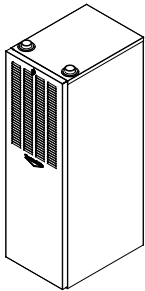




GAS FIRED HIGH EFFICIENCY FURNACE DOWN FLOW & DIRECT VENT (SEALED COMBUSTION)



MODEL: CMA1-50N & CMA2-75N INSTALLATION AND SERVICE MANUAL

For installation in:

1. Manufactured Homes
2. Modular Homes/Buildings
3. Site Constructed—Residential (Single Story Dwellings)

⚠️ WARNING

FOR YOUR SAFETY

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.
- 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.

⚠️ WARNING: *If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury, or loss of life.*

⚠️ WARNING: *Improper installation, adjustment, alteration, service, or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information, consult a qualified installer, service agency, or fuel supplier.*

⚠️ WARNING: *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 electrical or control system that has been underwater.*

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



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



MG-508
ECN 5320-MA 130307

MADE IN USA

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REFERENCED PUBLICATIONS:
NATIONAL FUEL GAS CODE
NFPA 54/ANSI-Z233.1
(LATEST EDITION)

FOR COPIES CONTACT:
NATIONAL FIRE PROTECTION ASSOCIATION
1 BATTERYMARCH PARK
P.O. BOX 9101
QUINCY, MA 02269-9101

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

<p>CAUTION</p> <p>MOVING PARTS CAN CAUSE SEVERE PERSONAL INJURY. SHUT OFF FURNACE BEFORE REMOVING THIS PANEL.</p> <p>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.</p> <p>DO NOT REMOVE THIS LABEL.</p> <p>390231</p>	<p>△ WARNING</p> <p>SPECIAL HOMEOWNERS INSTRUCTIONS</p> <ul style="list-style-type: none"> • 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. 	<p>FOR YOUR SAFETY</p> <p>WHAT TO DO IF YOU SMELL GAS:</p> <ol style="list-style-type: none"> 1. DO NOT TRY TO LIGHT ANY APPLIANCE. 2. DO NOT TOUCH ANY ELECTRICAL SWITCHES. DO NOT USE ANY PHONE IN YOUR BUILDING. 3. IMMEDIATELY CALL YOUR GAS SUPPLIER FOR ASSISTANCE. FOLLOW THE GAS SUPPLIER'S INSTRUCTIONS. 4. IF YOU CANNOT REACH YOUR GAS SUPPLIER, CALL THE FIRE DEPARTMENT. <p>FOR YOUR SAFETY</p> <p>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.</p>
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△ WARNING

REINSTALL ALL PARTS!

Should this unit be disassembled all components, panels, block offs, collars, gaskets, and fasteners must be reassembled as originally factory produced.

Failure to do so may result in property damage, injury, or loss of life.

390056

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

390410

△ WARNING

Hazardous fire 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.

390131

△ WARNING

This compartment must be closed except when servicing.

390024

NOTE: DO NOT ADD SEALANT TO THE PVC BURNER BOX INLET RING CONNECTION. (REFER TO INSTALLATION INSTRUCTIONS)

LO-224

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

390229

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.

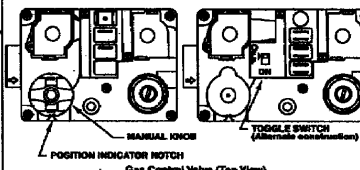
- This appliance does not have a pilot. It is equipped with a hot surface igniter that automatically lights the burner. Do **not** try to light the burner by hand.
- BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell near to the base of unit because some gas is heavier than 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.
- Use only your hand to push in or turn the gas control knob, or move the gas control switch. Never use tools. If the knob will not push in or turn, or 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.
- 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

- STOP!** Read the safety information above on this label.
- Set the thermostat to the lowest setting.
- Turn off all electric power to the appliance.
- This appliance is equipped with a hot surface igniter that automatically lights the burner. Do **not** try to light the burner by hand.
- Turn gas control knob clockwise to "OFF" position. (For gas valves with a switch, move the switch to the "OFF" position.)
- 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 next step.
- Turn gas control knob counterclockwise to "ON" position. (For gas valves with a switch, move the switch to the "ON" position.)
- Turn on all electric power to unit.
- Set thermostat to desired setting, and, if equipped, set the operating mode to "HEAT".
- If appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.





TO TURN OFF GAS TO APPLIANCE

- Set thermostat to lowest setting, and, if equipped, set the operating mode to "COOL" or "OFF".
- If service is to be performed, turn off all electric power to the appliance.
- To turn off gas control valve, remove the burner compartment cover.
- Turn gas control knob clockwise to "OFF" position. (For gas valves with a switch, move the switch to the "OFF" position.)
- Replace the burner compartment cover.

390499

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

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

3018528
MODEL NO. SERIAL NO.

FOR INSTALLATION IN MANUFACTURED HOME. DATE OF MANUFACTURE 13 MAR 2012
FOR INSTALLATION AS CENTRAL FURNACE SPECIAL TYPE FOR SINGLE STORY DWELLING.

FUEL TYPE	BTUH INPUT	ORIFICE DRILL SIZE	LINE PRESSURE (IN. W.C.)		MANIFOLD PRESSURE (IN. W.C.)
			MIN.	MAX.	
NAT.		#42	4.5	14.0	3.5 INCHES W.C.
L.P.		1.5 MM	11.0	14.0	10.0 INCHES W.C.

APPLIANCE IS SHIPPED FROM FACTORY WITH #42 ORIFICES FOR NATURAL GAS.
FOR L.P. GAS CONVERSION REFER TO INSTRUCTION MANUAL PROVIDED WITH THIS APPLIANCE.

INSTALLATION

APPLIANCE MAY BE INSTALLED IN A CLOSET OR ALCOVE WITH MINIMUM CLEARANCES TO ADJACENT COMBUSTIBLE CONSTRUCTION OF NOT LESS THAN: 6 INCHES AT FRONT OF CLOSET, 18 INCHES AT FRONT OF ALCOVE, 0 INCH AT BACK, 0 INCH AT SIDES, 0 INCH FROM FLUE PIPE, 0 INCH FROM TOP OF APPLIANCE TO CEILING, 1 INCH FROM PLENUM SIDES AND WARM AIR DUCT WITHIN 3 FEET OF APPLIANCE. FOR CLOSET INSTALLATION A 250 SQ. IN. RETURN AIR OPENING MUST BE PROVIDED IN THE CLOSET DOOR. SEE INSTRUCTION MANUAL FOR LOCATION DETAILS. THIS TYPE FSP APPLIANCE MAY BE INSTALLED WITH A THERMO PRODUCTS, LLC. MODEL 70-BASE ASSEMBLY. SEE INSTRUCTION MANUAL FOR DETAILS ON INSTALLATION OF BASE. THIS FURNACE REQUIRES A SPECIAL VENTING SYSTEM. REFER TO INSTALLATION INSTRUCTIONS NO. MG-508 FOR PARTS LIST AND METHOD OF INSTALLATION.

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

390425(A); D 5148 MA
1004-015086-MA

MAXIMUM VENT LENGTH 30 FT. MINIMUM VENT LENGTH 8 FT.
THIS FURNACE MUST BE INSTALLED IN ACCORDANCE WITH THERMO PRODUCTS INSTRUCTIONS AND LOCAL CODES. IN THE ABSENCE OF LOCAL CODES, CONFORM TO THE FOLLOWING CODES AS APPLICABLE:
NATIONAL FUEL GAS CODE, ANSI Z223.1
MANUFACTURED HOME CONSTRUCTION AND SAFETY STANDARD, TITLE 24 CFR, PART 3280
MANUFACTURED HOME INSTALLATION, ANSI/NCSBCS A225.1

THICKNESS OF THE WALL CONSTRUCTION THROUGH WHICH THE VENT-AIR INTAKE PIPES MAY BE INSTALLED. MINIMUM - 1/2", MAXIMUM - 18"

PERFORMANCE

THIS APPLIANCE IS A CATEGORY I, DIRECT VENT FORCED AIR FURNACE FOR MOBILE HOME OR TRAVEL TRAILER INSTALLATION. TESTED AT 0.3 INCHES OF WATER, STATIC PRESSURE. DESIGNED MAXIMUM OUTLET AIR TEMPERATURE 200°F OR LESS WITH A NOMINAL TEMPERATURE RISE OF 55°F. CONFORMS TO ANSI Z21.47b-CSA 2.3b-2008 CENTRAL FURNACE. FOR MAXIMUM EFFICIENCY, SET APPLIANCE FOR A 40°F TEMPERATURE RISE.

ELECTRICAL RATING

115 VOLTS 60 HERTZ 1 PHASE
MAXIMUM CURRENT AMPS 7.15

WARNING - RISK OF FIRE OR ELECTRIC SHOCK. ONLY CERTIFIED OR MANUFACTURER QUALIFIED SERVICE PERSONNEL SHALL BE USED TO INSTALL AND PROVIDE MAINTENANCE OF THIS APPLIANCE.

390425(B); D 5059 MA
1004-015086-MA

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

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

1. Use only with type of gas approved for this furnace. Refer to furnace rating plate.
2. Do not install this furnace where it could be exposed to drafts or other wind or moisture conditions. Refer to Section IV of this manual.
3. Provide adequate ventilation air to the furnace space. Refer to Section IV, C and D, of this manual.
4. Connect this furnace to an approved vent system only. Combustion products must be carried outdoors. Refer to Section IV, F thru J, of this manual.
5. Never test for gas leaks with an open flame. Leak test methods must comply with State, Local and National codes including the National Fuel Gas Code NFPA 54/ANSI-Z233.1 (Latest Edition).
6. Always install furnace with a duct system that has an external static pressure within the allowable range referenced in specifications.
7. Make sure supply air ducts are completely sealed to the furnace casing. Refer to Section IV.

The following pages contain various warnings and cautions found throughout the Thermo Pride Gas Fired High Efficiency 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.

⚠CAUTION: Negative pressure inside the closet with closet door closed and the furnace blower operating on high speed shall be no more negative than minus 0.05 inch water column.

⚠WARNING: Do not obstruct any return air openings, including the return grille on the furnace. To do so may cause the furnace to activate the high limit and shut down.

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

⚠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 CMA furnace has been designed to be installed as a direct vent system and must have its combustion air brought in from outside the conditioned space. 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: *All gas piping must be leak tested methods approved by State, Local and National Codes including the National Fuel Gas Code NFPA 54/ANSI-Z233.1 (Latest Edition). A final test for gas leakage must be made after purging the gas line. This test must be conducted with the unit operating and should include the furnace piping and gas valve. Never use an open flame to check for a gas leak.*

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

⚠WARNING: *The furnace and its individual gas shutoff valve must be disconnected from the gas supply during pressure testing of the gas supply system at pressures in excess of 1/2 PSIG or 14.0" w.c. The furnace must be isolated from the gas supply by closing its manual shut off valve at test pressures equal to or greater than 1/2 PSIG or 14.0" w.c.*

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

⚠WARNING: *Copper and brass tubing and fittings (except tin lined) shall not be used if the gas contains more than a trace (0.3 grains per 100 cubic ft.) of hydrogen sulfide gas. Check with your gas supplier.*

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

⚠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 in accordance with State, Local and National Codes including the National Fuel Gas Code NFPA 54/ANSI-Z233.1 (Latest Edition).*

⚠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.*

⚠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 above for 15 minutes or until odor has dissipated.*

⚠CAUTION: *The CMA furnace models are of direct vent design and do 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.*

⚠CAUTION: *Label wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.*

⚠CAUTION: *The inducer motor mounting plate gasket and the collector box gasket must be replaced if they show any sign of having been damaged.*

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

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

INSTALLATION PARTS PACKAGE

PARTS PKG# DESCRIPTION	CMA*-50 S00S4179		CMA*-75 S00S4114	
	PART #	QTY	PART #	QTY
J-box cover	350020	1	350020	1
wire nut	300132	2	300132	2
3" stainless steel hose clamp	300276	4	300276	4
2-3/8" radiator hose	410017	2	410017	2
CPVC adapter	320833	1	320833	1
LP conversion kit	AOPS7677	1	AOPS7678	1

III. GENERAL INSTRUCTIONS AND CLEARANCES – READ BEFORE START OF INSTALLATION

1. 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 the American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc. (ASHRAE).
2. This furnace is equipped with orifices sized for operation with natural gas. For conversion to Propane Gas see instruction MG-799 in Gas Conversion Kit AOPS7678.
3. 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 40°F to 70°F through the furnace after installation. (See rating label located on separator 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.

4. 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

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

accordance with the latest edition of the UL Standard for Single and Multiple Station Carbon Monoxide Alarms, UL 2034, or the CSA International Standard, Residential Carbon Monoxide Alarming Devices, CSA 6.19.

5. The installer shall be familiar with and comply with all codes and regulations applicable to the installation of these heating appliances and related equipment. In lieu of local codes, the installation shall be in accordance with the current provisions of one or more of the following standards.

- a. Federal Manufactured Home Constructions & Safety Standard (H.U.D. Total 24, Part 280.)
- b. American National Standard (ANSI-119.2/NFPA-501C) for all recreational vehicle installations.
- c. American National Standard (ANSI-Z223.1/NFPA-54) for all gas-fired furnaces.
- d. American National Standard (ANSI-C1/NFPA-70 Electric Code for all electrical field wiring.
- e. These gas-fired units have been investigated under standards ANSI Z 21.47 CAN/CGA Z223-2001 Central Furnace test standards.
- f. These gas-fired units have been listed by ETL "For installation as central furnace special type for single story dwelling."

⚠WARNING: The area around the furnace must be kept free and clear of combustible materials, especially papers and rags.

⚠WARNING: This furnace is not to be used as a construction heater.

Listed below are definitions of "COMBUSTIBLE MATERIAL" and "NON-COMBUSTIBLE MATERIAL."

COMBUSTIBLE MATERIAL:

Material made of or surfaced with wood, compressed paper, plant fibers, plastics or other material that will ignite.

NON-COMBUSTIBLE MATERIAL:

Material that will not ignite and burn. Such materials consist entirely of steel, iron, brick, tile, concrete, slate, glass or a plaster combination thereof.

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

MODELS CMA	CLOSET	ALCOVE
FRONT	6"	18"
BACK	0"	0"
SIDES	0"	0"
VENT CONNECTOR(PVC)	0"	0"
TOP	0"	0"
PLENUM SIDES	1"	1"
TOP AND SIDES OF DUCT	1"	1"
BOTTOM OF DUCT	1"	1"

Table 1

This heating appliance must be installed with clearances not less than the minimums shown above as well as ample clearance for easy access to the air filter, blower assembly, burner assembly, controls, and vent connections.

IV. GENERAL INSTALLATION

A. FURNACE LOCATION

1. For best performance, locate the furnace so that it is centralized with respect to the duct system.
2. The furnace installation is only intended for free air return through the furnace door louvers. **DO NOT** connect a ducted return air system directly to the furnace. An improper return air installation may create a hazard and damage equipment, as well as void all warranties.
3. This furnace may be installed on a combustible floor when utilizing either the No. 70 counterflow floor base or CE113S / CE213T coil cabinet for below the floor duct systems, or the cottage base for floor level air distribution. See Figure 1A for description of Combustible Floor Base and Figure 1C for Cottage Base.

This furnace is ETL listed for closet, alcove or free standing applications. All applications must comply with the requirements of this manual.

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

**Combustible Floor Base
Model: 70-BASE**

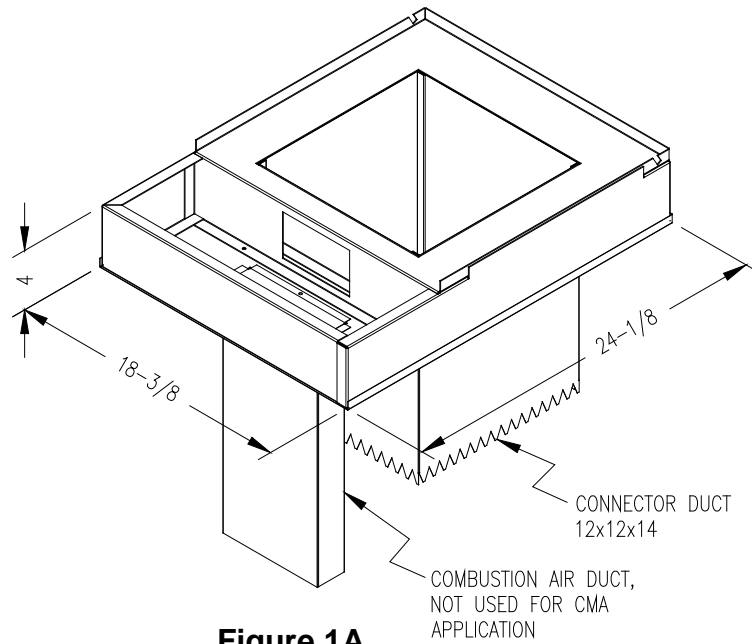
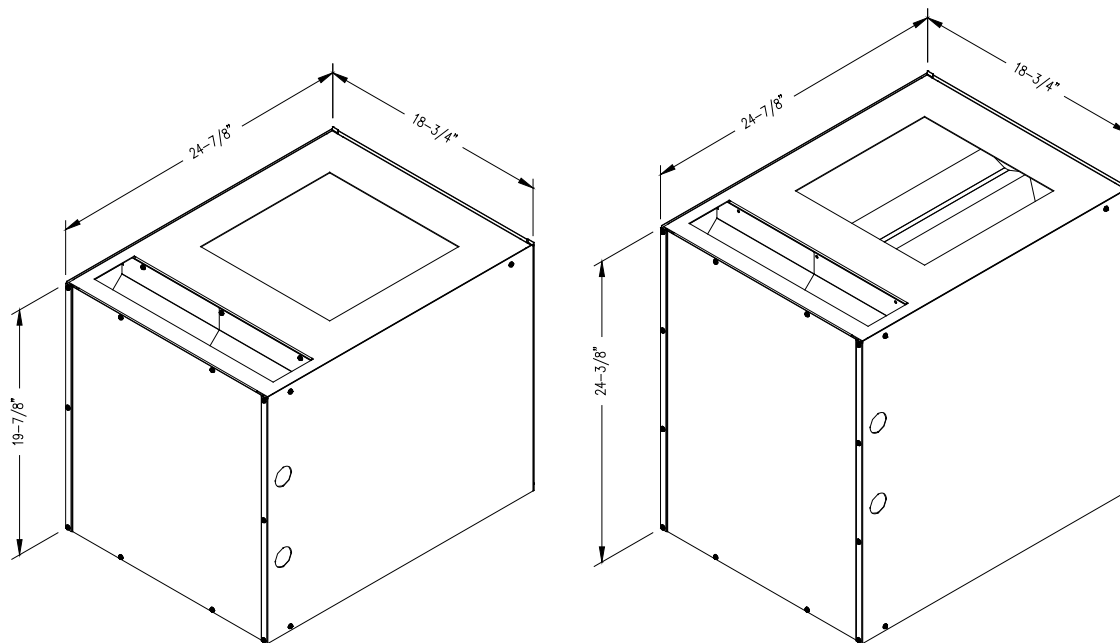


Figure 1A.

**Coil Cabinet
Model: CE113S / CE213T**

Note: Coil cabinet cannot be utilized as a cottage base.



CE113S

CE213T

Figure 1B.

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

Cottage Base
Model: 01COT-BASE

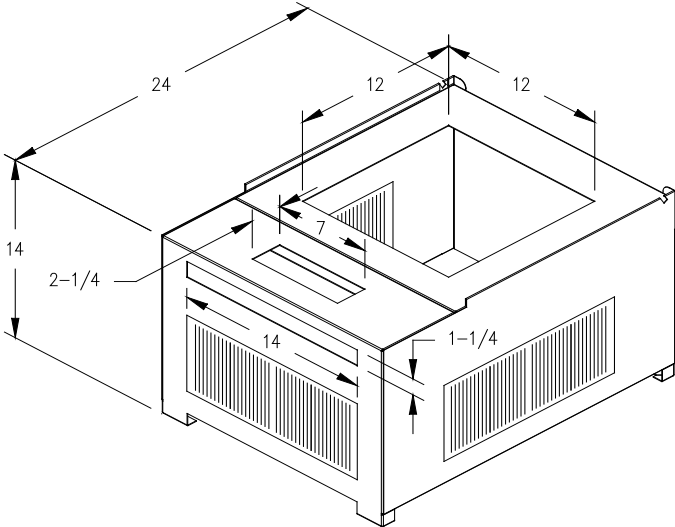


Figure 1C.

NOTE: Serves as a plenum for single story applications with exposed supply air systems.

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

B. BASE INSTALLATION

1. Combustible Floor Base Model: 70 BASE

Use the base bottom panel as a template to mark floor opening locations (see Figure 2). Cut a square opening in the floor for the supply air connector duct. Cut the opening 1-inch larger than the square template opening. (duct requires 1-inch clearance to combustible floor).

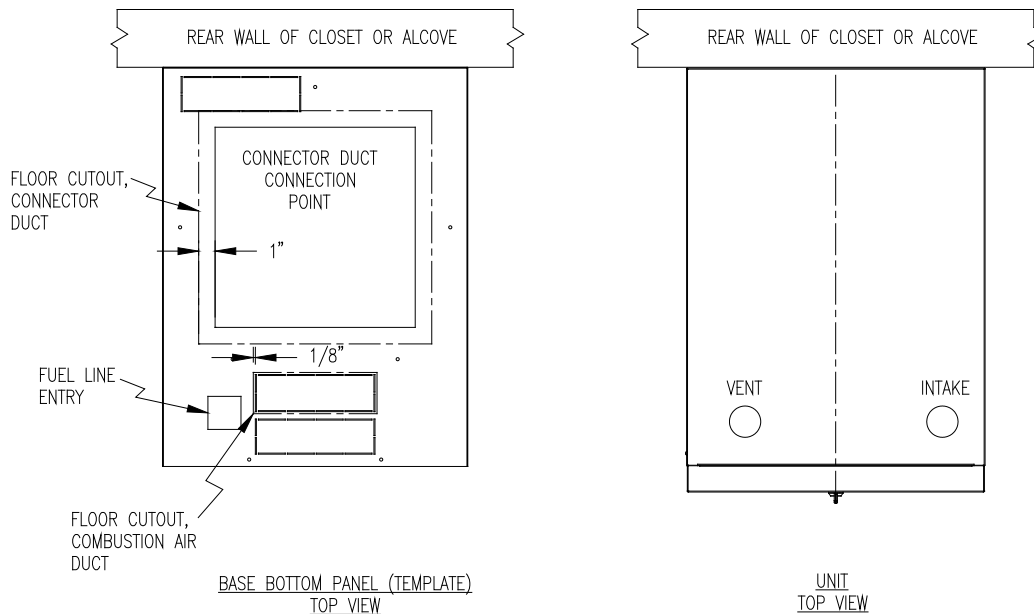


Figure 2.

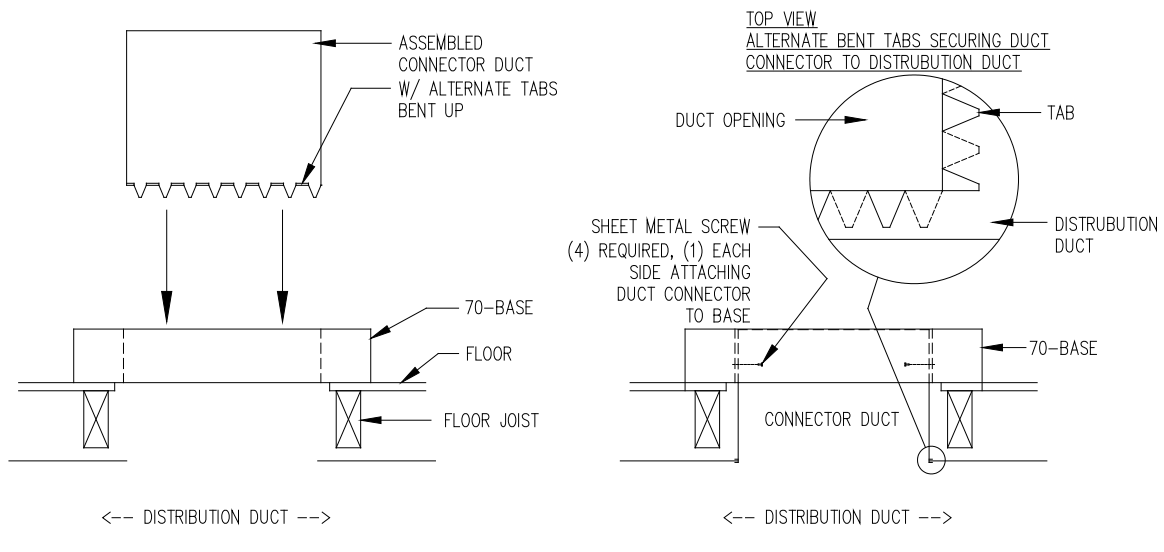


Figure 3.

After cutting openings in the floor, place the bottom panel in position. Mark the square opening location on the distribution duct at the connection point of the

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

connector duct. Remove the bottom panel. Cut an opening in the distribution duct slightly larger than the connector duct. (refer to Figure 2 for location of this cut.) Cut the connector duct to length. Install the connector duct. Bend over each tab. Insure an airtight seal by using high temperature sealant or tape on the joint. Reinstall the bottom panel over the connector duct. Put the base top assembly in place (see Figure-3).

Slit the corners of connector duct down to the top of the base assembly. If metal projects more than 1-inch above the top of the base assembly, trim the flanges down to 1-inch. While the top of distribution duct is being pulled up with one hand, bend down each side of the connector duct tightly to the base assembly with the other hand. This assures a tight connection between the base assembly and the connector duct and that the distribution duct will be full size. Use high temperature tape and/or high temperature silicone caulking on all joints and seams to minimize air leakage. Secure the base assembly to the floor with two screws in the front flange.

2. Cottage Base Model: 01COT BASE

The 01COT BASE cottage base (Figure 1C) is required for a freestanding cottage base installation. The cottage base allows the two sides and rear to have an 8" x 12" register installed. **IMPORTANT: All joints and seams of supply ducts must be sealed with a sealing method suitable to the application conditions and temperatures (I.E. High temperature silicone and/or aluminum tape).** Refer to assembly and installation instructions included with cottage base for additional information.

C. ALCOVE INSTALLATION

In this application, a minimum of 18 inches of clearance **must** be provided to the front of the unit. See Figure 4.

Note – access to diagnostic view port.

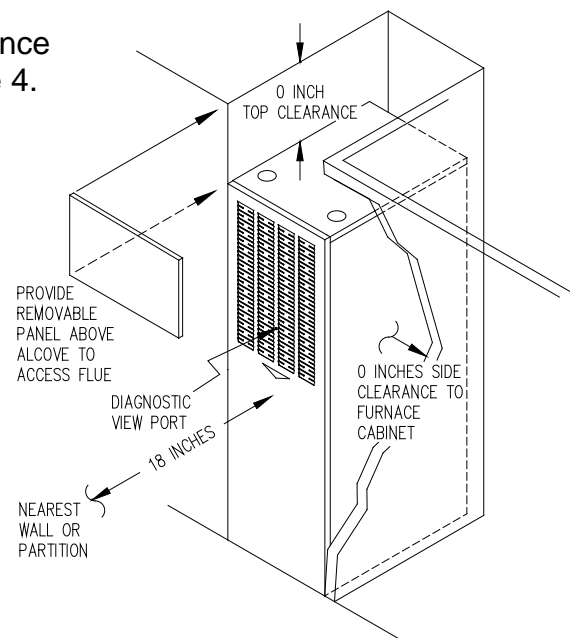


Figure 4.

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

D. CLOSET INSTALLATION

1. The return air opening into the closet is to have a **minimum** free area of 250 sq. in. (see Figure 5).
2. The return air opening may be located in the top, center or (ideally) bottom of the closet door or side wall.

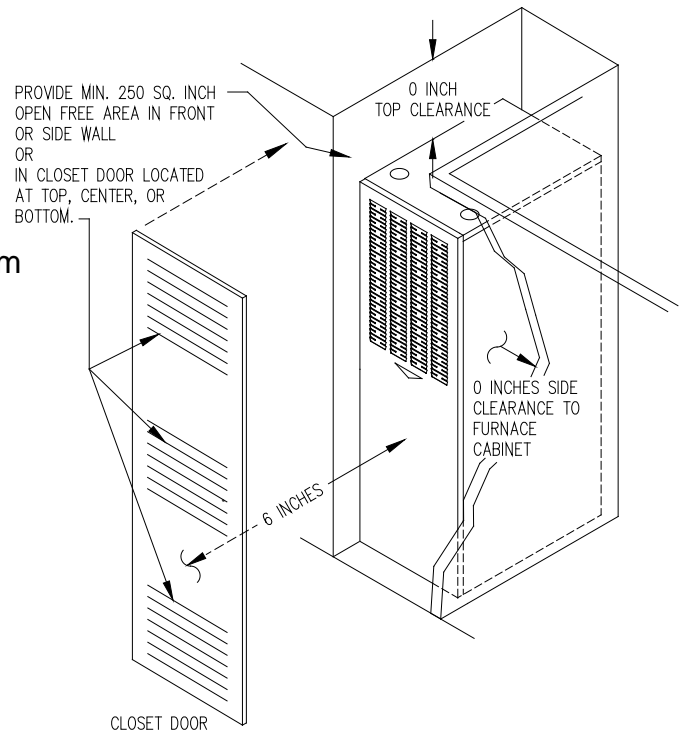


Figure 5.

⚠WARNING: Do not obstruct any return air openings, including the return grille on the furnace. To do so may cause the furnace to activate the high limit and shut down.

3. The cross-sectional area of the return system leading into the closet (when located in the floor or ceiling) shall not be less than 250 square inches.
4. The total free area of openings in the floor or ceiling registers serving the return duct system must be at least 350 square inches. At least one register must be located where it is not likely to be covered by carpeting, boxes, furniture or other objects.
5. Materials located in the return duct system must have a flame spread classification of 200 or less.
6. Non-combustible pans having one inch upturned flanges are to be located beneath openings in a floor return duct system.
7. Wiring materials located in the return duct system must conform to articles 300-22 of the National Electrical Code NFPA70 (Latest Edition).
8. Gas piping is not to be located in or through the return duct system .

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

E. FUEL PIPING

Sizing and installation of fuel lines must be in accordance with Federal, State & Local regulations. Including the National Fuel Gas Code NFPA 54/ANSI-Z233.1 (Latest Edition).

NOTE: These furnaces are designed to be gas piped through the left side or the bottom. For service purposes, it is recommended that the gas union be located inside the furnace when possible.

⚠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.

A qualified installer or service person must perform all gas piping and testing. Piping from the natural gas meter to the furnace shall be in accordance with requirements of the local gas utility. Piping from the LP tank to the furnace must follow the recommendations of the gas supplier.

A readily accessible manual shut off valve (certified for the applicable gas) with a non-displaceable rotor member shall be installed within six feet of the gas equipment it serves.

A union or flanged connection shall be provided directly up stream of the burner to allow burner removal. Unions must be of a ground joint type or flange-jointed type using a gasket resistant to the applicable gas. Pipe dope or sealant certified to be resistant to the action of the applicable gases should be used on all threaded joints.

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 pipe connections must be leak tested using methods approved by State, Local and National Fuel Gas Code NFPA 54/ANSI-Z233.1 (Latest Edition). Any leaks must be repaired immediately after turning off the gas supply. A final test for gas leakage must be made after purging the gas line.

⚠CAUTION: DO NOT wet electronic components during the leak test. Wetting electronic components may damage 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 system.

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

⚠WARNING: *The furnace and its gas valve must be disconnected from the gas supply during pressure testing of the gas supply system at pressures in excess of 1/2 PSIG or 14 inches w.c*

F. GENERAL VENTING REQUIREMENTS

The CMA furnace venting system must be installed by a qualified service person in accordance with local codes, the National Fuel Gas Code NFPA 54/ANSI-Z223.1 (Latest Edition) and these instructions.

The following items and local code requirements must be followed:

1. The vent/air intake terminations outlined by Thermo Products in this manual must be used.
2. The entire vent/air intake system must be made of PVC Schedule 40 pipe except for the concentric vent kit. **NOTE:** All CMA furnaces must be installed with outside combustion air.
3. The flue vent pipe and combustion air pipe must be at least as large as the exhaust vent/air intake pipe specified by Thermo Products. No reduction in size is permissible. The CMA requires 2" Schedule 40 PVC pipe.
4. This CMA furnace shall not be common vented with any other appliance including those burning solid fuels.
5. The maximum permissible vent length of straight pipe and number of elbows permitted for the exhaust vent and combustion air inlet is shown in Table 2 . The elbows shown are in addition to the length of straight pipe permitted. When counting elbows, all elbows used in the exhaust vent or combustion air intake must be counted. This includes elbows used inside the furnace jacket and termination elbows.

Care should be taken to plan out the vent system to be as short as possible (but not shorter than 8 ft.) and to contain as few elbows as possible to insure the best possible operation of the furnace.

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

MAXIMUM VENT LENGTH

VENT SIZE	2 IN. PVC		
	FURNACE MODEL	VENT LENGTH (FT.)	EXHAUST VENT ELBOWS (NO.)
CMA	30	8*	7**

*Note the drain elbow supplied with CMA furnaces count as 1 elbow.

**Note the two 45° elbows supplied w/CMA furnace count as 1 elbow.

Table 2

6. A hack saw may be used to cut the PVC pipe. It must be cut smoothly at right angles with all burrs removed. All joints must use standard PVC Schedule 40 elbows and couplings. Joints are not to be made by gluing, except where noted, and butting together the cut or raw edges of the vent pipe. (The joints inside the vestibule should be sealed with a silicone caulk to allow for maintenance.) **Notice: Do not use silicone caulk to seal the PVC sleeve or coupling to the metal air intake collar on the burner box. The screw securing the sleeve or coupling to the collar is sufficient.**

7. Use the two radiator hose clamps to connect both the exhaust vent and combustion air vent pipes to the venting system (included in the parts package.) This will aid in the serviceability of the vent should it need to be removed in the future. (Refer to figure 6).

8. Vent connections shall be checked for leakage with the furnace induced draft blower running and with the vent termination blocked. A mild soap and water solution may be used to check for leaks.

9. Vent pipe passing through an unheated space must be insulated with 1.0" thick foil faced fiberglass insulation or its equivalent to prevent freezing of any condensate within the pipe.

10. Minimum clearance from the PVC pipe to combustible material is zero inches.

IMPORTANT: The CMA furnace models are vented through the roof. For roof venting refer to Section IV, J, of this manual.

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

G. CONNECTING THE EXHAUST VENT AND COMBUSTION AIR INTAKE

Figure 6. shows the typical exhaust vent and combustion air intake connection for CMA furnace.

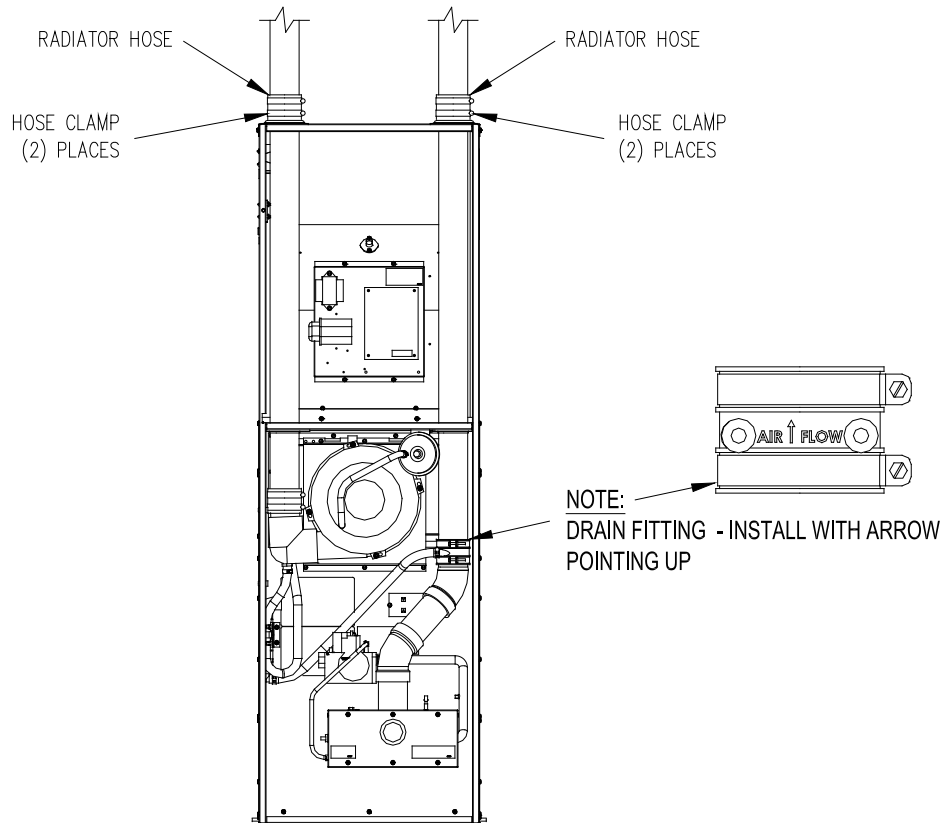


Figure 6. (CMA*-75 SHOWN)

NOTICE: The exhaust vent pipe must be supported every 4 feet. After making sure the length of the piping is correct glue all connections in place.

⚠WARNING: *This CMA furnace has been designed to be installed as a direct vent system and must have its combustion air brought in from outside the conditioned space. 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.*

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

NOTICE: The furnace model series CMA may be vented either through the sidewall or the roof. For sidewall instructions, continue to the following section. For roof venting, refer to Section IV J, of this manual.

NOTICE: The air intake pipe must be supported every 4 feet. After making sure the length of the piping is correct, glue all connections in place except the connection to the burner box.

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 1.0" foil faced insulation or its equivalent.

If the vent piping is run through an unconditioned space, it must be insulated with a 1.0" foil faced insulation or its equivalent.

⚠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.*

H. Direct Venting Through a Sidewall

1. Vent And Combustion Air Pipes

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 7, the maximum distance from the outer wall to the center of the elbow is 12 inches.

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

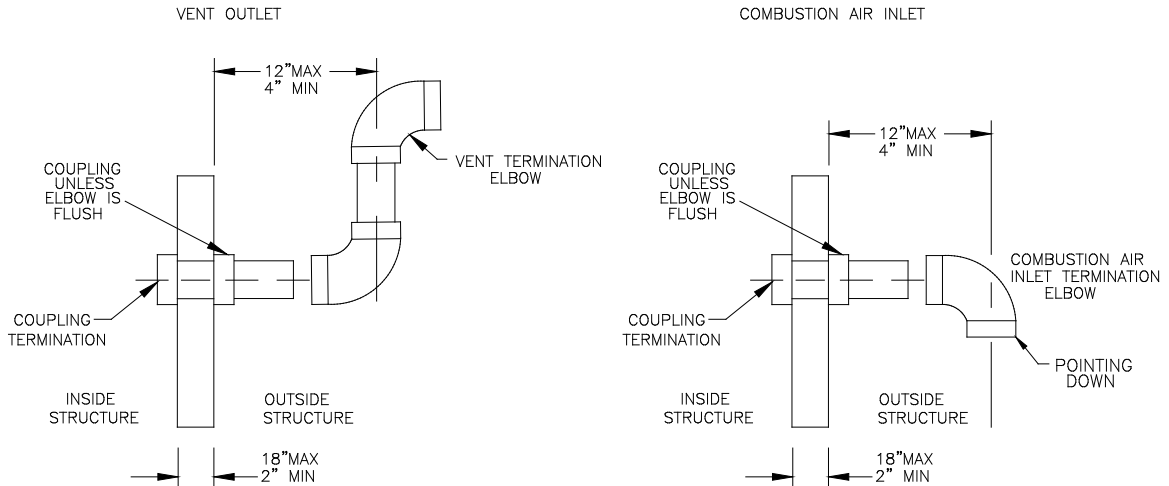


Figure 7: Proper Direct Vent Terminations (RH & LH views) and Vent Termination Only w/o Outside Combustion Air Intake (RH view)

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

2. Exhaust Vent Termination Elbow

The exhaust vent termination elbow shall be installed in accordance with these instructions and any applicable local codes. Refer to Figures 7 and 8 for typical examples of proper terminations.

- a. The exhaust vent termination must be installed in the same atmospheric pressure zone (i.e. on the same wall) as the air intake termination.
- b. The bottom edge of the vent termination elbow must be installed at least 12-inches above the outlet of intake termination elbow.
- c. The horizontal distance between the inlet and exhaust terminations should be minimized, when possible, and should never exceed 24-inches.
- d. The vent and intake systems should utilize the same numbers of elbows and approximately the same length of straight pipe to reach the outside termination.

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

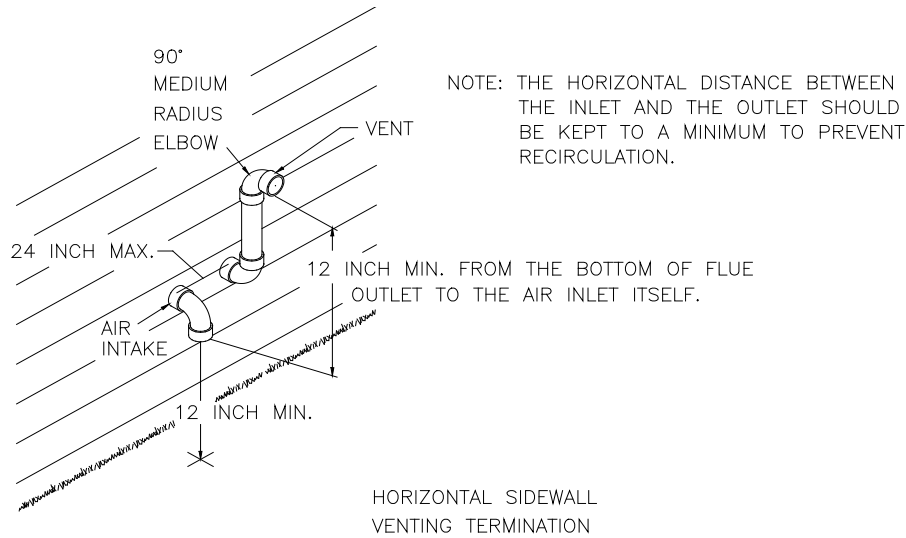
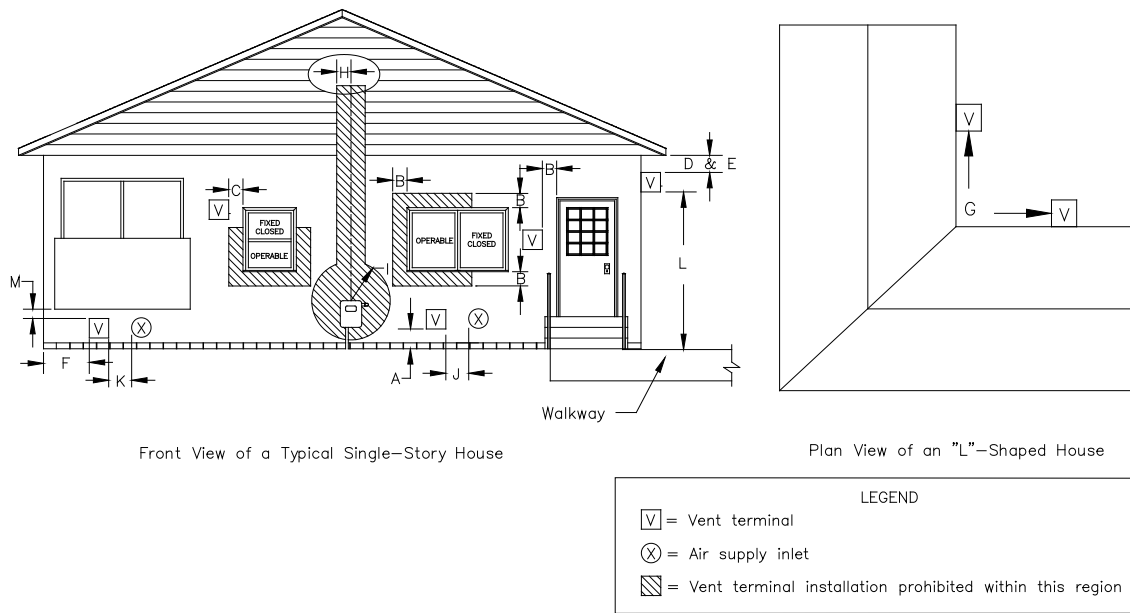


Figure 8: Typical Relative Locations of Direct Vent Terminations When Sidewall Venting

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

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



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 9: NFGC Minimum Clearances Between the Vent Terminal and Various Building Features

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

4. Vent Terminal Location Guidelines

⚠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.

I. 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), 2-3/8 inch diameter holes in the outside wall for the outdoor terminal(s)

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.) 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 H., 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

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

inlet as shown in Figure 10, making sure that the spacing between the inlet and outlet complies with that noted in Figure 8.

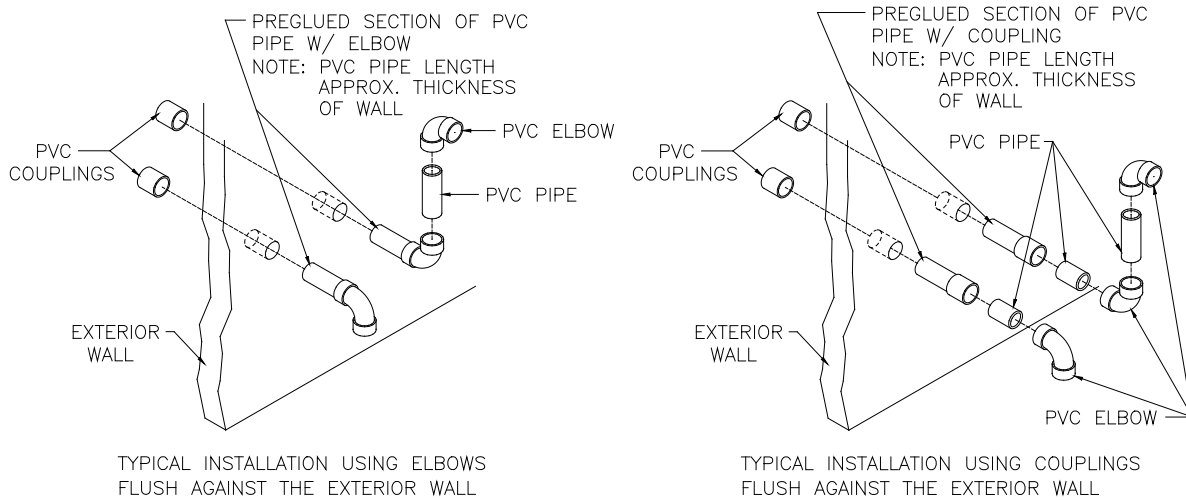


Figure 10: Typical Construction Details of Sidewall Vent and Air Intake Terminations

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

J. CONNECTING THE FURNACE TO ROOF VENT / AIR TERMINATIONS

The CMA is designed to be vented with either a concentric vent assembly or twin 2" pvc stacks. The concentric vent (AOPS7483) can be vented through the ceiling/roof either thru the existing roof jack or thru the 3" ceiling/roof flashing plate.

Concentric vent utilizing existing roof jack as a chase.

Follow instructions included with concentric vent kit AOPS7483.

Concentric vent without roof jack as a chase.

Follow instructions included with concentric vent kit AOPS7483.

Dual 2" vent/air termination kit AOPS7484

1. Remove roof jack assembly.
2. Place a 2" (2-holes) ceiling/roof flashing plate to the ceiling centering it over existing hole.

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

3. Place second flashing plate on roof over existing hole.
4. Plate must be sealed to roof to ensure a weather proof seal.
5. Secure plate to roof.
6. Drop pvc pipes thru holes in flashing plates.
7. Secure with hose clamps to flashing plate.
8. Seal with silicone type caulk.

The furnace may be vented vertically through the roof. The outlet/inlet of the vent and air intake terminations shall be a minimum of 12 inches above highest anticipated snow level. The vent outlet must be installed a minimum of 12 in. above the air intake inlet. The combustion air intake shall be installed upwind of the vent outlet when exposed to prevailing winds. The exhaust vent and combustion air intake can be a minimum of 3 in. and a max. of 24 in. apart (see Figures 11 & 12). When installing dual 2" PVC pipes and the 2" flashing plates (AOPS7484) on pitched roof, slope adapter may be used to simplify installation.

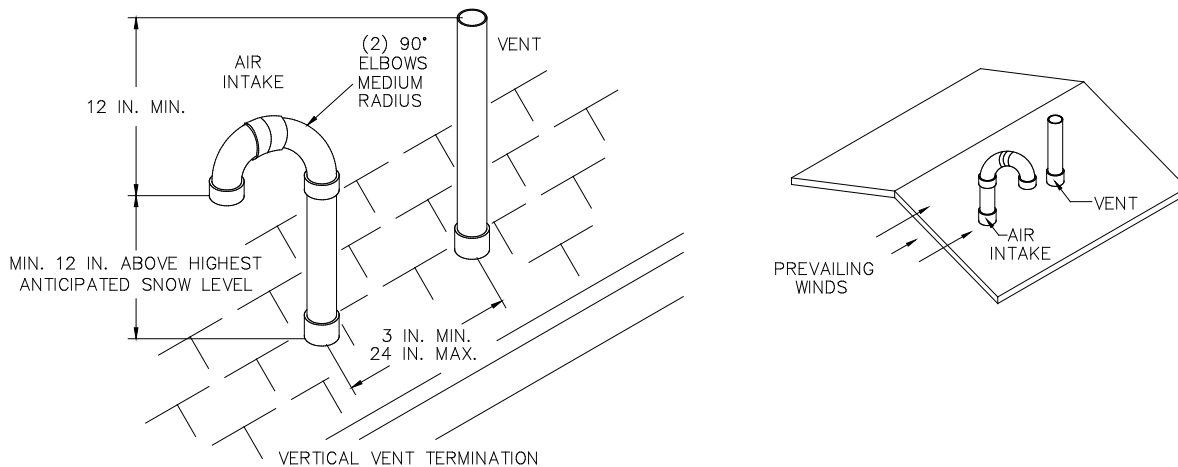


Figure 11.

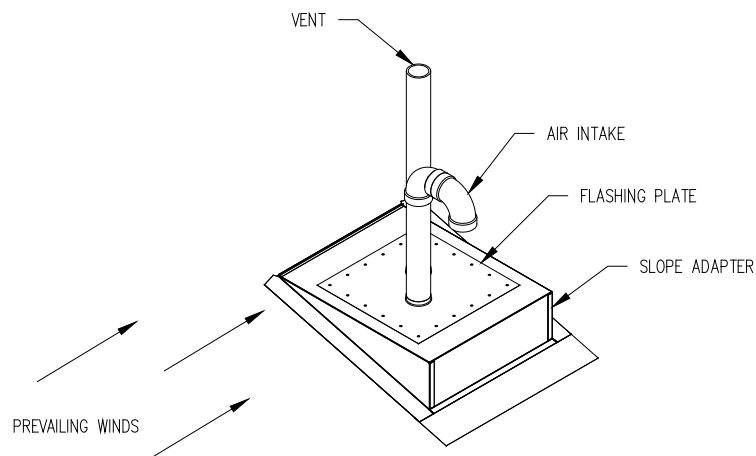


Figure 12.

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

When the PVC vent and combustion air intake pipes pass through a ceiling, and a fire stop is required. Refer to the following:

CEILING: Frame out area around where PVC pipe is to penetrate ceiling. Cut a 2-3/8" diameter hole for 2" PVC in the ceiling and a corresponding hole in a firestop to be made of a minimum of 18 gauge galvanized metal large enough to cover the entire framed area. Cut PVC pipe so that it extends up past the fire stop far enough to engage a PVC coupling that will rest on the fire stop and act as a support. Seal between the pipe coupling and fire stop with high temperature RTV silicone sealant (see Figure 13). Continue installing PVC pipe to exhaust vent and combustion air intake termination as described previously.

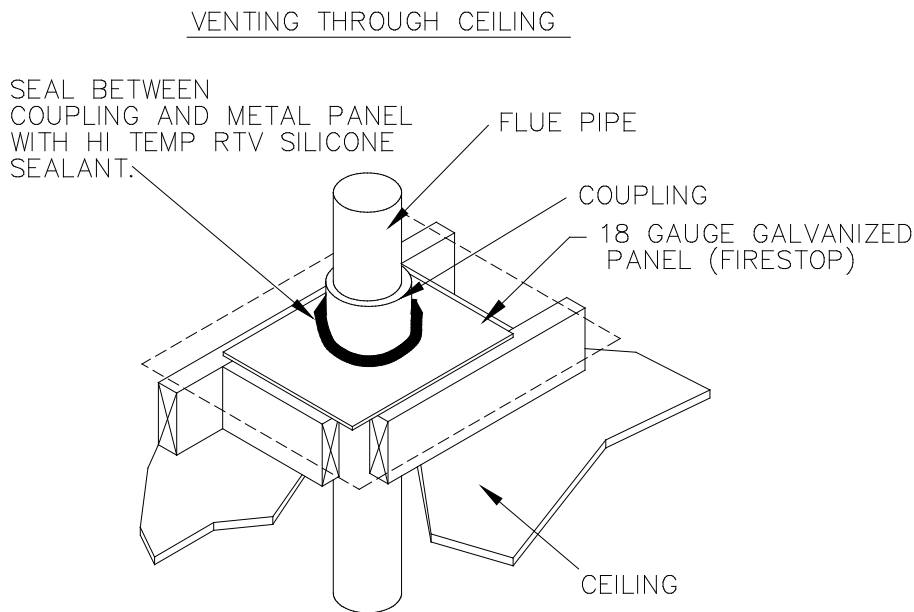


Figure 13.

K. CONDENSATE DRAIN LINE AND TRAP ASSEMBLY

1. Figure 14 illustrates the typical drain trap connection for a CMA furnace. (Trap will be installed at factory.) Connect condensate drain trap to building drain system.
2. An optional condensate neutralizer kit (P/n 320095) is available when gas furnace condensate needs to be neutralized (pH increased) prior to discharge into drain system.

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

3. An optional mini condensate pump (P/N 350224) is available. This pump will fit into the vestibule of the furnace. Instructions will be included with pump if this option is utilized.

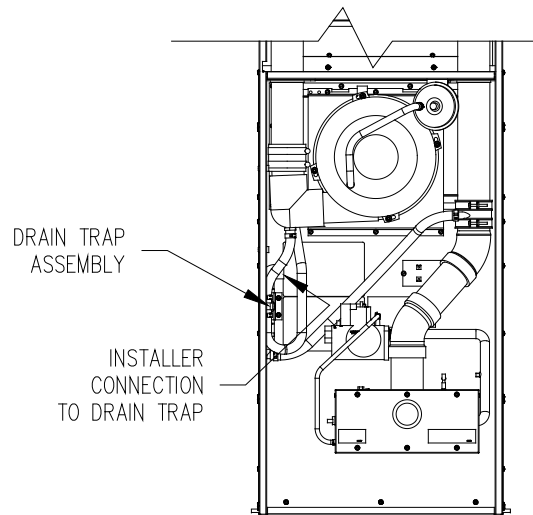


Figure 14.

L. ELECTRICAL 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 (LATEST EDITION).

1. Electrical Branch Supply Circuit

Route all electrical wiring to the left side of the furnace. The power supply circuit to the furnace must be installed and grounded in accordance with the provisions of the National Electrical Code, ANSI/NFPA-70-1999, or latest edition, and all local codes having jurisdiction.

2. Connection Of Power Supply Wires

- a. Remove the cover from junction box.
- b. Insert 115 VAC wires through the strain relief bushing (or conduit connection as applicable) on the left side of the furnace junction box.
- c. Connect the “hot” wire to the black wire.
- d. Connect the “neutral” wire to the white wire.
- e. Connect the “ground” wire to the green wire.
- f. Reinstall and secure the junction box cover with the original mounting screws.

3. Connection Of Room Thermostat Wires

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

NOTE: Class 1 thermostat wire must be used inside the furnace burner compartment.

- a. Insert 24 VAC wires through the plastic grommet on the left side of the furnace casing.
- b. Connect the thermostat wires to the W/R 50A65-143 control (refer to the wiring diagram).
- c. Connect the thermostat wires to the room thermostat.

IMPORTANT: The room thermostat should be installed 4 to 5 feet above the floor on an interior wall which is relatively free from direct sources of heat (sunlight or supply airflow) or exposure to cold (drafts from open windows and doors). The nominal anticipator setting is 0.8 amperes, for the CMA (refer to the thermostat literature for additional information).

Four-conductor thermostat wire is recommended for 24 VAC, low-voltage, control circuit wiring. However only 2 wires are required for the furnace (a heating application only).

Electrical Wire Diameter (AWG)	Maximum Recommended Thermostat Wire Length (Feet)
24	55
22	90
20	140
18	225

Once the furnace is installed, check the thermostat anticipator for proper nominal setting.

1. Connect a multimeter, capable of reading milliamps (mA), in series with the low voltage wires to the thermostat.
2. Increase the thermostat setting, or create a "call for heat".
3. Read the value of the thermostat current, in milliamps.
4. Adjust the heat anticipator of the thermostat to the value read by the multimeter.

If the heat anticipator is set too high, the furnace may delay activation of a heating cycle for too long. If the heat anticipator is set too low, the furnace may cycle too frequently. Either condition may not provide optimal comfort to the homeowner.

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 (L1) and the common leg (L2) to the white line lead in the field

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

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 (Latest Edition) when an external electrical source is utilized.

4. BLOWER MOTOR SPEED WIRING

FACTORY WIRING CMA*50:
 MOTOR CONTROL
 LOW (RED) HEAT-H
 MED-LOW (BLUE) PARK
 MED-HIGH (YELLOW) PARK
 HIGH (BLACK) COOL-H
 COMMON (WHITE) CIR-N

FACTORY WIRING CMA*75:
 MOTOR CONTROL
 LOW (RED) PARK
 MED-LOW (BLUE) HEAT-H
 MED-HIGH (YELLOW) PARK
 HIGH (BLACK) COOL-H
 COMMON (WHITE) CIR-N

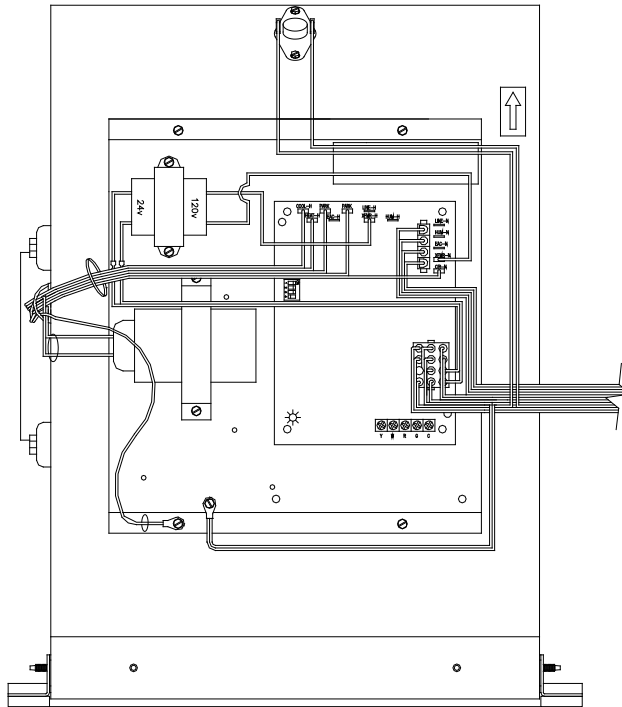


Figure 15.

BLOWER DELAY SETTINGS

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

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

*Factory Settings For Optimal Performance

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

CMA1-50

ALTERATIONS REQ'D FOR A/C @ DESIGN EXTERNAL STATIC PRESSURE		
COOLING UNIT	HTG Speed	Recommended CLG Speed
24,000	LOW	MED-LOW
30,000	LOW	MED-HIGH
36,000	LOW	HIGH

Speed Tap \ Static Pressure	Furnace Airflow (CFM) vs. External Static pressure (in. WC.)						
	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	836	805	773	743	695	620	566
ML	1044	1010	972	914	860	826	752
MH	1250	1196	1146	1101	1038	977	902
High	1339	1338	1283	1233	1162	1086	1008

Speed Tap \ Static Pressure	Temperature Rise vs. External Static Pressure (in. WC.)						
	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	53	55	57	59	63	71	78
ML	42	44	45	48	51	53	59
MH	35	37	38	40	42	45	49
High	31	33	34	36	38	41	44

Speed Tap \ Static Pressure	Blower Motor Current Draw (Amps) vs. External Static pressure (in. WC.)						
	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	3.3	3.2	3.1	3.0	2.9	2.7	2.6
ML	4.0	3.8	3.6	3.5	3.4	3.2	3.1
MH	4.6	4.4	4.2	4.1	4.0	3.8	3.6
High	5.3	5.1	5.0	4.9	4.7	4.6	4.4

Speed Tap \ Static Pressure	Blower Motor Watts vs. External Static pressure (in. WC.)						
	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	315	311	304	300	292	281	275
ML	400	390	376	363	351	342	330
MH	485	467	452	441	427	412	394
High	573	555	544	530	513	493	477

 = Recommended operation range

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

CMA2-75

ALTERATIONS REQ'D FOR A/C @ DESIGN EXTERNAL STATIC PRESSURE		
COOLING UNIT	HTG Speed	Recommended CLG Speed
24,000	MED-LOW	MED-LOW
30,000	MED-LOW	MED-HIGH
36,000	MED-LOW	HIGH

Speed Tap \ Static Pressure	Furnace Airflow (CFM) vs. External Static pressure (in. WC.)						
	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	817	797	773	730	668	620	555
ML	1019	995	959	918	869	821	760
MH	1257	1210	1174	1125	1076	1024	959
High	1470	1420	1366	1312	1259	1196	1127

Speed Tap \ Static Pressure	Temperature Rise vs. External Static Pressure (in. WC.)						
	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	81	83	85	90	90	106	119
ML	65	66	69	72	76	80	87
MH	52	55	56	59	61	64	69
High	45	46	48	50	52	55	59

Speed Tap \ Static Pressure	Blower Motor Current Draw (Amps) vs. External Static pressure (in. WC.)						
	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	3.1	3.0	2.9	2.8	2.7	2.6	2.5
ML	3.9	3.8	3.6	3.5	3.3	3.2	3.1
MH	4.8	4.6	4.4	4.2	4.1	4.0	3.8
High	5.7	5.5	5.4	5.2	5.1	5.0	4.8

Speed Tap \ Static Pressure	Blower Motor Watts vs. External Static pressure (in. WC.)						
	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	312	303	298	291	280	273	264
ML	400	390	381	366	354	342	330
MH	513	490	478	462	447	432	413
High	624	605	591	573	556	542	522

 = Recommended operation range

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

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

The furnace is factory wired to the ignition control with standard heating and cooling speeds. When changing motor speeds, simply switch the needed speed to either the heating or cooling terminal as applicable on the module to obtain the desired CFM. The unused speeds should then be reconnected to the module in the “park” positions. (Refer to figure 15) Refer to section II for blower speed and air flow performance for A/C installation.

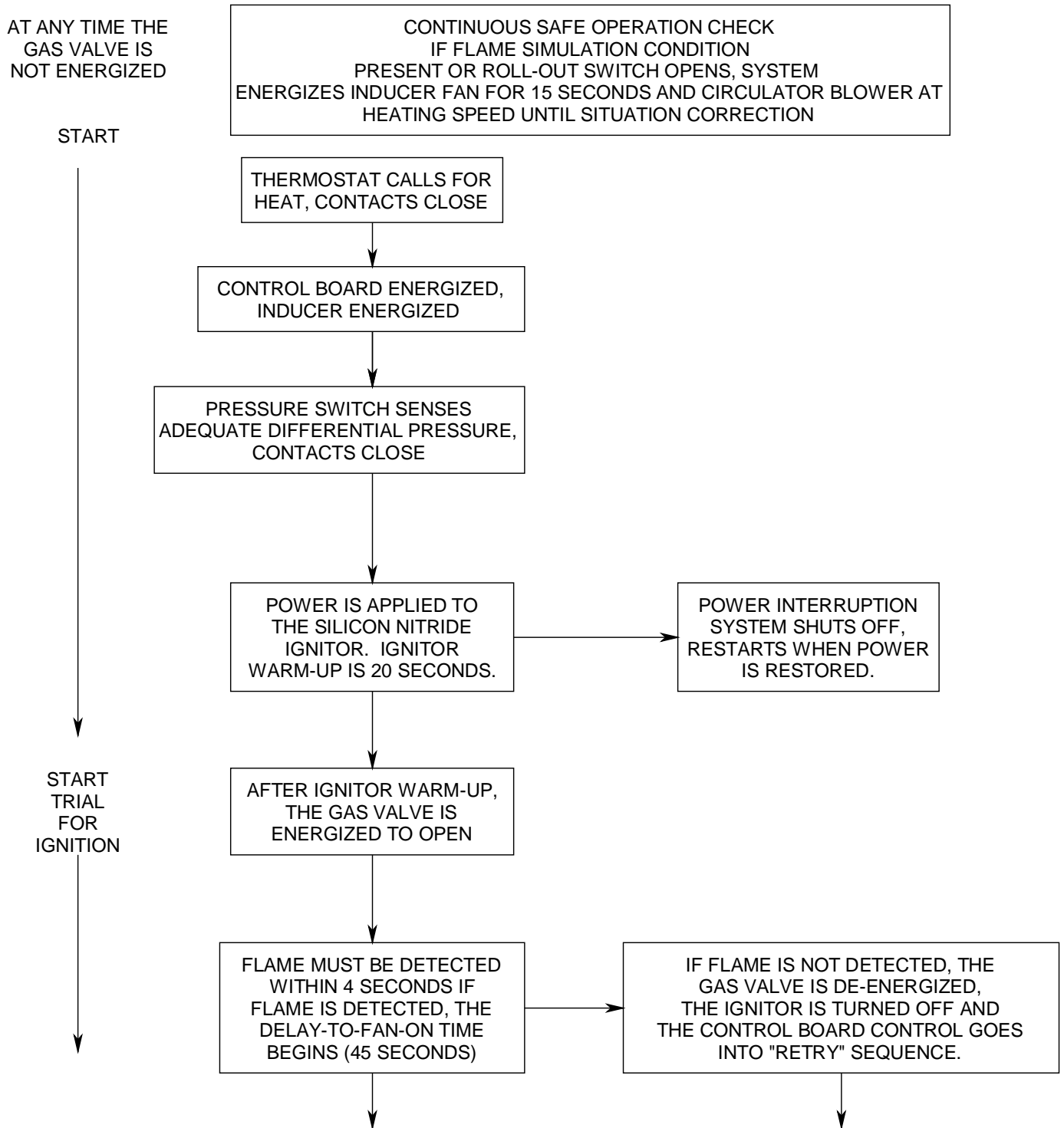
5. FIELD WIRING AND REPLACING WIRING

Field wiring between the furnace and devices not attached to the furnace shall conform with the temperature limitation for Type T 35 C wire. 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.

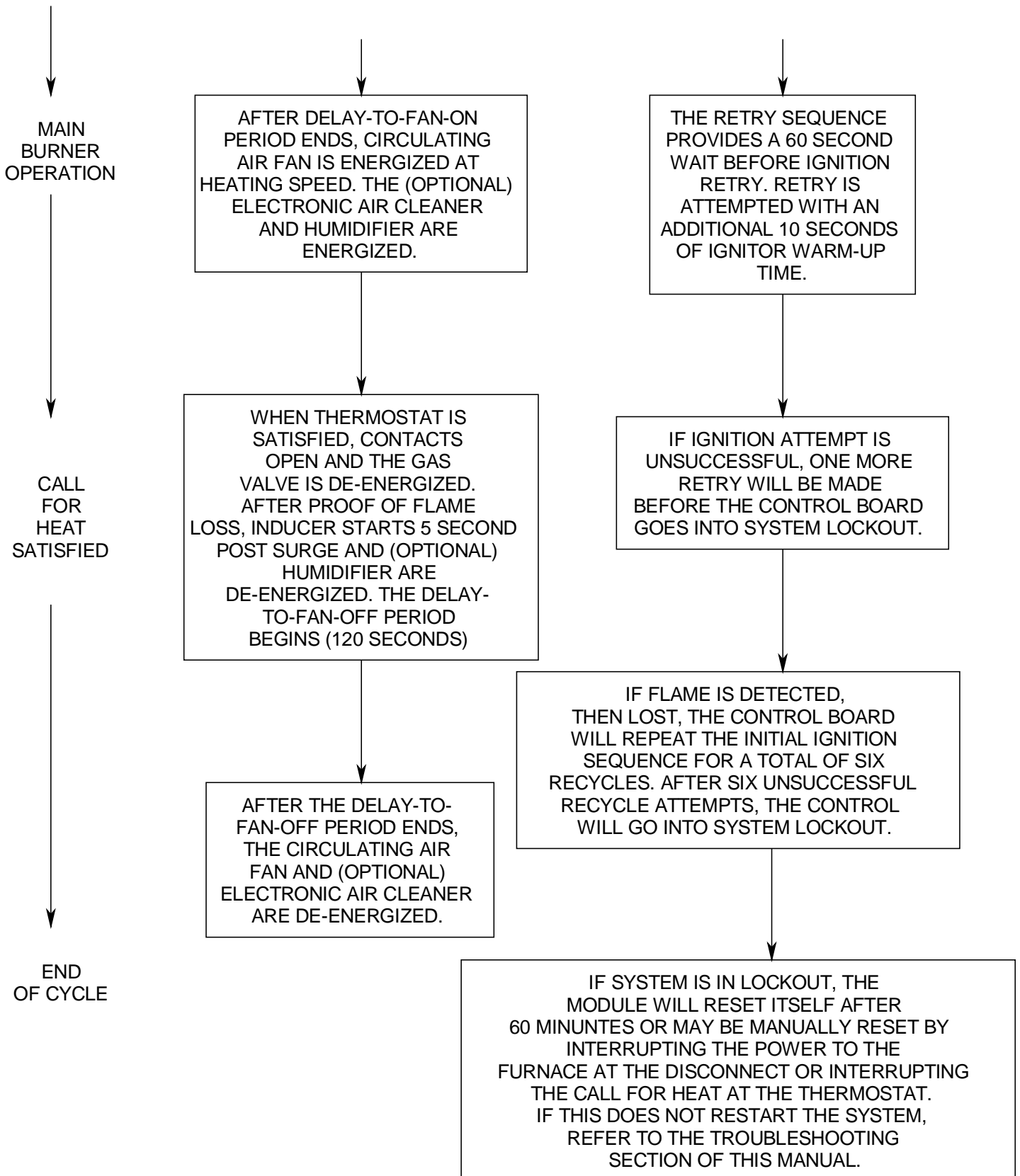
All installations and services must be performed by qualified service personnel.

V. STARTING THE UNIT

A. SEQUENCE OF OPERATIONS



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



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

B. INITIAL START UP:

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

1. Check all wiring for loose connections and proper hook up.
2. Leak test gas piping connections.
3. Check all tubing to the pressure switch and drains to make sure they are connected firmly at all their connection points.
4. Check flue pipe, combustion air inlet and all pvc connections for tightness and to make sure there is no blockage.
5. Make sure air filter is in place.
6. Make sure the outside vent and air intakes are installed according to instructions and that they are free from blockage.
7. Make sure that the drain trap is properly connected to the furnace and to the 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 in accordance with State, Local and National Codes including the National Fuel Gas Code NFPA 54/ANSI-Z233.1 (Latest Edition).

⚠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.

⚠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 as noted above for 15 minutes or until odor has dissipated.***

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C. ADJUSTMENT OF BTU INPUT RATE:

The orifice for this furnace was sized: 1) for natural gas having a heating value of 1025 BTU per cubic foot and a specific gravity of .65, or 2) for liquefied propane gas with a heating value of 2500 BTU per cubic foot and a specific gravity of 1.55. The information plate inside the furnace vestibule will specify which gas your furnace is orificed for. If the furnace is installed at an altitude that is more than 2,000 feet above sea level, it is mandatory that the input to the burner be reduced 4.0% for every 1,000 feet that it is above sea level. If the furnace is installed at an elevation of 5,000 feet, its input must be reduced 20.0%. Example: a furnace rated at 75,000 BTU at sea level must be reduced to a firing rate of 60,000 ($75,000 \times .80 = 60,000$) at an elevation of 5,000 feet. If the furnace is installed at an elevation of 2,000 feet or less, no reduction in input is required. Your gas supplier or Thermo Products will supply you with the correct orifice sizing information.

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

1. Call your gas supplier and ask for the BTU content (heating value) of one cubic foot of the gas, supplied to the installation area. An alternate approach is to assume a value of 1025 BTU/Cu Ft which is the national average.
2. With all other gas appliances turned off and using a stopwatch, clock the time required for the (small) dial on the gas meter to make one full revolution. The meter dial will state the cubic feet of flow for one revolution usually one, two or five.

FORMULA:
$$\frac{\text{BTU/Cu Ft} \times \text{Number of Cu Ft} \times 3600 \text{ Seconds}}{\text{Seconds for one revolution}} = \text{Input BTU/hr}$$

EXAMPLE:
$$\frac{1025 \text{ BTU/Cu Ft} \times 2 \text{ Cu Ft} \times 3600}{100.40 \text{ Seconds}} = 73,505 \text{ BTU Input}$$

Check the model number of the furnace, the input rate, the type of gas, and the manifold pressure on the rating label located in the burner vestibule. If using the above example, the furnace is a CMA2-75N model and the input rate is 73,505 BTU/hr. The input rate would be acceptable because it was within $\pm 2\%$ of the listed input of 75,000.

3. Make sure that the gas supply pressure to the furnace is within the allowable range of 5.5" to 14" WC pressure on natural gas and 11.0" to 14.0" WC on propane gas. The pressure to the furnace must be checked while the furnace burner and any other gas appliances on the same supply system are operating, using the 1/8 in. NPT manifold pressure tap.

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

GAS PRESSURE CHART FOR CMA* MODEL FURNACES

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

TABLE 3

This gas furnace is equipped with a fixed orifice sized for the manifold pressure shown on the rating label. The input can only be increased, or decreased, by adjusting the manifold pressure. Remove the 1/8" threaded pipe plug located on the gas manifold.

Use a U tube manometer or recently calibrated pressure gage to measure the pressure. To adjust the pressure, remove the screw cap from the regulator on the gas valve and using the adjustment screw. Decrease the pressure by turning the screw counterclockwise or increase it by turning the screw clockwise.

⚠CAUTION: ADJUSTMENTS TO THE LISTED PRESSURE MUST NOT EXCEED 0.3" WC. A 0.3" WC adjustment will increase or decrease the input approximately 4.0%.

Replace screw (cap) when adjustment is complete.

The correct input can be assumed if the furnace manifold pressure is the same as that shown on the rating label if a gas meter is not available for natural gas or the unit is installed on an unmetered propane gas supply. Shut off the gas supply to the furnace. Remove the pressure gage and re-install the pipe plug using a thread compound resistant to the action of LP gases.

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

D. BURNER ADJUSTMENT

This unit is designed to not require any burner adjustment. The flames should be checked by looking through the sight glass located on the burner box. Burner

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

flames should be clear, blue and almost transparent in color. (see Figure 16).

NOTE: It is not unusual to have orangish flames visible in the tube for LP gas.

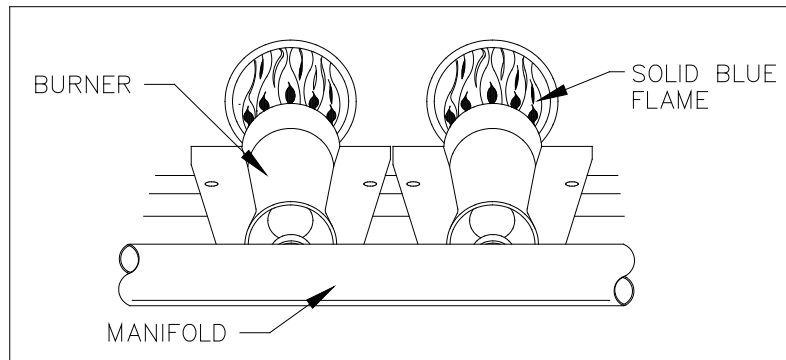


Figure 16.

⚠CAUTION: *The CMA furnace models are direct vent design and do not require an air shutter adjustment (air shutters are not used) for proper flame characteristics. Burner box access cover must always be secured with all screws in place and tightened before operating furnace.*

E. SETTING TEMPERATURE RISE

All CMA Models are designed and wired at the factory for a heating blower speed that should result in an approximate temperature rise of 60°F. The blower motors are wired on med-low speed for heating mode. The temperature rise through the furnace may vary depending on the duct system, elevation, heating value, etc. for each installation. A lower temperature rise will result in a higher efficiency.

Temperature rise = supply air temperature - return air temperature.

After 10 to 15 minutes of continuous operation, the temperature rise through the furnace must fall within a range of 40°F to 70°F. If the outlet or supply duct temperature is too high, you should check to make sure that your return air filter is clean, your return air openings are free from obstruction, your outlet registers are properly adjusted and clear and your supply and return air ducts are open.

The circulating air blower is not moving enough air if the supply air temperature is still too high. Before proceeding further, turn off the power supply to the furnace and remove the front door of the unit.

The speed of the blower must be increased by changing the speed tap from the motor (see figure 15). This is accomplished by locating the control panel attached to the blower housing and switching the blue (med. low) blower lead, which should be connected to the "Heat" terminal on the White-Rodgers 50A65-143

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

control, with one of the higher speed blower leads attached to a terminal marked "Park". Be sure to attach any unused blower leads to a terminal marked "Park". Replace the blower door and turn on the power supply.

F. 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 Fuel Piping Section of this Furnace Manual.

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

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

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

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

2. Make certain thermostat will automatically start and stop furnace.

3. Block the flue pipe outlet gradually with a flat piece of metal, until the pressure switch functions shutting off the main burners. **IMPORTANT:** Remove flue outlet blockage when done.

4. Block the PVC pipe inlet gradually with a flat piece of metal until pressure switch functions shutting off the main burners. **IMPORTANT:** Remove air inlet blockage when done.

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

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

VI. 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 the instructions must be kept along with instructions for any accessories in the plastic pouch.
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 this manual.
5. That failure to maintain and operate this furnace in accordance with these instructions could result in hazardous conditions, bodily injury, property damage and may void the limited warranty on the furnace.
6. Review with and encourage the user to read the label reproductions and all warnings and instructions in this manual.
7. Recommend that the user have a qualified heating contractor inspect the furnace at the start of each heating season. Inform the user of the frequency of inspection required for each component.
8. Should the furnace not operate after installation – note diagnostic code through view port prior to removing door.

VII. DEALER MAINTENANCE

The following maintenance procedures should be performed at the beginning of each heating season by a qualified heating contractor. Correct any deficiencies at once.

⚠WARNING: Personal injury or property damage could result from repair or service of this furnace by anyone other than a qualified heating contractor.

⚠WARNING: To avoid injury from moving parts, shut off the power to the furnace before removing blower compartment door.

⚠CAUTION: Label wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

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

A. ELECTRICAL:

1. Check diagnostic code through view port prior to removing access door.
2. Check all wiring for loose connections and any signs of damage or unusual wear.
3. Check for correct voltage at the furnace when operating.
4. Check amp-draw on blower motor and inducer motor to assure they are not exceeding name plate amp rating.
5. Check for correct operation and proper settings (if manually adjustable) of all controls.

Shut off gas and disconnect power before continuing.

B. GENERAL INSPECTION

1. VENT PIPE COMBUSTION AIR INTAKE

- a. Remove the vent and check the vent for signs of carbon build-up and for signs of blockage.

- b. The entire length of vent and combustion air inlet pipe and their terminations should be inspected for restrictions, loose or loosely sealed joints, carbon build-up. Also inspect the outside vent and combustion air terminals and ensure that they are clear and unobstructed.

2. CONDENSATE LINE/TRAP ASSEMBLY

The condensate line must be inspected to make sure it is not blocked. All of the lines should be flushed with water to remove any build-up of sediment.

3. BURNERS

If it appears that material is accumulating in the burner box, the burner box cover can be removed and the box and burners can be vacuumed. (NOTE: The igniter & flame sensor must be removed before removing the assembly.) If necessary, the burners assembly can be removed by taking out the two screws/one on each bracket on the bottom of the box on CMA's or on top of the box and removing the burner drawer assembly. Assembly must be pulled & tilted away from the blower compartment in order to remove from box. If necessary, the individual tubes can be cleaned out using compressed air to blow out the individual tubes. Care must be taken not to damage the igniter.

4. INDUCER BLOWER ASSEMBLY

Inspect the pressure switch and drain tubing connections and inspect the blower/assembly for warpage, deterioration and carbon or other build-up. If necessary, clean the accessible portions of the housing and blower with a damp cloth. Vacuum to remove any lint or dust from the motor assembly.

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

5. GASKETS/SEALING MATERIALS

Inspect all visible gaskets for signs of degradation or liquid seepage, especially any seals which were removed as part of the inspection. Replace any suspect gaskets.

C. HEAT EXCHANGER

Inspect for corrosion, pitting, warpage, deterioration, carbon build-up and loose gaskets in the flue pipe, burner box and accessible areas of the heat exchanger.

1. CLEANING THE COIL AIR SIDE

- a. Remove the blower from the blower compartment. In order to remove the blower, it will first be necessary to disconnect the furnace from the outside power supply and disconnect the blower wire harness from the furnace at the blower pan quick connect.
- b. Clean the coil with a vacuum cleaner by going through the blower pan opening being careful not to bend or damage any of the fins.
- c. Once all components are cleaned, they must be re-installed to their factory produced state. Any seals or joints in the flue system which have been removed or loosened must be reconnected and sealed if necessary. Do this in accordance with the installation instructions.

⚠CAUTION: The inducer motor mounting plate gasket and the collector box gasket must be replaced.

D. HOUSE AIR BLOWER

Check and clean the blower wheel, housing and compartment with a vacuum. Check the motor name plate and follow the motor manufacturers instructions for lubrication, if required.

IMPORTANT: Some motors are permanently lubricated **and should not be oiled.** See motor name plate for specific instructions.

E. RETURN AIR FILTER

The Return Air Filter(s): Provided with this unit is a permanent type filter. This filter(s) should be inspected and when dirty, cleaned or replaced, if necessary to assure proper furnace operation. Follow the cleaning, removal and replacement procedure below.

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

FILTER MAINTENANCE PROCEDURE

The filter is located inside front door of the CMA. Remove filter retaining rod and remove dirty filter. Clean the filter by vacuuming, rinsing with tap water, hosing or dipping in an ordinary detergent solution. After cleaning, replace the completely dry filter and retain with retaining rod. If the filter has a mesh, the mesh side of the filter must be towards the furnace.

FILTER REPLACEMENT

Should the filter require replacement, replace with like size and type filter as originally supplied with furnace.

IMPORTANT: Remind homeowner of importance of monthly filter inspections during the heating season to ensure efficient and trouble-free operation of their furnace.

VIII. 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.

Note – check diagnostic code through view port prior to removing access door.

DIAGNOSTIC FEATURES

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

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

1 flash, then pause

system locked

2 flashes, then pause

pressure switch stuck closed

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

3 flashes, then pause	pressure switch stuck open
4 flashes, then pause	open high limit switch
6 flashes, then pause	115 volt AC power reversed
7 flashes, then pause	low flame sense signal
8 flashes, then pause	check ignitor or improper grounding

Continuous flashing (no pause)	Flame has been sensed when no flame should be present
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(no call for heat)

The LED will also flash once at power-up.

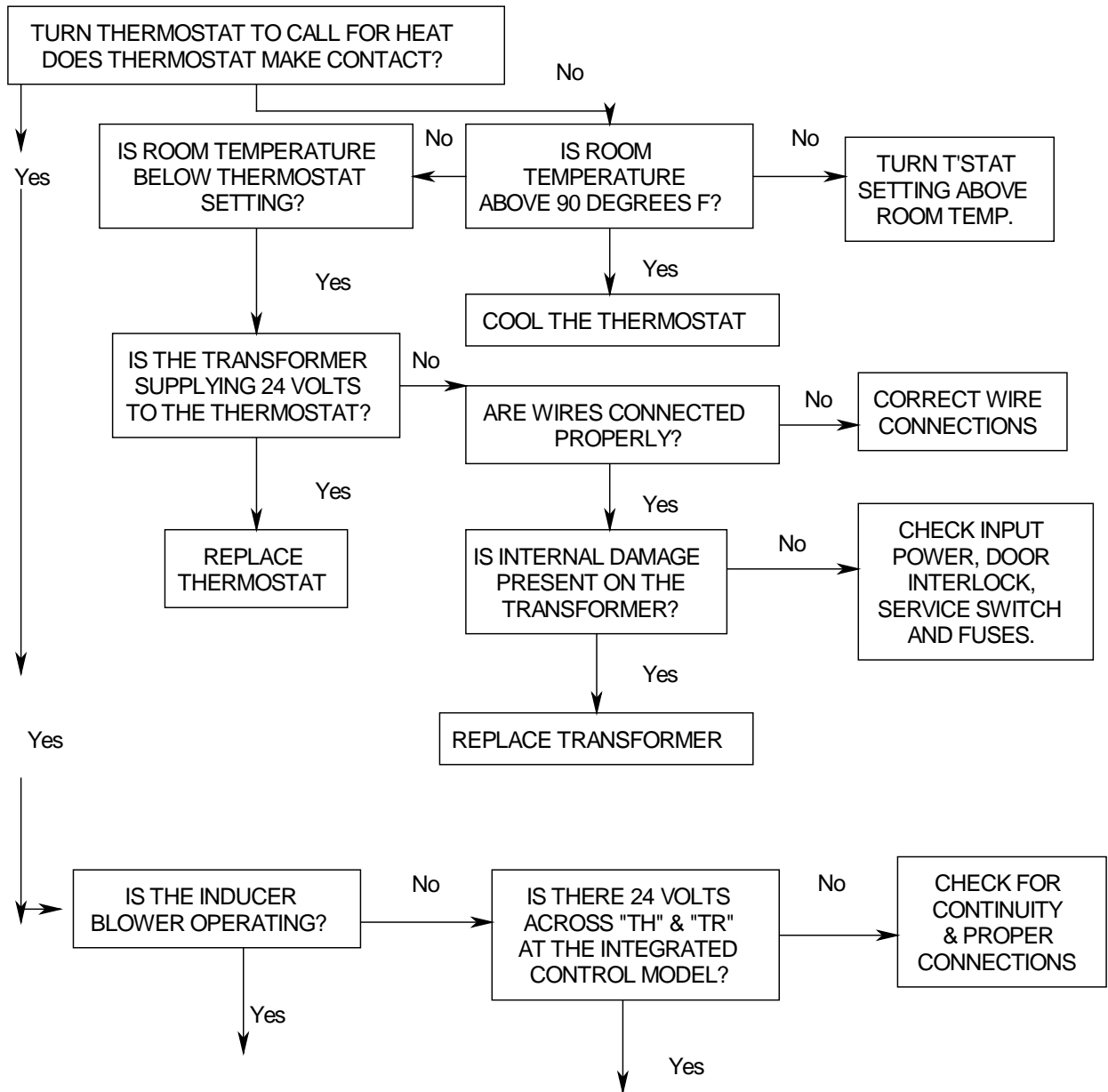
⚠WARNING : Power must be disconnected before servicing.

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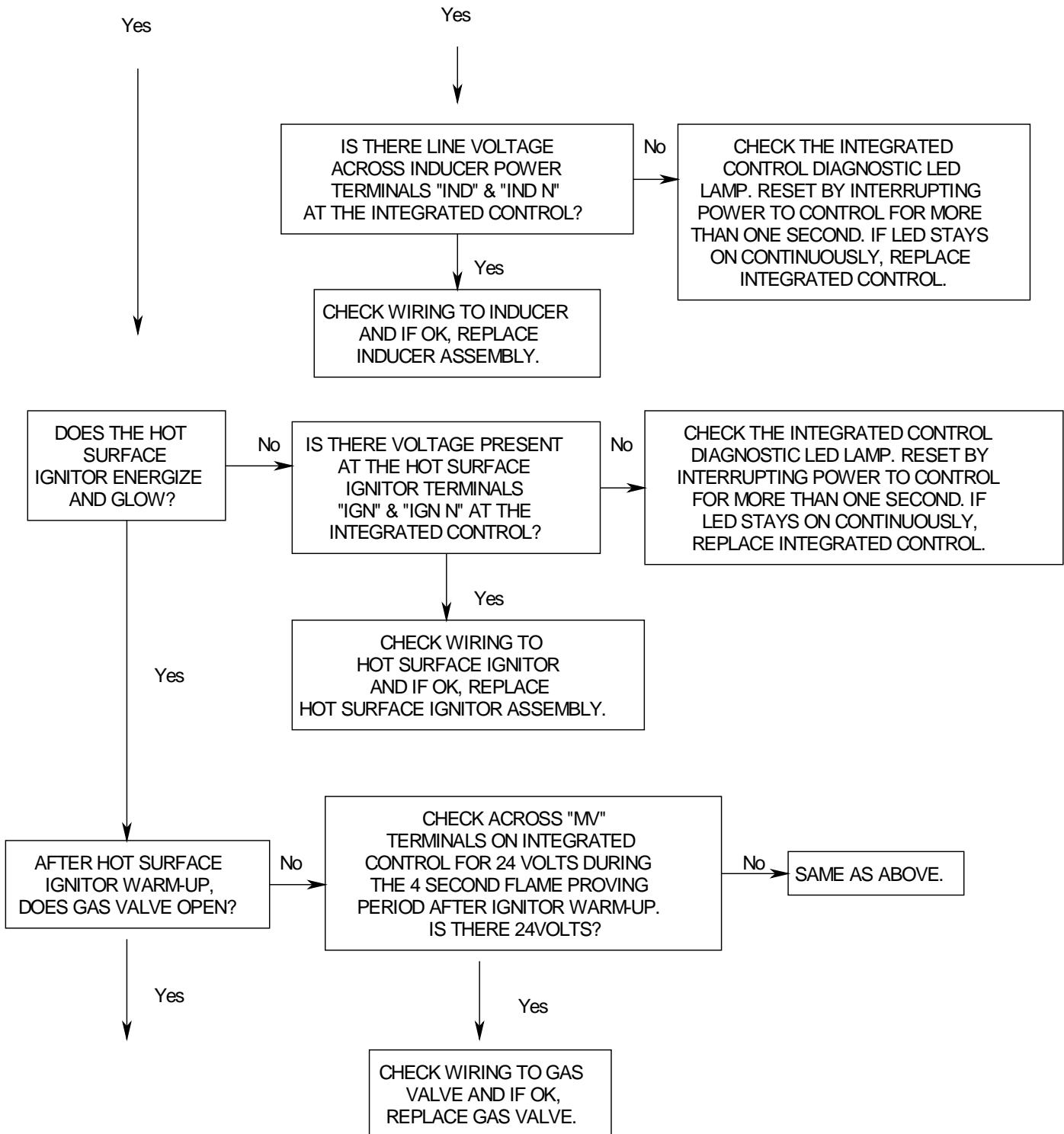
TROUBLESHOOTING GUIDE
 THE SYSTEM IS STARTED BY SETTING THE THERMOSTAT TO CALL FOR HEAT. THE FOLLOWING SHOULD HELP ESTABLISH THE TYPE OF MALFUNCTION OR DEVIATION FROM THE NORMAL OPERATION.

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

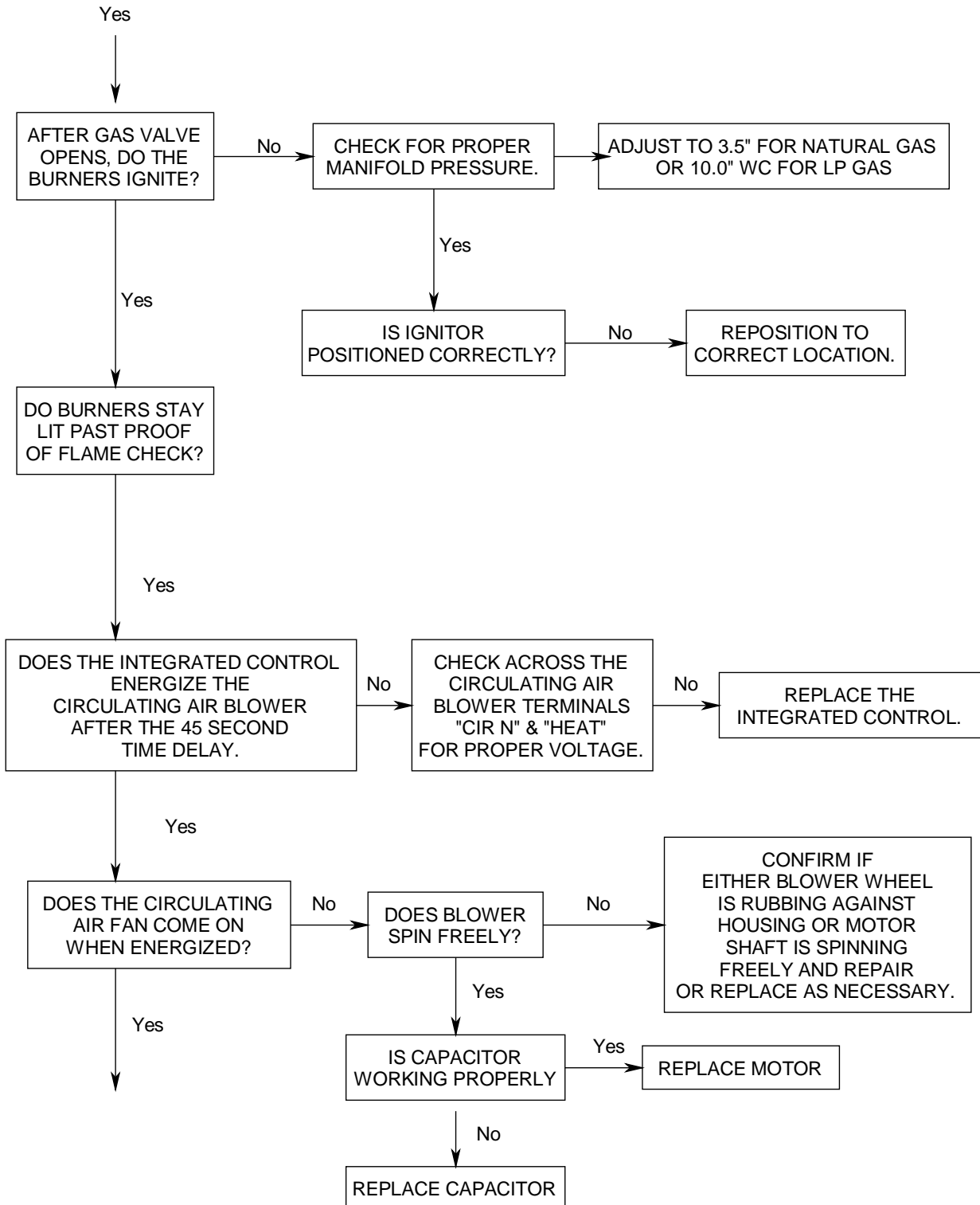
NOTE: CHECK DIAGNOSTIC CODE THROUGH VIEW PORT PRIOR TO REMOVING ACCESS DOOR.



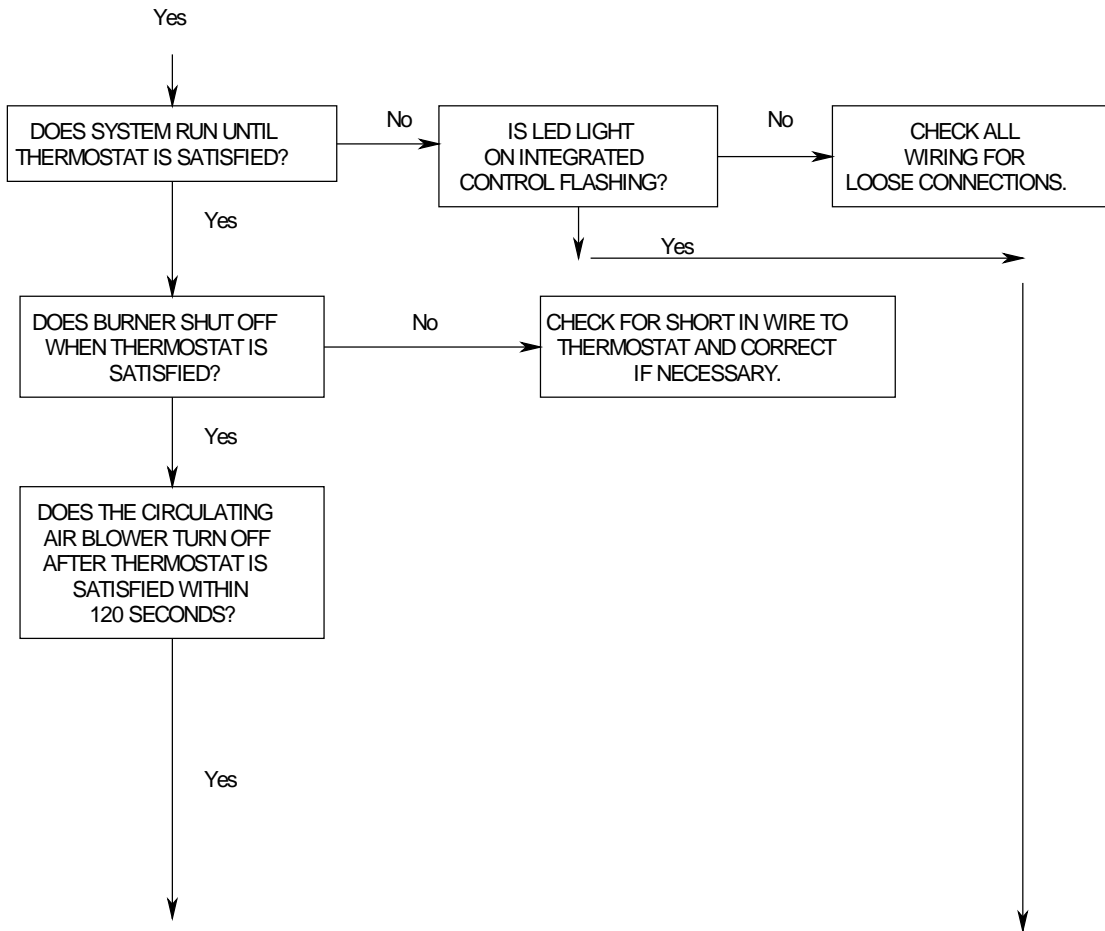
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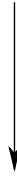


All installations and services must be performed by qualified service personnel.

Yes



Yes



IF LED LIGHT FLASHES:

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

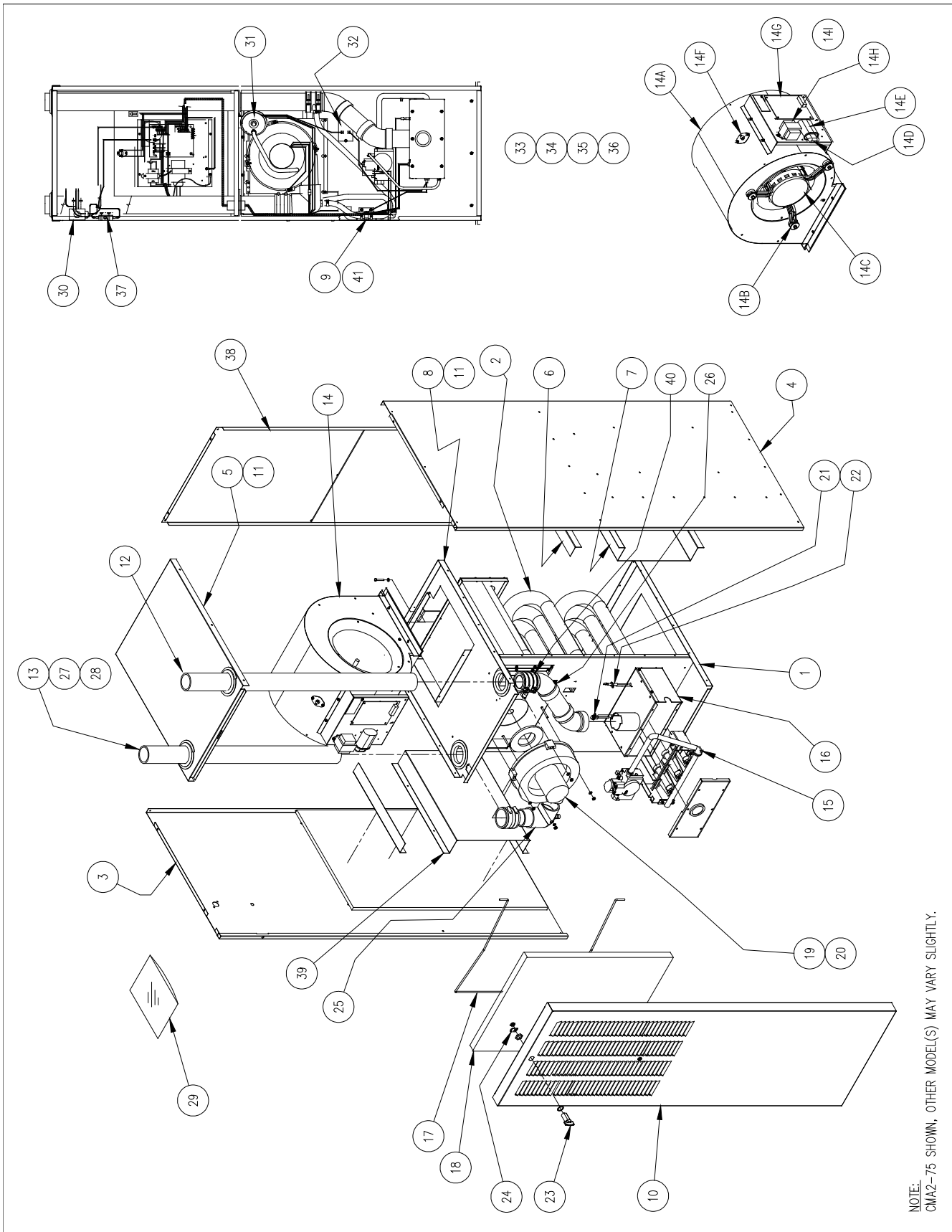
THE LED WILL ALSO FLASH ONCE AT POWER-UP.

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

TROUBLESHOOTING COMPLETE.

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

APPENDIX – A REPLACEMENT PARTS



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

APPENDIX – B WIRING DIAGRAM

