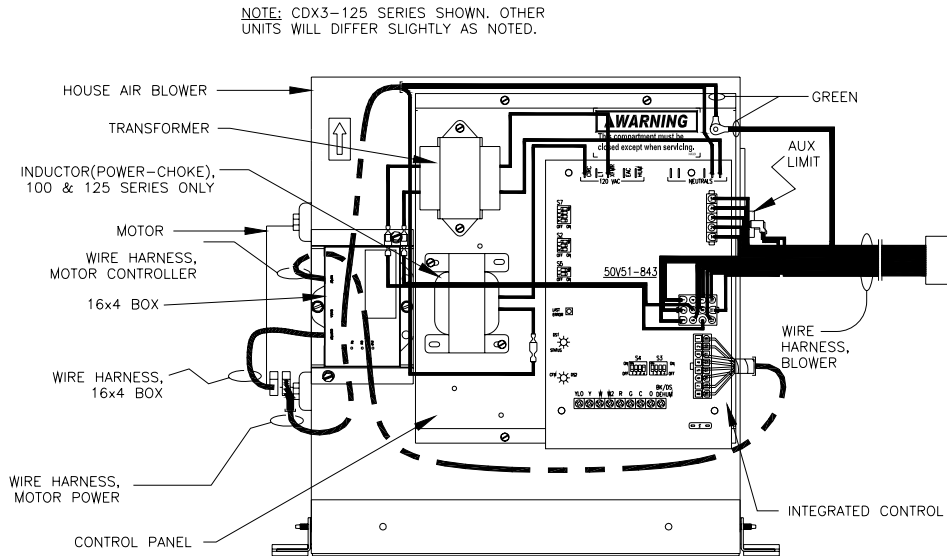


Figure 21

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

Table 4B

S7 DIP Switch			
	Switch Settings		Options
	S7-1	S7-2	Time
Thermostat Type and W2 Delay	Off	Off	Off *
	On	Off	10 Min
	Off	On	Auto
	On	On	20 Min
Heat Fan Off Delay	S7-3	S7-4	Time
	Off	Off	90 Sec
	Off	On	120 Sec *
	On	Off	150 Sec
	On	On	180 Sec

* Factory Setting / 2 Stage Thermostat setting

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

Modifications to ECM blower speed settings are done using the S3 and S4 dip switch controls. Thermo Pride two-stage furnaces are factory shipped at the CFM settings listed below in Table 4C.

2-Stage Blower Settings (from factory)
Table 4C

Unit	Control Board Dip Switch Settings	Heating CFM (low fire)	Heating CFM (high fire)	Constant Fan CFM	Cooling CFM
CDX3-75	SW3 1-4 Off SW4 1-3 Off SW4 4 On	885	1012	500	1000
CHX3-75	SW3 1-4 Off SW4 1-4 Off	760	931	500	1000
CDX3-100	SW3 1-4 Off SW4 1-3 Off SW4 4 On	1094	1340	600	1200
CHX3-100	SW3 1-4 Off SW4 1-4 Off	1015	1243	600	1200
CDX3-125	SW3 1-4 Off SW4 1-3 Off SW4 4 On	1366	1673	700	1400
CHX3-125	SW3 1-4 Off SW4 1-4 Off	1270	1556	700	1400

For adjustments to the Cooling CFM settings, as well as all additional CFM changes, please reference the dip switch tables listed in the ECM operation manual. (Included with every furnace.)

5. DE-HUMIDIFICATION

The ECM motor in conjunction with the W/R 50V51-843 has a feature to enhance de-humidification in the cooling mode. In the dehumidify mode the indoor blower motor (ECM) reduces CFM. By reducing airflow the indoor coil runs colder and thus extracts more moisture from the air.

The W/R 50V51-843 is shipped from the factory with dipswitch S5-2 set to on for system that do not have a dehumidification connection from the thermostat. For systems using a thermostat that provides dehumidification option move dip switch S5-2 to "OFF". With the S5-2 switch in the "OFF" position the air conditioning fan speed will be reduced 30% from the normal CFM setting when the humidity in the home is higher than the set point of the dehumidistat.

6. FIELD WIRING AND REPLACING WIRING

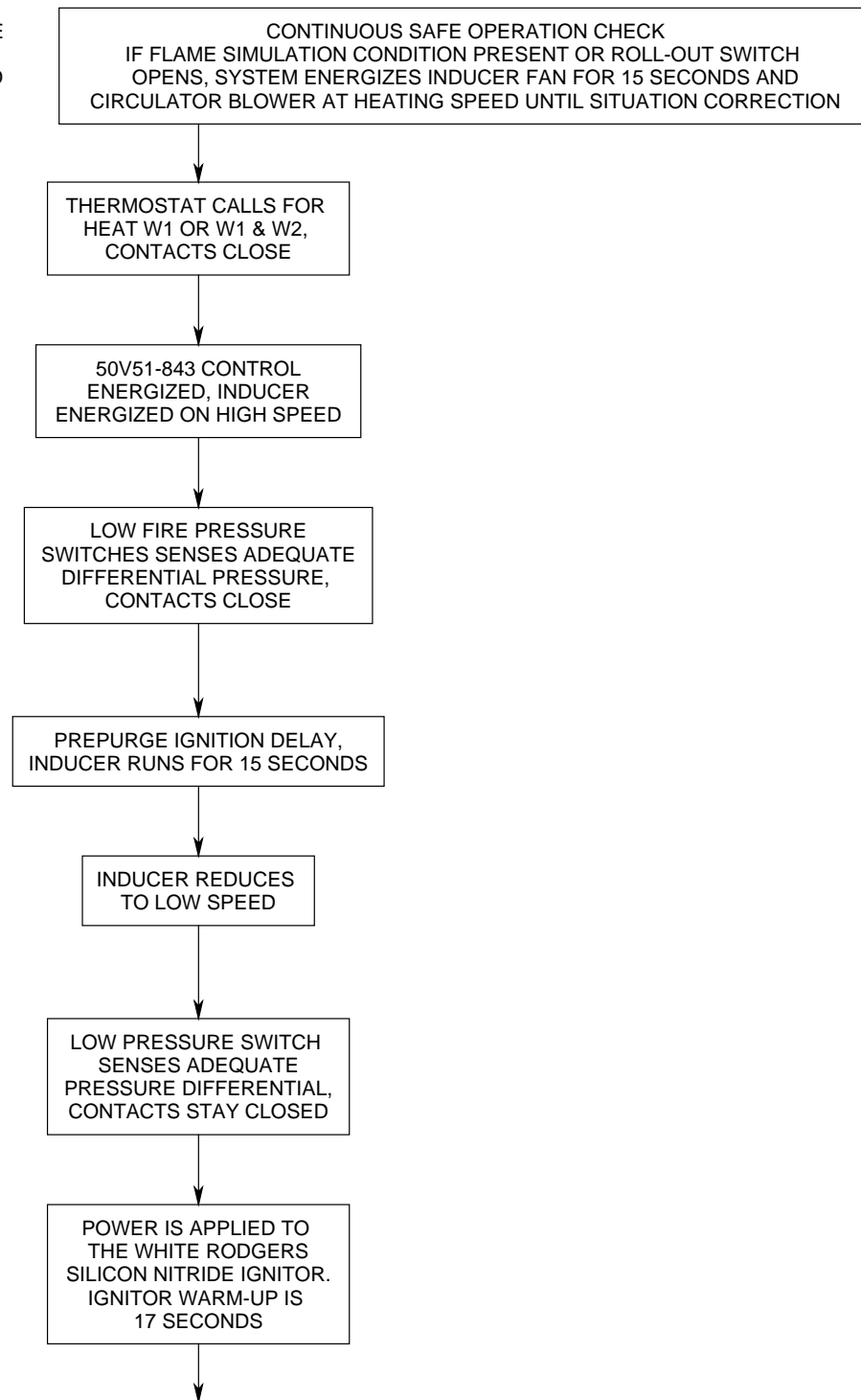
Field wiring between the furnace and devices not attached to the furnace shall conform with the temperature limitation for Type T wire [63°F rise (35°C)] when installed in accordance with the manufacturer's instructions. If any of the original factory supplied furnace wiring is replaced or a separate 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.

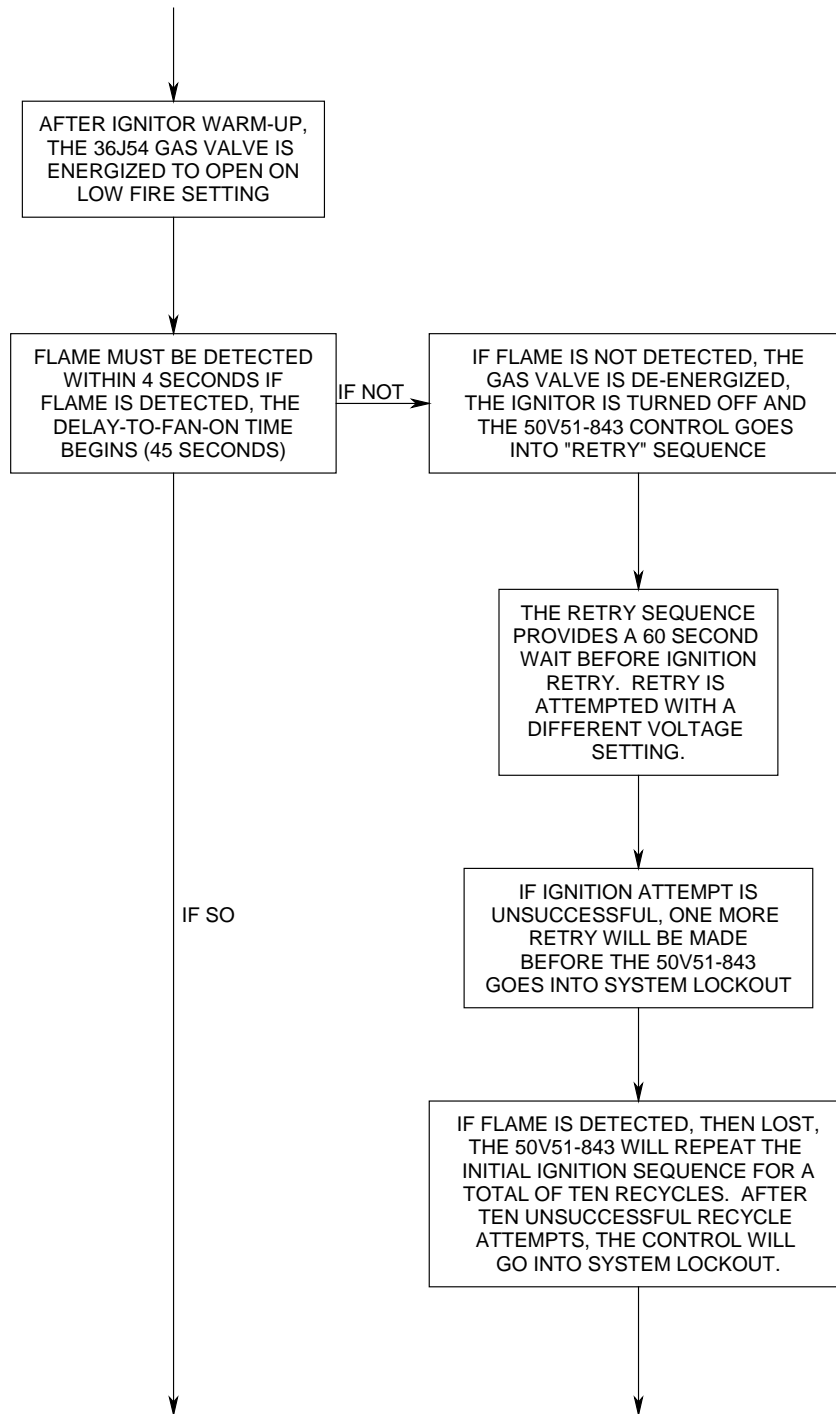
IV. STARTING THE UNIT

A. SEQUENCE OF OPERATIONS

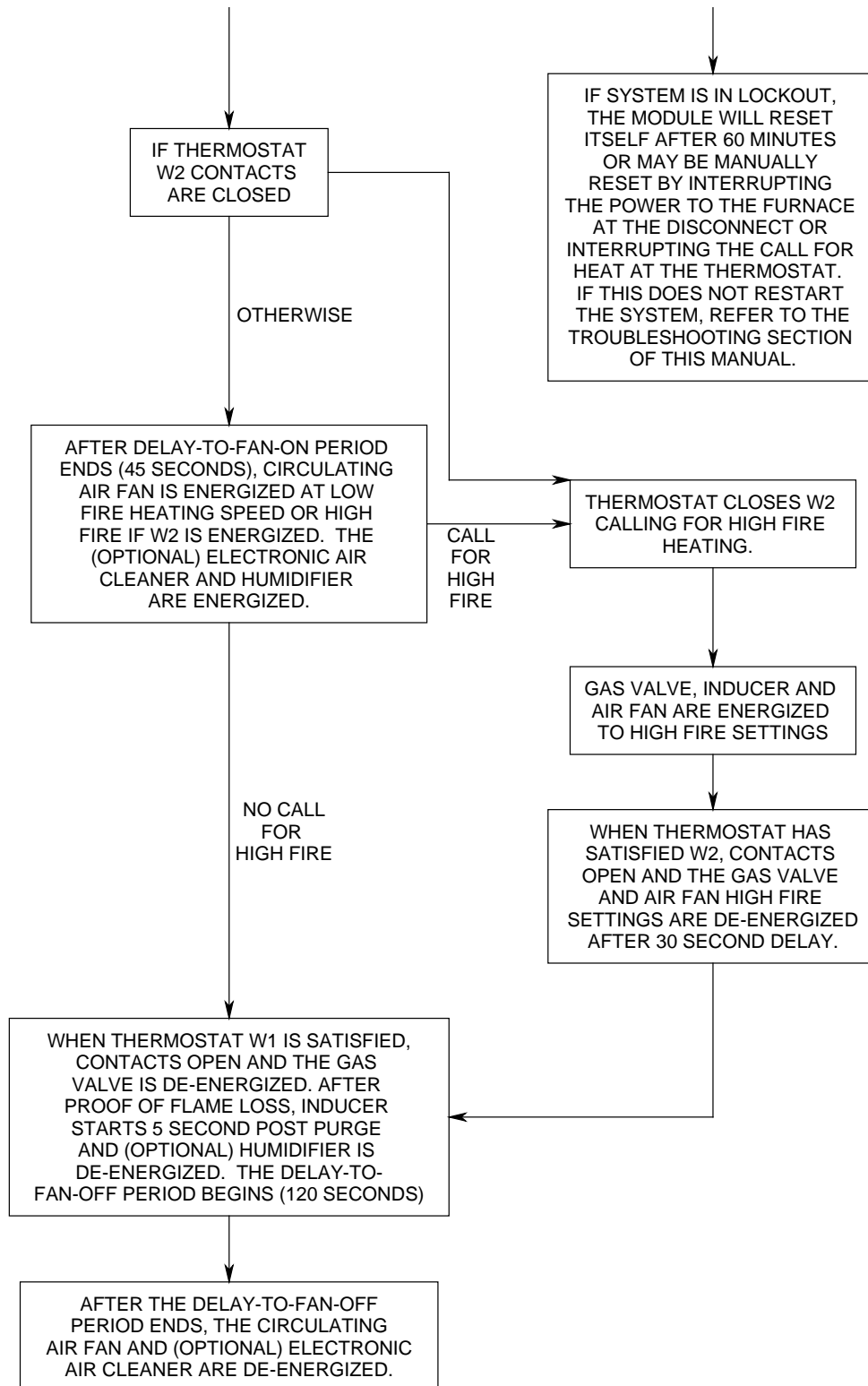
AT ANY TIME THE
GAS VALVE IS
NOT ENERGIZED



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.

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.*

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

C. Measuring And Adjusting Heat Input Rate

CAUTION

DO NOT exceed input rating stamped on furnace nameplate or manufacturer's recommended burner manifold pressure for orifice size used.

Observe the following precautions when measuring:

A. Burner manifold pressure with a pressure gauge.

1. Close the gas valve (turn the gas control knob to the OFF position) BEFORE removing the:
 - a. burner manifold pressure tap plug to connect the manometer (or calibrated pressure gauge)
 - b. manometer, or gauge, and replacing the pressure tap plug.
2. Shut off the gas supply at the appliance service (manual gas shutoff) valve (or for LP gases, shut off the gas at the storage tank service valve) BEFORE removing the:
 - a. gas valve inlet pressure tap plug
 - b. manometer, or gauge and replacing the inlet pressure tap plug.
3. Perform a gas leakage test at the gas valve inlet and burner manifold pressure tap plugs.

B. Gas flowrate by clocking gas meter.

1. To determine the amount of flow, through the gas meter, due to the operation of the furnace.
 - a. Turn off all other appliances and extinguish their pilot flames, if equipped, or
 - b. Deduct the gas consumption of all other operating appliances from the total meter reading.
2. Convert the gas flowrate to the heat input rate (in BTUH) as described in step 10 (in the following section) and compare the value to the heat input rating on the furnace nameplate.

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

NOTICE: A U-tube manometer, measuring pressure in inches of water column, **is recommended** for all gas pressure measurements. However, **an aneroid pressure gauge**, in good working condition, capable of reading pressure changes of 0.05 in. W.G., or less, that was **recently calibrated** (within the last year), **is a satisfactory alternate**. These two (2) devices will be considered as equivalent and interchangeable. Either device is referred to below as a "pressure gauge"

NOTICE: This 2-stage gas valve has two separate gas pressure regulators. Checks and adjustments must be made at both high fire (high adjustment) and low fire (low adjustment).

1. **Shut off the gas** at the automatic gas control valve (turn gas control switch to the OFF position).
2. Remove the outlet pressure tap plug from gas burner manifold and connect a pressure gauge. Refer to Figure 22, below.

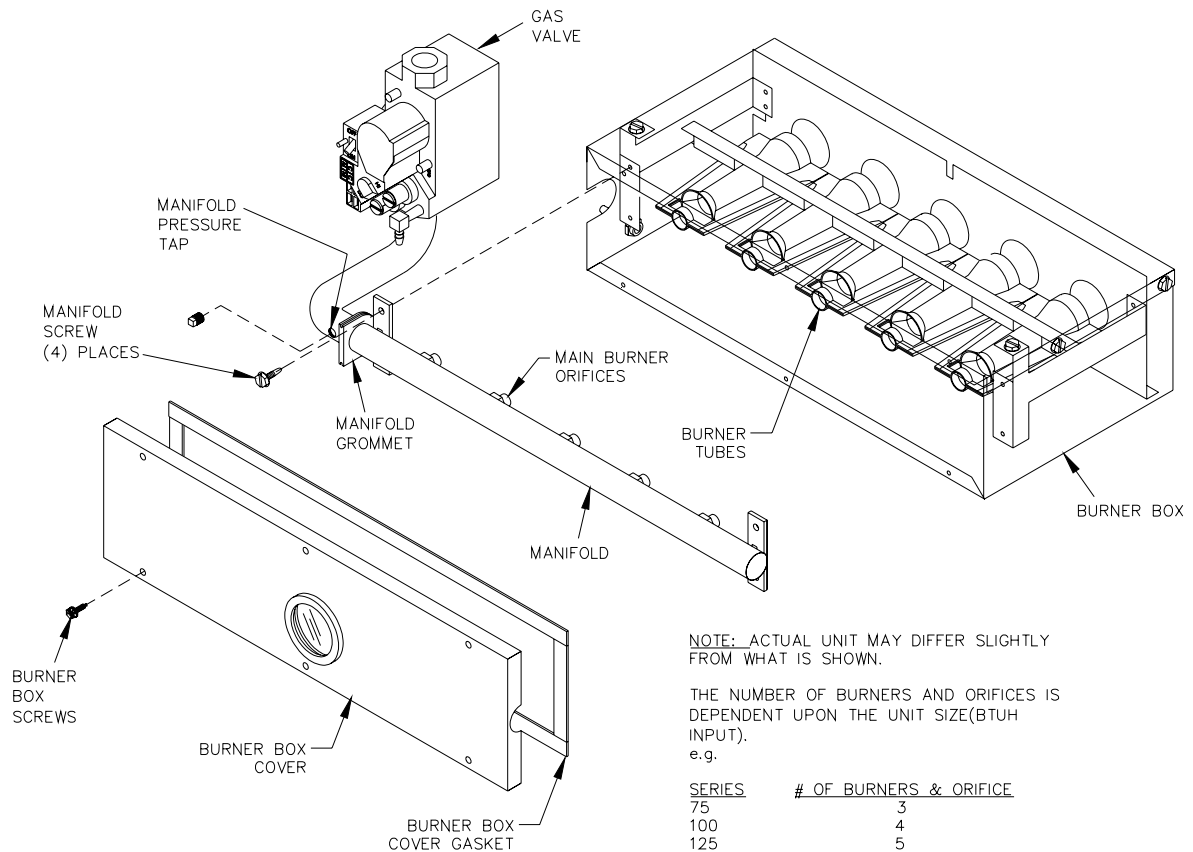


Figure 22: Exploded View of CDX/CHX Gas Control System

3. Turn on the gas at the automatic gas control valve (turn gas control switch to the ON position).
4. Adjust the room thermostat so the furnace will **operate on low fire only**.

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

5. To obtain an accurate manifold gas pressure reading, the main burner must be cycled on and off several times to stabilize the gas control valve pressure regulator diaphragm.
6. Allow the burner to **operate for at least 3 minutes** before taking gas pressure readings.
7. Using a pressure gauge, measure the burner manifold gas pressure.
8. If checking the **input rate by measuring burner manifold pressure, skip to step 12.** If measuring the **input rate using a gas meter, proceed to step 9.**
9. Using a clock (or watch) capable of measuring time in seconds, carefully clock the gas meter to determine the time for one (1) complete revolution of the gas meter dial or reel. At least one (1) cubic foot of gas flow should be measured. Use Table 6 to determine the main burner gas flow rate in cubic feet per hour (CFH).

NOTICE: Some gas meters will require more than one (1) cubic foot of gas pass through the meter for reasons of accuracy. When more than one (1) cubic foot of gas is consumed, divide the total time by the number of cubic feet for comparison to the figures in Table 6.

10. Compare actual heat input rate with our recommended input (printed on the furnace rating label). To convert the rating label input rate (given in BTUH) to the equivalent gas flowrate (in CFH), use the following formula:

$$\text{Heat input rate (in BTUH)} = \text{Fuel gas higher heating value} \left(\text{in } \frac{\text{BTU}}{\text{ft}^3} \right) \times \text{Fuel gas flowrate (in CFH)}$$

or,

$$\text{Fuel gas flowrate (in CFH)} = \frac{\text{Heat input rate (in BTUH)}}{\text{Fuel gas higher heating value} \left(\text{in } \frac{\text{BTU}}{\text{ft}^3} \right)}$$

11. If the measured input rate is above, or below, the rating label value by more than 2%, adjust the manifold gas pressure using the gas control valve pressure regulator to obtain the input rating within a $\pm 2\%$ range. Refer to steps 12(a) through 12(d).
12. **If the gas pressure is not within the specified low fire manifold pressure range (refer to Table 5),** use the following procedure to adjust the low fire, gas pressure regulator to match the specified low fire manifold pressure.
 - a. Remove the regulator cover screw from the gas valve. Refer to Figure 23.

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

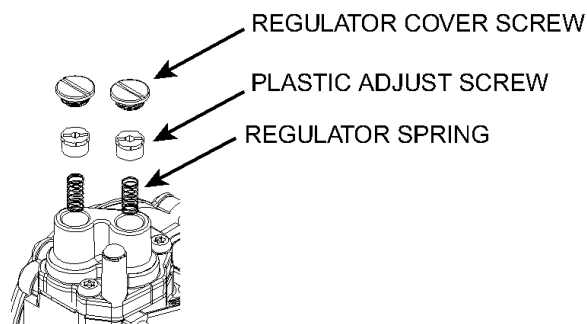


Figure 23:

- b. Turn the inner plastic adjustment screw clockwise to increase, or counterclockwise to decrease, the gas pressure (and gas flow) to the main burner.
- c. Replace the regulator cover screw and tighten it firmly to prevent gas leakage.
- d. Referring to Table 5, measure the gas pressure and to confirm it has been adjusted to within the allowable range. Repeat adjustments (a) through (c), as required.

Table 5 Design Gas Pressures for each Furnace Model Series, Operating Mode, and Type of Fuel.

Fuel Gas Type	Propane			Natural		
	High Fire	CHX Low Fire	CDX Low Fire	High Fire	CHX Low Fire	CDX Low Fire
Normal Manifold Pressure (in. W.G.)	10.0 ± 0.3	4.8 ± 0.3	5.6 ± 0.3	3.5 ± 0.3	1.8 ± 0.3	2.0 ± 0.3
Maximum Gas Supply Pressure (in. W.G.)	14.0			14.0		
Minimum Gas Supply Pressure (in. W.G.)	11.0			4.5		

13. Adjust the room thermostat so the burner will **operate on high fire only**.
14. To obtain an accurate manifold gas pressure reading, the main burner must be cycled on and off several times to stabilize the gas control valve pressure regulator diaphragm.
15. Allow the burner to **operate for at least 3 minutes** before taking gas pressure readings.
16. Using a pressure gauge, measure the burner manifold gas pressure.
17. If checking the **input rate by measuring burner manifold pressure, proceed to step 18**. If measuring the **input rate by clocking the gas meter, repeat steps 9 through 11, above**.

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

18. **If the gas pressure is not within the specified high fire manifold pressure range (refer to Table 5),** repeat steps 12(a) through 12(d), above, adjusting the high fire gas pressure regulator.

If the manifold pressure remains low and it cannot be adjusted into the proper range, **the supply pressure may be too low.** Follow these steps.

- a. **Turn off the gas** at the manual gas shutoff valve.
- b. Remove the automatic gas control valve inlet pressure tap and attach another pressure gauge to the inlet tap.
- c. Turn on the gas and repeat steps 14 and 15, above.
- d. Adjust the upstream (inlet) gas pressure to 14.0 in. W.G., or as close as possible.
- e. Using a pressure gauge, measure and adjust the burner manifold gas pressure.

If it is still not possible increase the manifold gas pressure to within the required range, there is too little gas supply to operate the furnace at full (high fire) input rate under present conditions. If necessary, consult your gas supplier or qualified heating contractor for recommendations to alleviate the problem.

19. **Turn off the gas** at the manual gas shutoff valve (turn handle to the OFF position).
20. Remove all pressure gauges and replace all pressure tap plugs.
21. Go to **Checkout Procedure** below.

Adjusting Burner Input For Altitudes Above 2000 Feet

Ratings of gas utilization equipment are based on sea level operation and **shall not be changed for operation at elevations up to 2,000 feet (600 m.)**. For operation at elevations above 2,000 feet (600 m), equipment ratings shall be reduced at the rate of 4 percent for each 1,000 feet (300 m) above sea level.

For additional information, refer to the latest edition of the National Fuel Gas Code.

Checking The Burner Flame

⚠ CAUTION: The furnace model series CDX3 and CHX3 are sealed combustion designs that do **not** require an air shutter adjustment (air shutters are not used) for proper flame characteristics. The burner box access cover must always be secured with all screws in place and tightened before operating furnace.

Once the input rate has been confirmed correct for a specific application, the burner flames should be checked for proper adjustment.

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

This furnace is designed **not** to require any burner adjustment. Burner aeration is fixed in this design. Burner flames can be seen by looking through the sight glass located on the burner box. Burner flames should be well-defined, light to medium blue in color, and almost transparent. (refer to Figure 24).

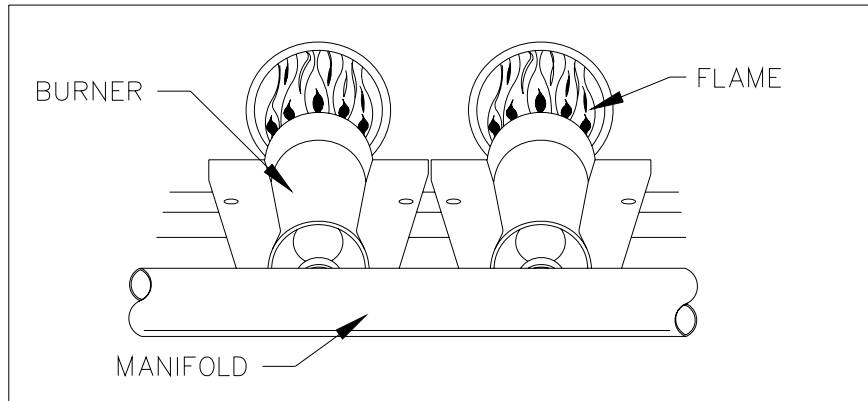


Figure 24: Sketch of Typical Main Burner Flames During Operation

NOTICE: When operating on propane gas, it is not unusual for flames to have yellow or orange colored tips.

If combustion problems are evident, it may indicate problems with either the furnace air supply or the vent system. Refer to the installation and maintenance sections of this manual, or contact Thermo Products at (574) 896-2133.

Checkout Procedure

1. Confirm the furnace exhaust vent and combustion air intake are constructed as outlined in the installation and service manual. They must not be blocked or otherwise obstructed.
2. Place system in operation and observe at least one (1) complete cycle to ensure all controls are operating properly. **The main burner must light reliably under all conditions.**
3. Perform gas leakage test on all gas pipe connections and pressure tap plugs.

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

TIME (sec.)	FLOW (cfh)
40	90
41	88
42	86
44	82
45	80
46	78
47	77
48	75
49	73
50	72
51	71
52	69
53	68
54	67
55	65
56	64
57	63
58	62
59	61
60	60
62	58
64	56
66	54
68	53
70	51
72	50
74	49
76	47
78	46
80	45
84	43
88	41
92	39
96	38
100	36
105	34
110	33
115	31
120	30
125	29
130	28
135	27
140	26
150	24
160	23
170	21
180	20

TABLE 6 - CONVERTING GAS FLOW RATE

- * For one cubic foot per revolution gas meter dials, use Table directly.
- * For 1/2 cubic foot per revolution gas meter dials:
 1. Determine time for two dial revolutions
 2. Use Table directly
- * For two cubic foot per revolution gas meter dials:
 1. Determine time for one complete dial revolutions
 2. Divide time by two
 3. Use Table directly

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

D. 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. 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 gradually with a flat piece of metal, until the pressure switch functions shutting off the main burners. Note: If the burner was initially operating in high fire, the burner will first reduce rate to the low fire setting. As the flue becomes more blocked, the pressure switch will function and completely shut 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. Note: If the burner was initially operating in high fire, the burner will first reduce rate to the low fire setting. As the flue becomes more blocked, the pressure switch will function and completely shut 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.

V. INSTALLER'S INSTRUCTIONS TO USER:

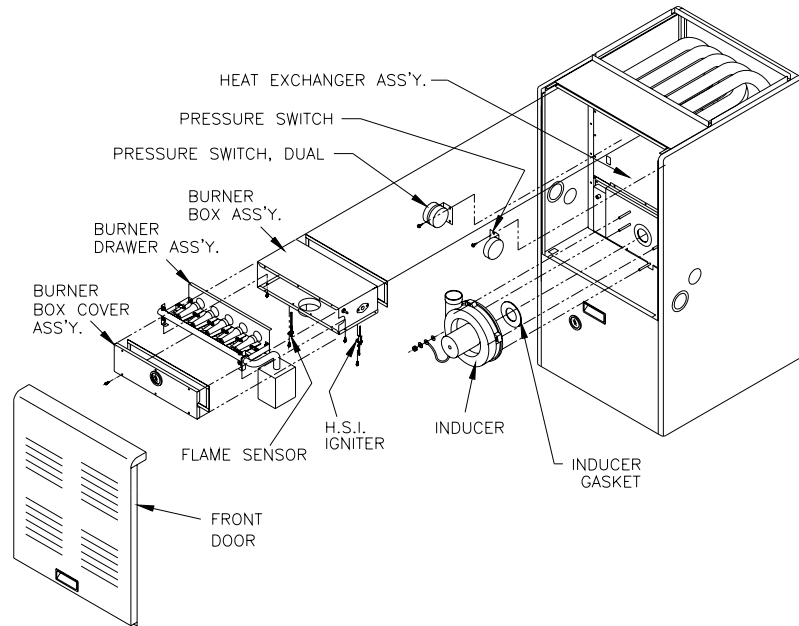
After completing the installation, the installer shall inform and/or demonstrate to the homeowner:

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.

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

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 reach item in Section III of the Users Manual.

Figure 25



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.

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. Turning off power to the furnace or removing the blower door which is equipped with a door interlock switch will reset the control. Should this occur, use the fault code retrieval process as described below.

To retrieve fault codes, push and release the "LAST ERROR" button for more than 1/5 second and less than 5 seconds. (Control will indicate this period by solid GREEN for 1/5 second to 5 seconds.) The LED will flash up to five stored fault codes, beginning with the most recent. If there are no fault codes in

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

memory, the LED will flash two green flashes. The control will flash the most recent error first and the oldest error last (last in first out). There will be 2 seconds between codes. Solid LED error codes will not be displayed.

DIAGNOSTIC FEATURES

The 50V51 control used on this furnace continuously monitors its operation and the operation of the system.

If the sensed failure is in the system (external to the control), the red 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):

Red LED Flash (DS1)

- 1 - flame sensed when no flame should be present
 - 2 - pressure switch stuck closed / inducer error
 - 3 - 1st stage pressure switch stuck open / inducer error
 - 4 - open limit switch
 - 5 - open rollout / aux limit
 - 6 - pressure switch cycle lockout
 - 7 - external lockout (retries)
 - 8 - external lockout (recycles)
 - 9 - grounding or reversed polarity
 - 10 - gas flow with no call for heat
 - 11 - limit switch open – blower failure
 - 12 - ignitor failure
- Solid - internal GV error, micro, and frequency check
3 double - 2nd stage pressure switch stuck open / inducer error

The LED will also flash once at power-up.

Amber LED Flash (DS1)

- 1 – normal call for first stage heat
 - 2 – normal call for second stage heat
 - 3 – W2 present with no W1
 - 4 – Y present with no G call
- Rapid – low flame sense current

Green LED indicator (DS2) is present to obtain an estimate of the air flow rate (in CFM) produced by the house air blower. This LED cycles regularly by providing a constant light, followed by a sequence of flashes. Each flash can be translated to programmed CFM by using the following:

- 1 flash per 100(programmed) CFM

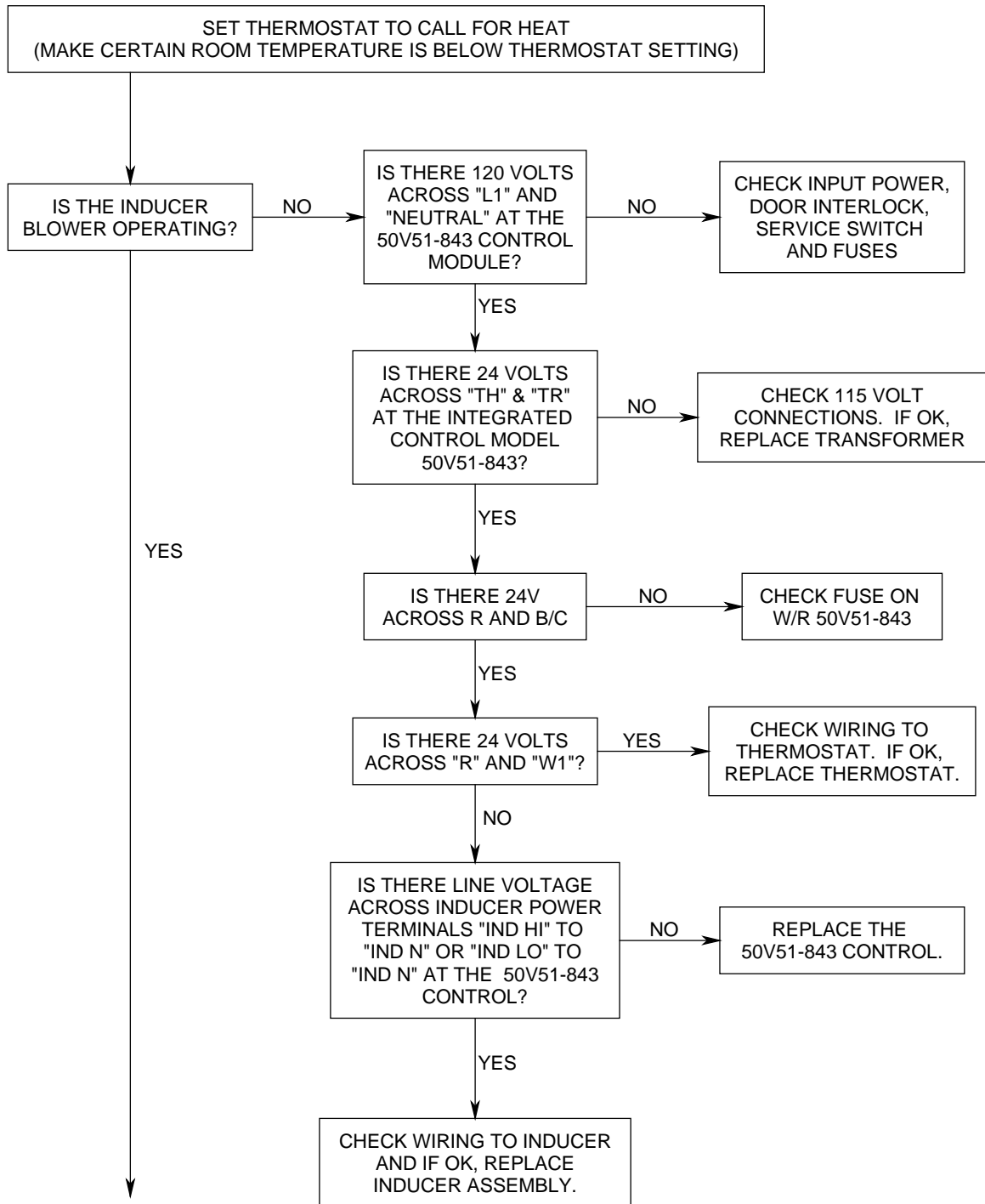
⚠WARNING: *Power must be disconnected before servicing.*

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

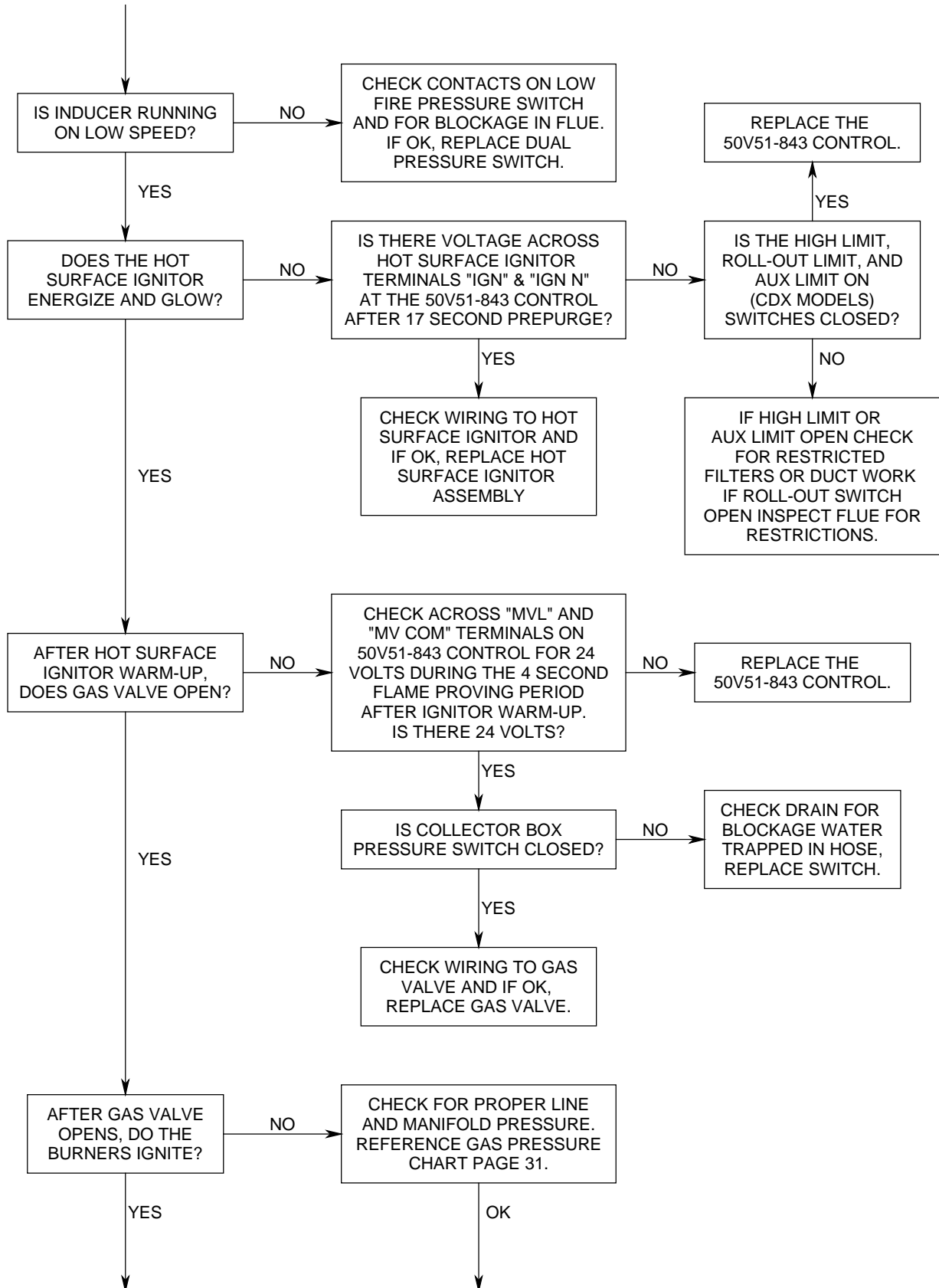
TROUBLESHOOTING GUIDE
THE SYSTEM IS STARTED BY SETTING THE THERMOSTAT TO CALL FOR HEAT. THE FOLLOWING SHOULD HELP ESTABLISH THE TYPE OF MALFUNCTION OR DEVIATION FROM THE NORMAL OPERATION.

NOTE: REFER TO PAGE 48 FOR DEFINITION OF DIAGNOSTIC LEADS.

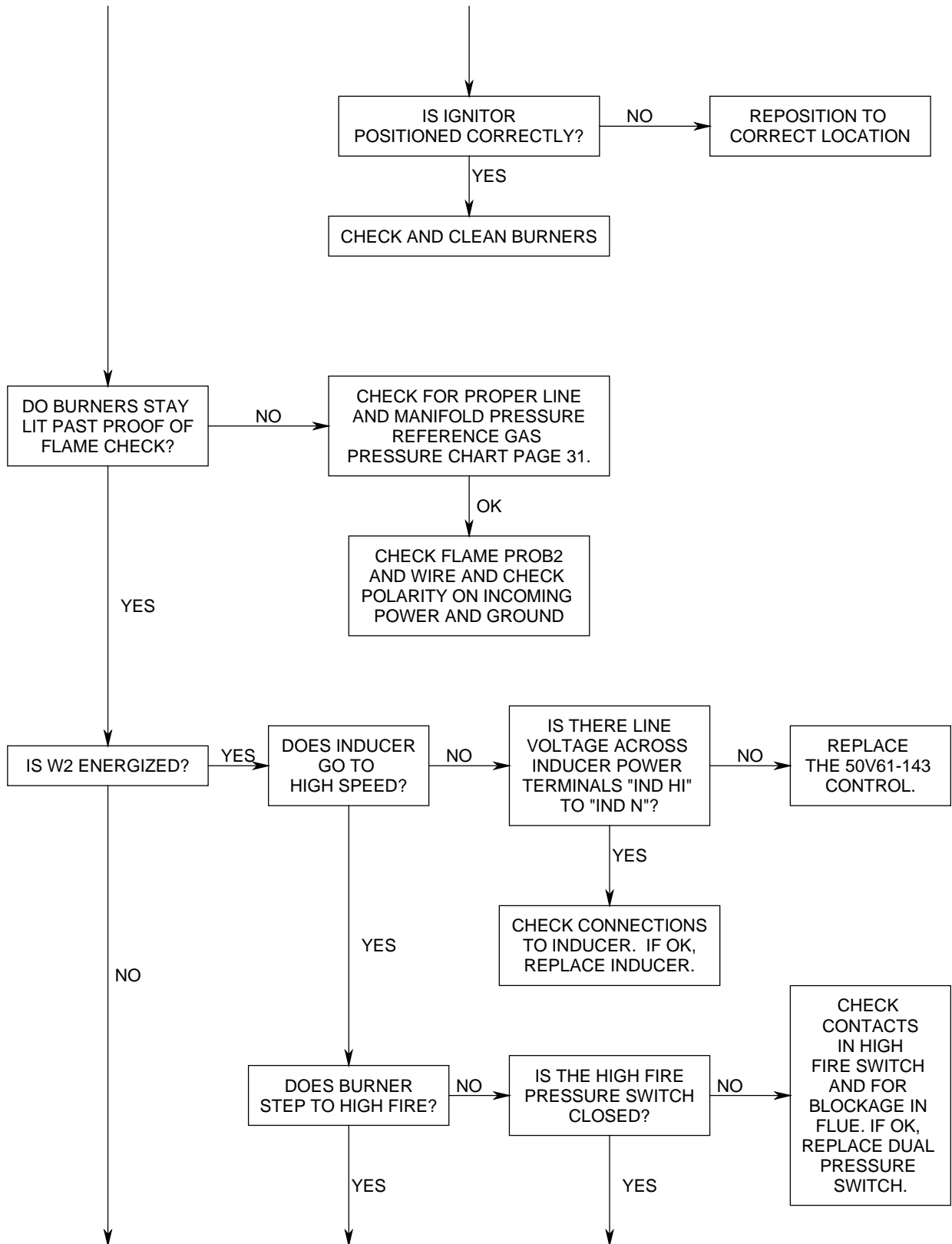
TO USE THIS DIAGRAM, YOU JUST NEED TO FOLLOW THE INSTRUCTIONS IN THE BOXES.



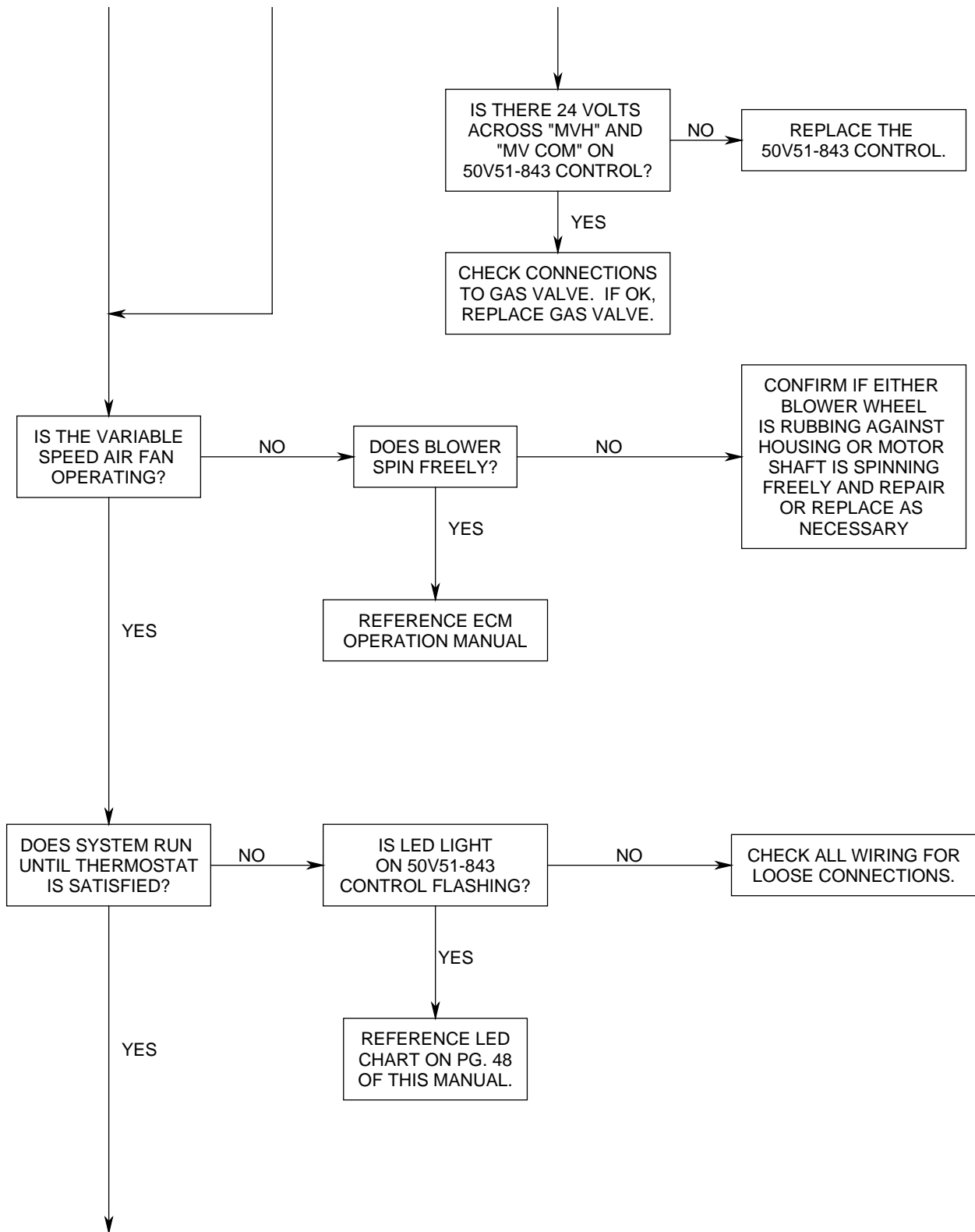
All installations and services must be performed by qualified service personnel.



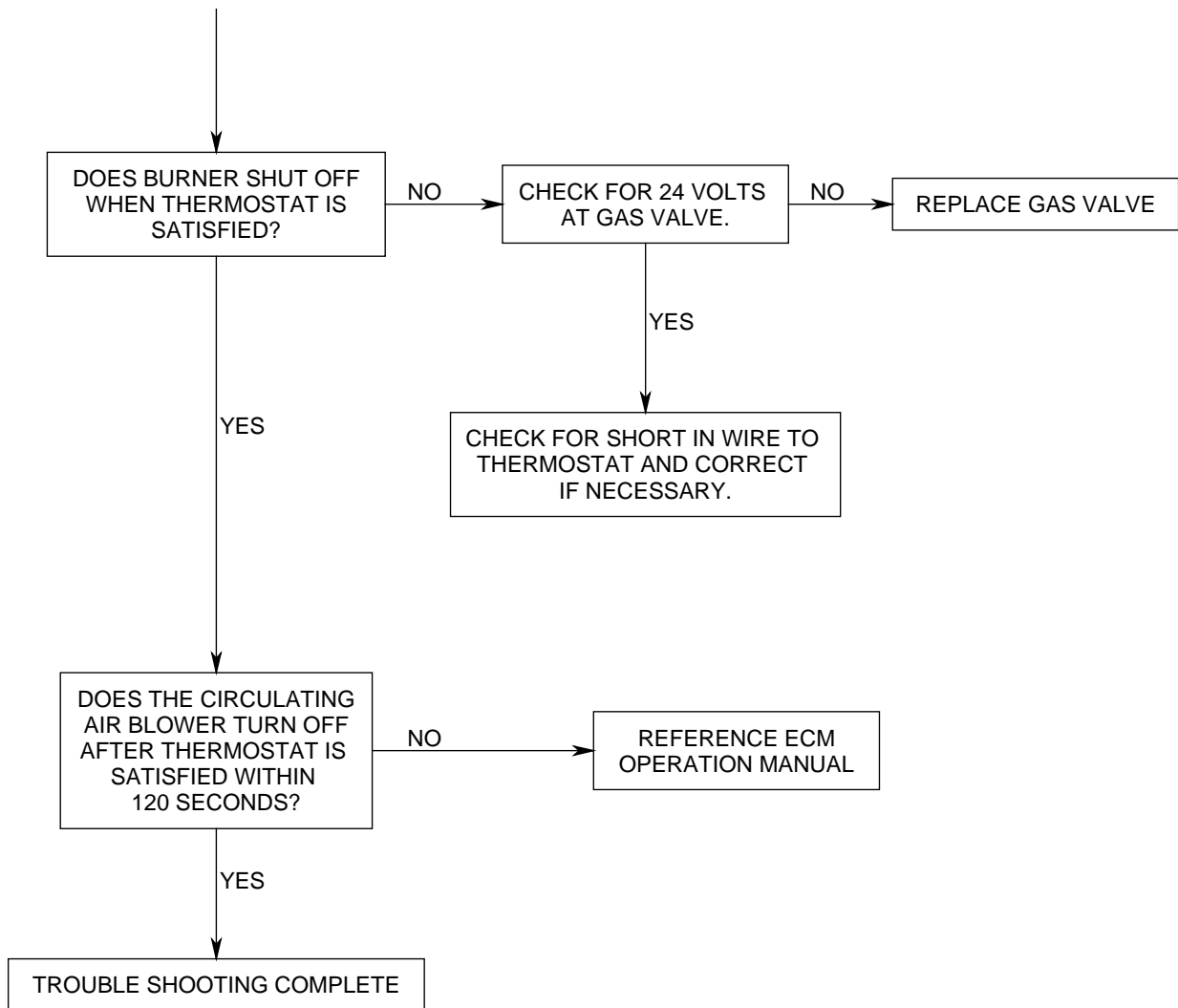
All installations and services must be performed by qualified service personnel.



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



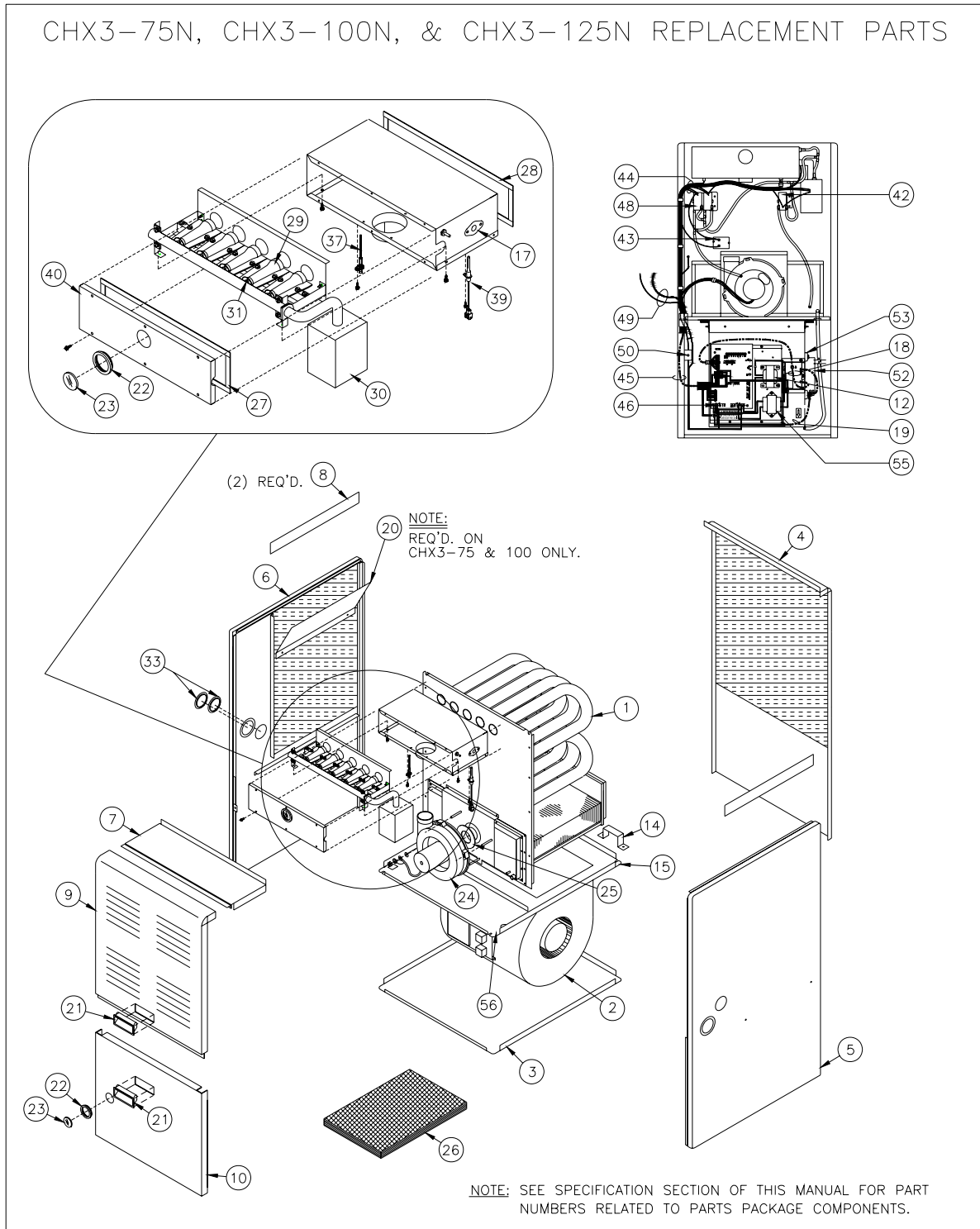
All installations and services must be performed by qualified service personnel.



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

Appendix –A Replacement Parts List

1. Replacement parts list for CHX3-75, CHX3-100 and CHX3-125.



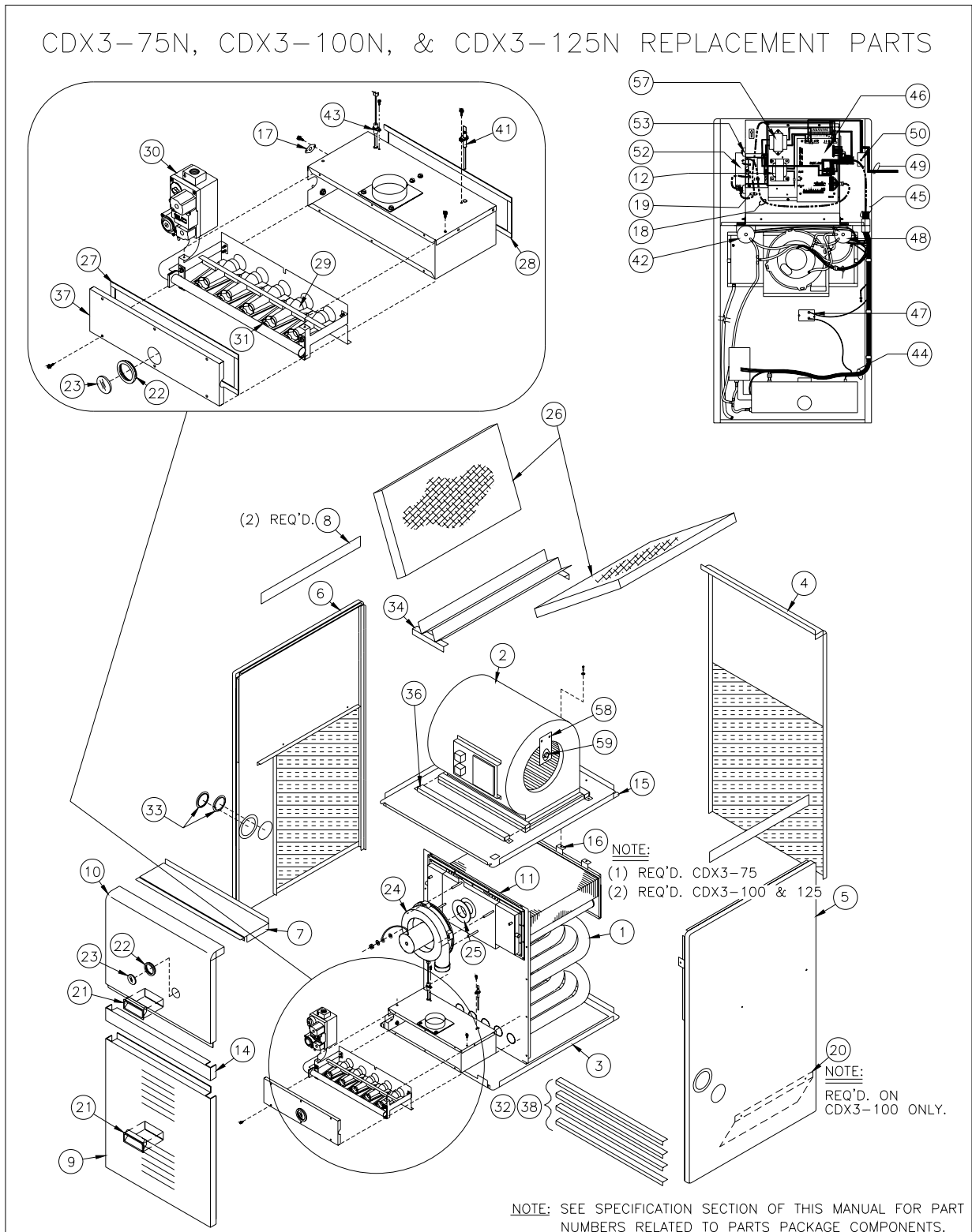
All installations and services must be performed by qualified service personnel.

ITEM	UNIT PARTS DESCRIPTION	CHX3-75N		CHX3-100N		CHX3-125N	
		PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.
1	HEAT EXCHANGER	38116	1	38128	1	38129	1
2	BLOWER ASSEMBLY	S00S4500	1	S00S4501	1	S00S4502	1
3	BASE	10926	1	10720	1	10721	1
4	CASING BACK	610925	1	610772	1	610773	1
5	SIDE CASING (RIGHT)	620105	1	620105	1	620105	1
6	SIDE CASING (LEFT)	620104	1	620104	1	620104	1
7	TOP CENTER PANEL	610929	1	610952	1	610953	1
8	PLENUM STRIPS	613382	2	613382	2	613382	2
9	FRONT DOOR	610933	1	610769	1	610770	1
10	BLOWER ACCESS DOOR	620927	1	620717	1	620718	1
11							
12	INDUCTOR (POWER CHOKE)	—		350855	1	350856	1
13							
14	HEAT EXCHANGER SUPPORT	12394	1	12394	1	12394	1
15	BLOWER PAN	18363	1	18364	1	18365	1
16							
17	LIMIT SWITCH (ROLLOUT)	350485	1	350485	1	350485	1
18	WIRE HARNESS, (MOTOR CONTROL)	350849	1	350849	1	350849	1
19	WIRE HARNESS, (MOTOR POWER)	350850	1	350850	1	350850	1
20	SIDE CASING (ANGLE) BAFFLE	14329	1	14329	1	—	
21	DOOR PULL	320157	2	320157	2	320157	2
22	SIGHT GLASS GASKET	330135	1	330135	1	330135	1
23	SIGHT GLASS	15887	1	15887	1	15887	1
24	INDUCER W\ GASKET	AOPS7427	1	AOPS7427	1	AOPS7427	1
25	INDUCER GASKET	330137	1	330137	1	330137	1
26	FILTER	(16x25x1) 370023	1	(16x25x1) 370023	1	(20x25x1) 370051	1
27	SILICONE SPONGE GASKET (1/2 IN. WIDE)	330141	28.50"	330141	33.75"	330141	39.50"
28	SILICONE GASKET TAPE (1" WIDE)	330140	26.50"	330140	32.25"	330140	38"
29	BURNER TUBE	380595	3	380595	4	380595	5
30	GAS VALVE, NAT.	AOPS7731	1	AOPS7731	1	AOPS7731	1
31	ORIFICE	380600	3	380600	4	380600	5
32							
33	BUTTON PLUG	350046	2	350046	2	350046	2
34							
35	HX COLLECTOR BOX GASKET TAPE (F/R)	330017	7.24'	330017	8.07'	330017	8.9'
36							
37	SENSOR	350759	1	350759	1	350759	1
38							
39	IGNITER	380771	1	380771	1	380771	1
40	COVER	15923	1	15924	1	15925	1
41							
42	PRESSURE SWITCH	350860	1	350860	1	350860	1
43	LIMIT SWITCH	350473	1	350473	1	350473	1
44	HARNESS (VESTIBULE)	350853	1	350853	1	350853	1
45	HARNESS (BLOWER COMPARTMENT)	350851	1	350851	1	350851	1
46	CONTROL, INTEGRATED FAN	350253	1	350253	1	350253	1
47							
48	PRESSURE SWITCH, DUAL	350861	1	350864	1	350861	1
49	HARNESS (SUPPLY)	350704	1	350704	1	350704	1
50	DOOR INTERLOCK SWITCH	350139	1	350139	1	350139	1
51							
52	MOTOR, PROGRAMMED REPLACEMENT KIT	AOPS7501	1	AOPS7502	1	AOPS7503	1
52A	MOTOR	350254	1	350255	1	350256	1
52B	16x4 BOX, PROGRAMMED	AOPS7509	1	AOPS7510	1	AOPS7511	1
52C	HARNESS, 16x4 BOX	350259	1	350259	1	350259	1
53	MOTOR MOUNTING BRKT	AOPS7670	1	AOPS7670	1	AOPS7670	1
54							
55	TRANSFORMER 24v	350464	1	350464	1	350464	1
56	HEYCO BUSHING (SR34-2)	350016	1	350016	1	350016	1
57	GROMMET GRO-7/8	350446	1	350446	1	350446	1
58	L.P. CONVERSION KIT	AOPS7682	1	AOPS7683	1	AOPS7419	1
59	FILTER RACK KIT	AOPS7547	1	AOPS7547	1	AOPS7375	1

(NOT SHOWN)

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

2. Replacement parts list for CDX3-75, CDX3-100 and CDX3-125.



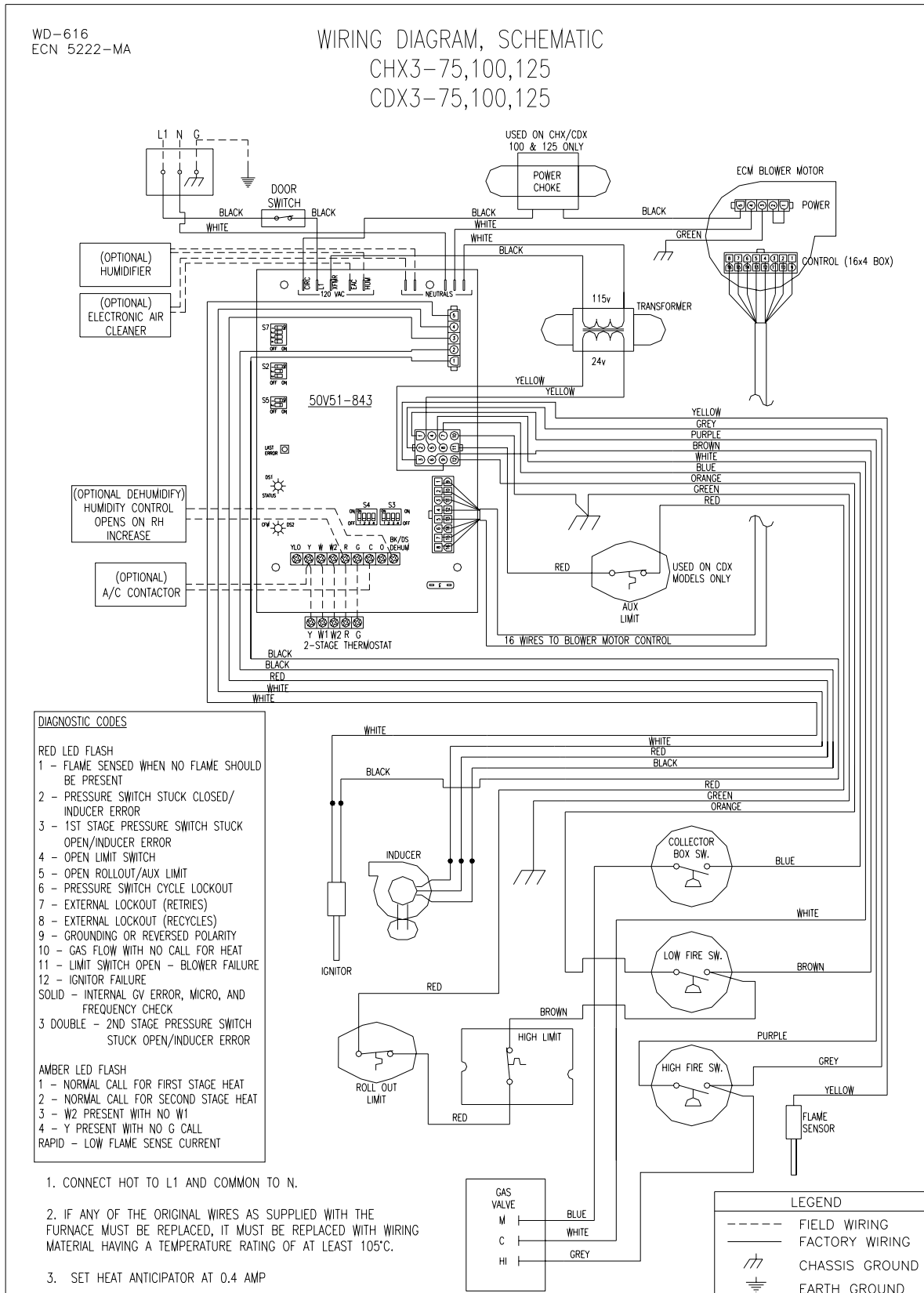
All installations and services must be performed by qualified service personnel.

ITEM	UNIT PARTS DESCRIPTION	CDX3-75N		CDX3-100N		CDX3-125N	
		PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.
1	HEAT EXCHANGER	38118	1	38126	1	38127	1
2	BLOWER ASSEMBLY	S00S4503	1	S00S4504	1	S00S4505	1
3	BASE	18121	1	10775	1	10776	1
4	CASING BACK	610931	1	610732	1	610733	1
5	SIDE CASING (RIGHT)	620107	1	620107	1	620107	1
6	SIDE CASING (LEFT)	620106	1	620106	1	620106	1
7	TOP CENTER PANEL	618124	1	610737	1	610738	1
8	PLENUM STRIPS	613403	2	613403	2	613403	2
9	FRONT DOOR	620932	1	620728	1	620730	1
10	BLOWER ACCESS DOOR	610930	1	610727	1	610729	1
11	TRIM PLATE (TOP)	18172	1	18174	1	18175	1
12	INDUCTOR (POWER CHOKE)	—		350855	1	350856	1
13							
14	FRONT CENTER PANEL	610928	1	610753	1	610754	1
15	BLOWER PAN	28120	1	28178	1	28179	1
16	COIL SUPPORT	22385	1	22385	2	22385	2
17	LIMIT SWITCH (ROLLOUT)	350485	1	350485	1	350485	1
18	WIRE HARNESS, (MOTOR CONTROL)	350849	1	350849	1	350849	1
19	WIRE HARNESS, (MOTOR POWER)	350850	1	350850	1	350850	1
20	SIDE CASING (ANGLE) BAFFLE	—		14329	1	—	
21	DOOR PULL	320157	2	320157	2	320157	2
22	SIGHT GLASS GASKET	330135	1	330135	1	330135	1
23	SIGHT GLASS	15887	1	15887	1	15887	1
24	INDUCER W\ GASKET	AOPS7427	1	AOPS7427	1	AOPS7427	1
25	INDUCER GASKET	330137	1	330137	1	330137	1
26	FILTER	(14x22x1) 370052	2	(14x22x1) 370052	2	(14x22x1) 370052	2
27	SILICONE SPONGE GASKET (1/2 IN. WIDE)	330141	28.50"	330141	33.75"	330141	39.50"
28	SILICONE GASKET TAPE (1" WIDE)	330140	26.50"	330140	32.25"	330140	38"
29	BURNER TUBE	380595	3	380595	4	380595	5
30	GAS VALVE, NAT.	AOPS7731	1	AOPS7731	1	AOPS7731	1
31	ORIFICE	380600	3	380600	4	380600	5
32	PLENUM STRIP	18122	2	13412	4	13412	4
33	BUTTON PLUG	350046	2	350046	2	350046	2
34	FILTER RACK	624803	1	624803	1	624803	1
35	HX COLLECTOR BOX GASKET TAPE (F/R)	330017	7.24'	330017	8.07'	330017	8.9'
36	ANGLE, SEPARATOR	18372	2	18373	2	18374	2
37	COVER	15923	1	15924	1	15925	1
38	PLENUM STRIP	18123	2	—		13413	2
39							
40							
41	SENSOR	350759	1	350759	1	350759	1
42	PRESSURE SWITCH	350860	1	350860	1	350860	1
43	IGNITER	380771	1	380771	1	380771	1
44	HARNESS (VESTIBULE)	350854	1	350854	1	350854	1
45	HARNESS (BLOWER COMPARTMENT)	350852	1	350852	1	350852	1
46	CONTROL, INTEGRATED FAN	350253	1	350253	1	350253	1
47	LIMIT SWITCH	350473	1	350473	1	350473	1
48	PRESSURE SWITCH, DUAL	350861	1	350864	1	350861	1
49	HARNESS (SUPPLY)	350705	1	350705	1	350705	1
50	DOOR INTERLOCK SWITCH	350139	1	350139	1	350139	1
51							
52	MOTOR, PROGRAMMED REPLACEMENT KIT	AOPS7501	1	AOPS7502	1	AOPS7503	1
52A	MOTOR	350254	1	350255	1	350256	1
52B	16x4 BOX, PROGRAMMED	AOPS7509	1	AOPS7510	1	AOPS7511	1
52C	HARNESS, 16x4 BOX	350259	1	350259	1	350259	1
53	MOTOR MOUNTING BRKT	AOPS7670	1	AOPS7670	1	AOPS7670	1
54							
55							
56							
57	TRANSFORMER 24v	350464	1	350464	1	350464	1
58	LIMIT BRACKET	14149	1	14149	1	14149	1
59	AUX. LIMIT SWITCH	350472	1	350472	1	350472	1
60	L.P. CONVERSION KIT	AOPS7682	1	AOPS7683	1	AOPS7419	1

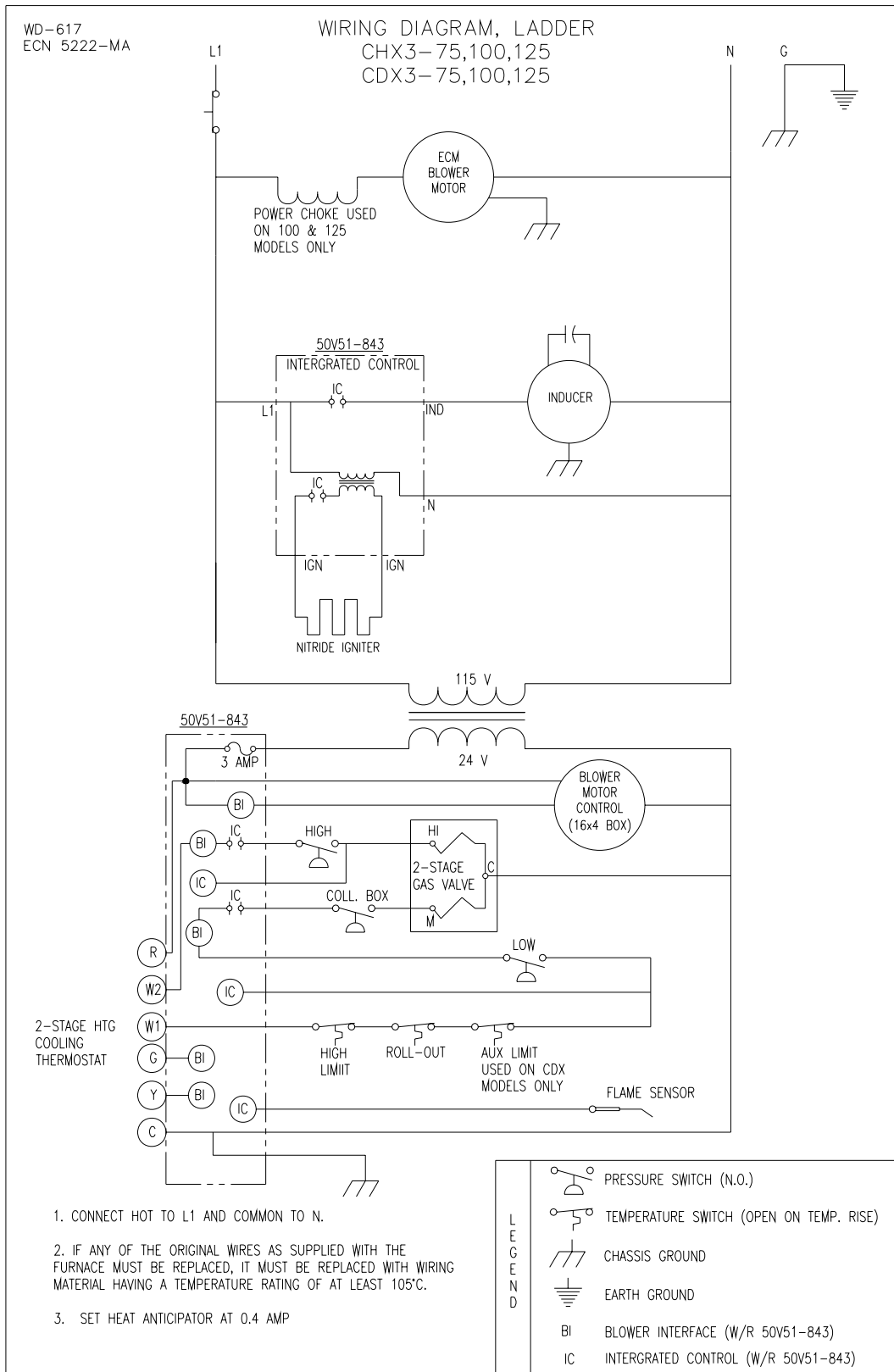
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All installations and services must be performed by qualified service personnel.

Appendix – B Wiring Diagrams



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



Thermo Products, LLC. "PEACE OF MIND" Warranty (Limited) Ten-Year Parts and Transportation Lifetime on Heat Exchanger

Thermo Products, LLC., a Delaware corporation, hereby warrants the Thermo Pride gas condensing warm air furnace manufactured by it to be free from defects in material and workmanship. The warranty is extended to the original owner(s) whose name(s) appear on this certificate and the Warranty Registration Card returned to Thermo Products, LLC. The heat exchanger warranty is also extended to any subsequent owner(s).

1ST-10TH YEAR: During the first 120 months after installation, all parts of the furnace are warranted with the exception of air filters. The owner may arrange with the original installing dealer or any other dealer of his choice to replace the defective part. Any labor costs involved in the removal of the defective part and replacement of the new part are the responsibility of the owner. Warranted replacement parts will be shipped with instructions to the dealer on disposition of the defective part. Beyond the fifth year, any transportation costs associated with the replacement of warranted parts are the responsibility of the owner. Beyond the tenth year, no other parts are covered except the furnace primary and secondary heat exchangers. The 10-year parts warranty is extended to the original owner only.

BEYOND THE 10TH YEAR: The primary and secondary heat exchangers carry a Limited Lifetime Warranty. If at any time during the warranty period the primary or secondary heat exchanger becomes defective, Thermo Products, LLC. will provide at its option either a replacement heat exchanger or the necessary repair parts on a no charge basis. Any labor costs involved in the diagnosis, repair or the removal and replacement of a heat exchanger are the responsibility of the owner. The owner may arrange with any qualified HVAC dealer for the necessary labor. Beyond the fifth year, any transportation costs associated with the replacement of the complete heat exchanger or the repair parts are the responsibility of the owner. If Thermo Products, LLC. requests the return of the defective heat exchanger after the fifth year, it must be returned by prepaid transportation at the expense of the owner.

THE CONDITIONS OF THIS WARRANTY ARE:

- A. The furnace must be operated within its rated capacity as indicated on the rating label.
- B. The furnace must be fired with the fuel for which it was designed.
- C. The furnace must have been provided reasonable and necessary maintenance.
- D. The furnace must operate with a duct system designed in accordance with the current ACCA (Air Conditioning Contractors of America) Manual D recommendations.
- E. The furnace must be installed in accordance with local and state codes regarding safety and electrical wiring requirements and/or installation instructions furnished by Thermo Products, LLC.
- F. That if the heat exchanger(s) fail as a result of corrosion caused from chlorides or other halogen based chemicals being brought through the furnace in the combustion air, then the heat exchanger warranty will be void. The use of outside combustion air helps reduce the risk of corrosion failure from chemical exposure.
- G. Limit controls and pressure switches which are supplied with the furnace and having pre-set temperatures or pressure settings must not be modified, altered or by-passed.
- H. The furnace cannot be modified and/or operated in any manner other than its design configuration.
- I. The furnace must be installed and maintained as specified in the operation and installation instructions.
- J. No air conditioning or heat pump coil may be installed on the return air side of the furnace.
- K. The furnace must be protected against freezing.
- L. The unit must remain at its original installation address.
- M. Thermo Products, LLC. shall not be responsible for any failure due to water damage and/or acts of God.

FAILURE TO COMPLY WITH ANY OF ABOVE CONDITIONS WILL VOID ANY AND ALL WARRANTIES LISTED ABOVE.

THIS WARRANTY EXPRESSLY SUPERSEDES ALL OTHER WARRANTIES AND OBLIGATIONS OF THERMO PRODUCTS, LLC. NO PERSON HAS AUTHORITY TO ALTER OR MODIFY THE TERMS OF THIS WARRANTY IN ANY MANNER. THERMO PRODUCTS, LLC. ASSUMES NO LIABILITY FOR CONSEQUENTIAL DAMAGE OF ANY KIND, AND THE PURCHASER BY ACCEPTANCE OF THIS EQUIPMENT ASSUMES ALL LIABILITY FOR THE CONSEQUENCE OF ITS USE OR MISUSE BY THE PURCHASER, HIS EMPLOYEE OR OTHERS.

Dealers Name _____

Address _____

City, State, Zip _____

Date of Installation _____

Model No. _____ Serial No. _____

G-33 ECN 5085-MA

Thermo Products, LLC.

P. O. Box 217
North Judson, Indiana 46366
PH. 574-896-2133

Owner(s) _____

Installation Address _____

City, State, Zip _____

Owner's Copy

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