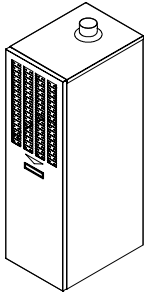


# Thermo Pride®

## GAS-FIRED FURNACE

### DOWN FLOW & DIRECT VENT (SEALED COMBUSTION)



### MODELS: GMD1-80N 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-505  
ECN 4501-MA

MADE IN USA

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

## I. SAFETY SECTION

This page and the following two pages contain various warnings and cautions found throughout this furnace Service and Installation Manual. Please read and comply with the statements on the cover and the statements below.

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

**⚠WARNING:** *When testing electrical equipment, always follow standard electrical procedures and precautions.*

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

**⚠WARNING:** *This furnace uses an automatic hot surface ignition control. NEVER try to ignite gas manually.*

**⚠CAUTION:** *If the temperature rise exceeds 85°F, the heat exchanger may fail voiding the heat exchanger warranty resulting in property damage, personal injury or loss of life.*

**⚠WARNING:** *Burner adjustments must be confirmed by instrumentation. Failure to use accurate or calibrated instrumentation to setup the burner may result in reduced efficiency, sooting, and/or the production of hazardous carbon monoxide gas.*

**⚠WARNING:** *Any attempt to relocate safety controls or replace safety controls with a control that is not approved or incompatible, may result in personal injury, substantial property damage or death.*

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

**⚠WARNING:** *HAZARD OF ASPHYXIATION: Negative pressure inside the closet with closet door closed and the furnace blower operating 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 or it may cause asphyxiation.*

**⚠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 pipe connections must be leak tested using a strong soap and water solution (with the gas turned on). Any leaks must be repaired immediately*

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*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.*

**⚠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 14.0 inches W.G. The furnace can be isolated from the gas supply by closing its manual shut off valve at test pressures equal to or less than 1/2 PSIG or 14.0 inches W.G.*

**⚠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:** *If you suspect there is a problem with the furnace, the venting system or any other related problem, immediately contact a qualified service agency. If a service agency is not available, contact your fuel supplier.*

**⚠WARNING:** *Personal injury, or property damage, could result from major repair or service of this furnace by anyone other than a qualified contractor. Only the routine maintenance described in the user section of this manual should be performed by the user.*

**⚠CAUTION:** *Do not block or obstruct air openings on the furnace or air openings communicating with the area in which the furnace is installed.*

**⚠CAUTION:** *Do not allow the outside air intake to be blocked or obstructed by vegetation, ice, snow or any other materials.*

**⚠WARNING:** *Do not use this furnace if any part has been underwater. Immediately call a qualified service agency to inspect the furnace and to replace any part of the electrical or control system, which has been underwater.*

**⚠WARNING:** *Should overheating occur or the gas supply fail to shut off, shut off the manual gas supply valve to the furnace before shutting off the electrical supply.*

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

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

SHOULD THIS UNIT BE DISASSEMBLED ALL COMPONENTS, PANELS, BLOCK OFFS, COLLARS, GASKETS, AND FASTENERS MUST BE REASSEMBLED AS ORIGINALLY FACTORY PRODUCED.

390056



390097

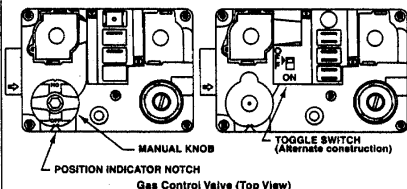
**FOR YOUR SAFETY READ BEFORE OPERATING**

**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 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.
- D. Do not use this appliance if any part has been under water. 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. Turn gas control knob clockwise to "OFF" position. (For gas valves with a switch, move the 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 next step.
7. Turn gas control knob counterclockwise to "ON" position. (For gas valves with a switch, move the switch to the "ON" position.)
8. Turn on all electric power to unit.
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.



**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. Turn gas control knob clockwise to "OFF" position. (For gas valves with a switch, move the switch to the "OFF" position.)
5. Replace the burner compartment cover.

390469



CONTROL NO. 3018528

MODEL NO. GMD1-80N



SERIAL NO. 00000000

FOR INSTALLATION IN MANUFACTURED HOME. DATE OF MANUFACTURE 08 JAN 2003  
 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.	80,000	2.45 MM	5.5	14.0	3.5 INCHES W.C.
L.P.	80,000	#53	11.0	14.0	10.0 INCHES W.C.

APPLIANCE IS SHIPPED FROM FACTORY WITH 2.45 MM 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, 6 INCHES FROM FLUE PIPE, 1 INCH FROM TOP OF APPLIANCE TO CEILING, 1 INCH FROM PLENUM SIDES AND WARM AIR DUCT WITHIN 3 FEET OF APPLIANCE, AND 0 INCH FROM ROOF JACK. 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, MODEL NO. VP-1 VENT PIPE, AND A LABELED MODEL NO. SRJ-1 ROOF JACK OR TYPE B GAS VENT. SEE INSTRUCTION MANUAL FOR DETAILS ON INSTALLATION OF BASE, VENT PIPE, AND ROOF JACK.

390425(A)/D 4443 MA  
 1000-07 4443-BA

**THERMO PRODUCTS, LLC.**  
 P O BOX 217 - NORTH WILSON TN 36266

**PERFORMANCE**

APPLIANCE IS A SEALED COMBUSTION SYSTEM 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 70°F.

**ELECTRICAL RATING**

115 VOLTS 60 HERTZ 1 PHASE  
 MAXIMUM CURRENT AMPS 6.15  
 MINIMUM CIRCUIT AMPACITY 8.66  
 MAXIMUM FUSE SIZE 15.0

**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 4355 MA  
 1000-07 4355-BA

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

<b>CAUTION</b>	<b>⚠ WARNING</b>	<b>FOR YOUR SAFETY</b>
<b>MOVING PARTS. CAN CAUSE SEVERE PERSONAL INJURY</b> SHUT OFF FURNACE BEFORE REMOVING THIS PANEL.	<b>SPECIAL HOMEOWNERS INSTRUCTIONS</b>	<b>WHAT TO DO IF YOU SMELL GAS:</b> 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.
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.	<ul style="list-style-type: none"><li>● <b>IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE OR MAINTENANCE CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.</b></li><li>● <b>FOR SAFE OPERATION</b> 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.</li><li>● THE OWNER AND/OR USER SHOULD ALSO CONDUCT PERIODIC VISUAL INSPECTIONS. REFER TO THE USERS INFORMATION MANUAL PROVIDED WITH THIS FURNACE FOR DETAILS.</li><li>● ANY DEFICIENCIES NOTED MUST BE CORRECTED AT ONCE BY A QUALIFIED HEATING CONTRACTOR. DO NOT ATTEMPT TO MAKE REPAIRS YOURSELF!</li><li>● FOR ASSISTANCE OR ADDITIONAL INFORMATION CONSULT A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER.</li></ul>	<b>FOR YOUR SAFETY</b> DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE. <b>THIS UNIT MUST BE INSTALLED AND SERVICED BY A QUALIFIED CONTRACTOR ONLY.</b> OPERATING INSTRUCTIONS ARE LOCATED INSIDE APPLIANCE NEAR BURNER ASSEMBLY.
<b>DO NOT REMOVE THIS LABEL</b>	390231	

KEEP CLOSED WHEN  
APPLIANCE IS IN OPERATION

390400

**WARNING**

THIS COMPARTMENT MUST BE CLOSED  
EXCEPT WHEN SERVICING.

390024

**NATURAL/PROPANE GAS CONVERSION  
INSTRUCTIONS**

An alternate main burner orifice and a gas valve pressure regulator conversion kit are supplied with this furnace.

1. Shut off electric power at the furnace and close the manual gas shutoff valve serving the furnace.
2. Disconnect the gas supply pipe from the gas control valve. Disconnect the wires and 1/4" tubing (if provided) from the gas control valve.
3. Remove the manifold and gas valve assembly from the furnace.
4. Carefully remove and replace all the orifices in the manifold with those supplied in the conversion kit.
5. Remove the cap screw from gas valve pressure regulator. Turn the plastic regulator screw counter clockwise to remove it.
6. Remove the regulator spring and replace it with the spring found in the pressure regulator conversion kit. Replace plastic regulator screw and turn the screw clockwise about 6 complete turns. (Refer to any instructions supplied in the kit)
7. Reassemble gas valve and manifold assembly to the furnace. Reconnect the gas piping, wiring, and 1/4" tubing (if provided) to the gas control valve.
8. Open the manual gas shutoff valve and turn on the electrical power.
9. Check for gas leaks before placing furnace back in operation.
10. During burner operation, turn the regulator screw (located beneath the gas valve pressure regulator cap screw) to obtain the required burner manifold pressure, refer to the rating label for correct settings.

390511

THIS FURNACE IS EQUIPPED FOR NATURAL GAS

This furnace is equipped with orifices sized for operation with natural gas. For conversion to propane gas see CONVERSION instructions label on the furnace. Orifices necessary for propane conversion are provided in the parts package located on the inside of this furnace.

Remove this label only after the furnace conversion has been made.

390512

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

## TABLE OF CONTENTS

<u>SECTION</u>	<u>BEGINNING PAGE</u>
I. SAFETY SECTION	1
II. GENERAL INSTRUCTIONS AND CLEARANCES	6
III. FURNACE SPECIFICATIONS	8
IV. INSTALLATION	10
A. ROOF JACK	10
B. STANDARD CHIMNEY	10
C. FURNACE LOCATION	10
D. BASE INSTALLATION	12
1. Combustible Floor Base Model: 70-BASE	12
2. Cottage Base Model: 01COT-BASE	13
E. ALCOVE INSTALLATION	14
F. CLOSET INSTALLATION	15
G. COMBUSTION AIR	16
H. GAS PIPING	18
I. ELECTRICAL WIRING	19
J. PROPANE CONVERSION	21
K. INITIAL START UP	24
L. ADJUSTMENT OF BTU INPUT RATE	24
M. BURNER ADJUSTMENT	26
N. SETTING TEMPERATURE RISE	27
O. FURNACE CHECKOUT PROCEDURE	27
V. INSTALLER'S INSTRUCTIONS TO USER	29
VI. STARTING THE UNIT	30
A. SEQUENCE OF OPERATIONS	30
VII. TROUBLESHOOTING	32
VIII. DEALER MAINTENANCE	38
A. ELECTRICAL	38
B. BURNERS	38
C. INDUCER BLOWER ASSEMBLY	38
D. INSPECTING THE VENTING SYSTEM	39
E. GASKETS/SEALING MATERIALS	39
F. HEAT EXCHANGER	39
G. HOUSE AIR BLOWER	39
H. EXTENDED SHUTDOWN	39
IX. USERS INFORMATION SECTION	41
A. WARNINGS & CAUTIONS	41
B. COMPONENT LOCATIONS	42
C. INSPECTION AREAS	42
D. FILTER LOCATION AND CLEANING	43
APPENDIX A - REPLACEMENT PARTS LIST	44
APPENDIX B – WIRING DIAGRAM	46

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

## **II. GENERAL INSTRUCTIONS AND CLEARANCES**

### **NOTE: READ THIS SECTION BEFORE STARTING INSTALLATION**

1. This furnace is equipped with orifices for operation with natural gas. For conversion to propane gas, see instructions in Gas Conversion Section of this manual.
2. Any reference to L.P. or Propane gas in this manual, any other labels, or markings on this furnace is to be construed to be propane HD-5. A commercial grade of liquefied petroleum gases composed of a minimum of 90 percent liquid propane (C<sub>3</sub>H<sub>8</sub>).
3. The selection of a furnace heating capacity for a proposed 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).
4. 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 (HUD Total 24, Part 280).
  - b. American National Standard (ANSI-119.2/NFPA-501C), for installations of all recreational vehicles.
  - c. American National Standard (ANSI-Z223.1/NFPA-54), for installation of all gas-fired furnaces.
  - d. American National Standard Electric Code (ANSI-C1/NFPA-70), for installation of all electrical field wiring.

The gas-fired furnace has been investigated under the ANSI Z 21.47-CAN/CGA 22.3-2001 CENTRAL FURNACE test standard. This gas fired unit is listed by Intertek Testing Services and described as, "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.***

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

5. Definitions of "combustible" and "non-combustible" materials as presented in the 1999 version of the National Fuel Gas Code, ANSI Z223.1-1999/NFPA 70-1999, are as follows:

**a. Combustible material:**

**"...materials made of or surfaced with wood, compressed paper, plant fibers, or other materials that are capable of being ignited and burned. Such material shall be considered combustible even though flame proofed, fire-retardant treated, or plastered."**

**b. Non-combustible material:**

**"...material that is not capable of being ignited and burned; such as material consisting entirely of, or a combination of, steel, iron, brick, tiles, concrete, slate, asbestos, glass, and plaster."**

This heating appliance must be installed with clearances to combustible material surfaces of not less than the minimum distances given below. Also, allow ample clearances for servicing the furnace for easy access to the air filter, blower assembly, burner assembly, controls, and vent connections.

<b>MODELS GMD1-80N</b>	<b>CLOSET</b>	<b>ALCOVE</b>
FRONT	6"	18"
BACK	0"	0"
SIDES	0"	0"
ROOF JACK	0"	0"
VENT CONNECTOR	6"	6"
TOP	1"	1"
PLENUM SIDES	1"	1"
TOP AND SIDES OF DUCT	1"	1"
BOTTOM OF DUCT	1"	1"



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

### III. FURNACE SPECIFICATIONS

<u>MODEL</u>	<u>GMD1-80</u>
HEAT INPUT RATE (BTUH)	80,000
HEATING CAPACITY (BTUH)	65,000
BURNER ORIFICE-NAT. GAS (MM)	2.45
BURNER ORIFICE-PROP. GAS (DMS)	#53
GAS SUPPLY PRESSURE (IN.W.G.)	
MINIMUM REQUIRED	
PROPANE	11
NATURAL	5.5
MAXIMUM ALLOWED	
PROPANE	14.0
NATURAL	14.0
GAS MANIFOLD PRESSURE (IN. W.G.)	
PROPANE	10 ± 0.3
NATURAL	3.5 ± 0.3
VENT PIPE SIZE (INCHES)	4
DESIGN TEMPERATURE RISE (°F)	70
SEASONAL EFFICIENCY (AFUE*, %)	81

\*AFUE - INCLUDES STEADY STATE THERMAL EFFICIENCY AND OFF CYCLE LOSSES.

#### ELECTRICAL RATINGS AND SETTINGS:

ELECTRICAL SUPPLY: 115 VAC / 60HZ / 1 PHASE

MAXIMUM TIME DELAY TYPE FUSE OR HACR BREAKER RATING: 15 AMPS

TOTAL RATED CURRENT (AMPS): 7.15 (GMD1)

NOMINAL HEAT ANTICIPATOR SETTING -- 0.8 mA (GMD1)

#### DIMENSIONS & WEIGHTS:

CABINET: WIDTH - 18 IN., DEPTH – 25-1/2 IN., HEIGHT - 57 IN.

NO.70 MOBILE HOME BASE: WIDTH - 18-5/16 IN., DEPTH - 24¼ IN., HEIGHT - 4 IN.

WARM AIR DUCT: WIDTH – 12 IN., DEPTH – 12 IN.

COTTAGE BASE: WIDTH – 18-3/16 IN., DEPTH - 24¼ IN., HEIGHT – 14 IN.

FILTER QUANTITY & SIZE: 1 – 18” x 24 “

APPROXIMATE SHIPPING WEIGHT: 165 LBS.

PRODUCT LISTED UNDER ETL FILE NUMBER –

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

**BLOWER DATA**

MANUFACTURER: MORRISON PRODUCTS, INC.  
BLOWER MODEL: 10-9, DIRECT DRIVE  
NOMINAL MOTOR POWER OUTPUT (HORSEPOWER): 1/3

TYPICAL AIRFLOW @ SPECIFIED EXTERNAL  
STATIC PRESSURES (SCFM @. IN.W.G.):

ESP (IN W.C.)	0.2	0.5
LOW SPEED:	712	640
MEDIUM LOW SPEED:	870	760
MEDIUM HIGH SPEED:	1100	886
HIGH SPEED:	1258	1003

ALL SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

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

## **IV. INSTALLATION**

### **A. ROOF JACK**

The roof jack assembly and accessories must be listed by a nationally recognized testing agency for the appropriate heating fuel.

The roof jack assembly must be installed according to the vent manufacturer's instructions prior to the furnace installation. (Refer to Figure 2 for flue location on furnace.) Adapters for pitched roofs as well as extended barrel length roof jacks are available from other suppliers.

All vent seams and connections must be sealed with high temperature silicone caulk.

### **B. STANDARD CHIMNEY**

When installed as a central furnace special type for single story dwelling, venting into a metal vent system approved by a nationally recognized testing agency for the appropriate heating fuel type is permitted. Lined masonry chimneys are acceptable when sized appropriately. The minimum chimney size should be equivalent to the inside free area of the 4-inch diameter vent collar exiting the furnace, or 12.5 square inches.

Maximum chimney sizes and acceptable installation practices are referenced in the following publication. When installing the GMD1-80N, refer to Appendix G of the latest edition of the installation standard NFPA 54, National Fuel Gas Code.

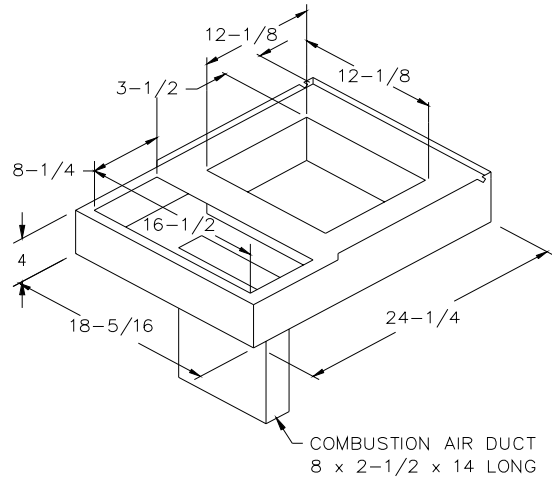
### **C. FURNACE LOCATION**

1. For best performance, locate the furnace so that it is centralized with respect to the duct system.
2. This furnace is only intended for installation with free air return through the furnace door louvers. **⚠ CAUTION: DO NOT** connect a ducted return air system directly to the furnace. Improper installation may create a fire hazard and damage internal equipment, as well as void all manufacturers' warranties.
3. This furnace may be installed on combustible flooring when utilizing either the No. 70 counterflow floor base, for below the floor duct systems, or with the cottage base, for floor level air distribution. See Figures 1A and 1B for depictions of the No. 70 and the cottage bases.
4. This furnace is listed for closet, alcove, or freestanding applications. All applications must comply with the requirements of this manual.

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

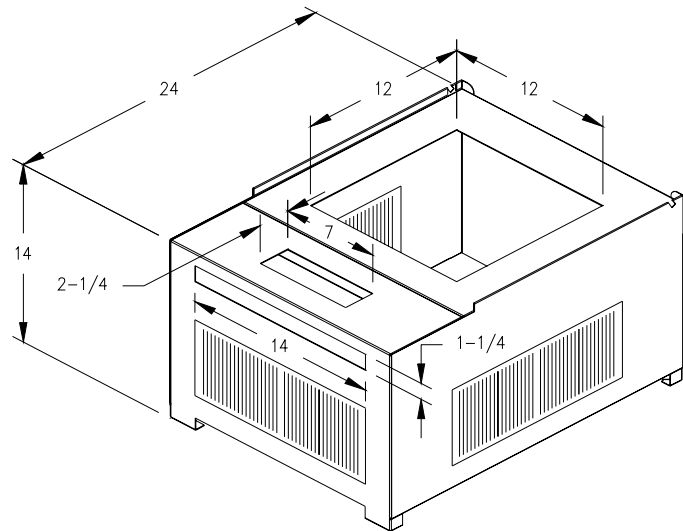
**Combustible Floor Base  
Model: 70-BASE**

**Figure 1A**



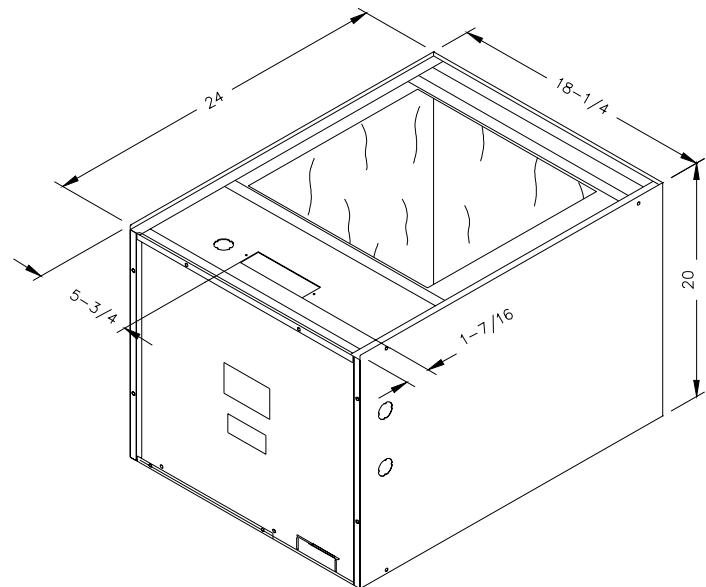
**Cottage Base  
Model: 01COT-BASE**

**Figure 1B**



**Coil Cabinet  
Model: CE111S**

**Figure 1C**

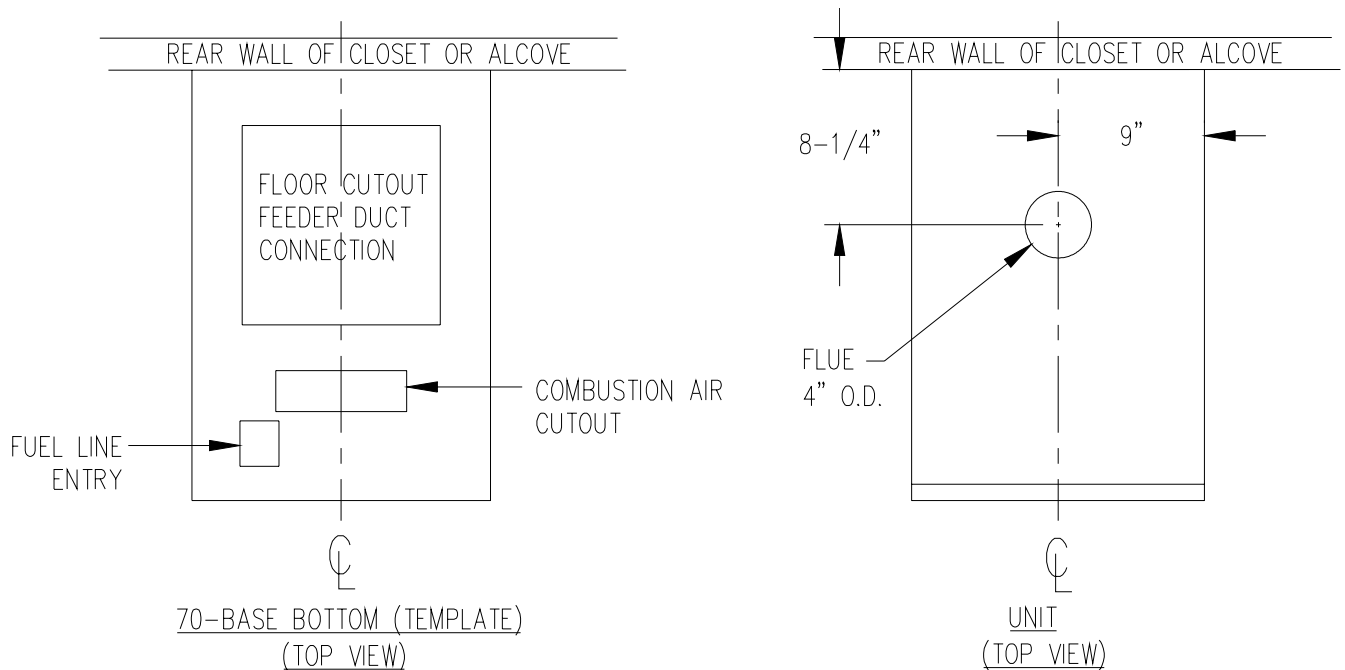


**All installations and services must be performed by qualified service personnel.**

#### D. BASE INSTALLATION

##### 1. Combustible Floor Base Model: 70-BASE

Referring to Figure 1A, for applications using a combustion air channel and a supply air duct, use the base as a template to mark the floor opening locations. See Figure 2 for cutout locations. Cut a square opening in the floor for the supply air duct. Cut the opening 1-inch larger than the square template opening. Cut the combustion air duct opening. See Figure 1A for cutout sizes.



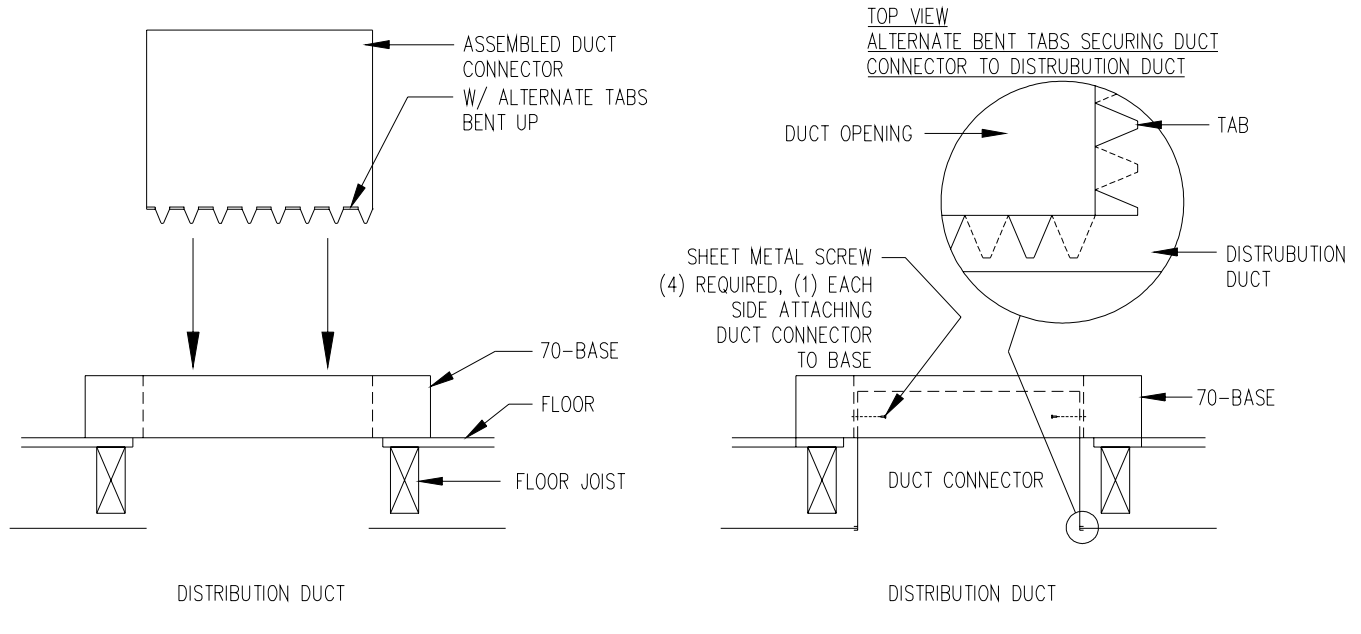
**Figure 2**

Place the bottom base panel in position. Mark the square opening location on the distribution duct at the connection point of feeder duct. Remove the bottom panel. Cut an opening in the duct slightly larger than the feeder duct. Cut the feeder duct to length. (Refer to Figure 3 for location of this cut.) Install the feeder 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 feeder duct. Insert and secure the combustion air duct. Put the top panel in place.

**⚠ CAUTION: A combustion air duct must be used. If the underside of the mobile home is skirted or enclosed (e.g. enclosed in a crawlspace), the combustion air intake should exit through the skirting, or enclosure, if at all possible. All joints and seams of supply ducts and combustion air ducts must be closed with a sealing method suitable to the application conditions and temperatures (e.g. high temperature silicone caulk and/or aluminum tape).**

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

***If the combustion air passageway cannot terminate outside of the skirting or enclosure, a permanent opening with a minimum of 50 square inches of unobstructed infiltration (free area) for ventilation air must be provided for adequate combustion. This permanent opening must be located no less than 12 inches from the bottom of the enclosure or skirting.***



**Figure 3**

Slit the corners of feeder duct down to the top of the top panel. If metal projects more than 1 inch above the top panel, trim the flanges down to 1 inch. While pulling the top of the distribution duct up with one hand, bend down each side of the feeder duct tightly to the top panel with the other hand. This assures a tight connection between the top panel and the feeder 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 top panel to the floor with two screws in the front flange.

## 2. Cottage Base Model: O1COT-BASE

The O1COT-BASE cottage base (Figure 1B) is required for a freestanding cottage base installation. The cottage base is designed to permit the installation of a 6-inch x 14-inch register in each of the two side panels and the front panel.

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

**⚠ CAUTION:** A permanent opening with a minimum of 50 square inches of unobstructed infiltration (free area) for ventilation and combustion air must be provided to the interior of the structure. Additional make-up air may need to be supplied to the interior of the structure to compensate for exhaust fans, appliances, or vents, which consume air from the interior of the structure.

Refer to the assembly installation instructions included with OM1COT-BASE cottage base for additional information.

### 3. Coil Cabinet: CE111S

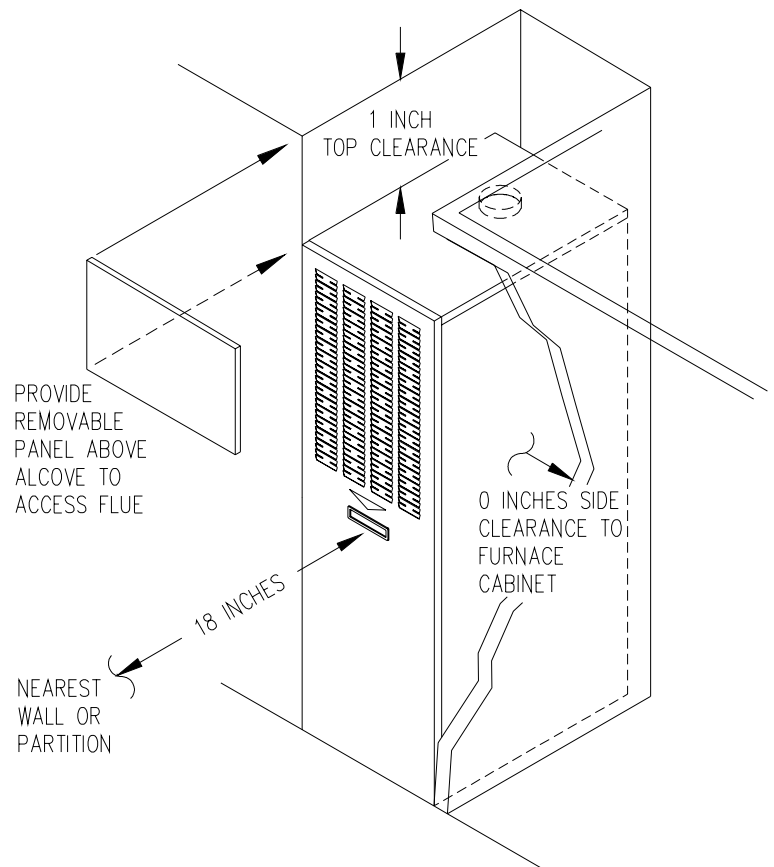
The CE111S coil cabinet (figure 1C) is for applications requiring air conditioning. The coil cabinet is designed to have the combustion air brought in from the bottom thru a duct, supplied with the cabinet. Refer to section G Combustion air of this manual for further instructions on the combustion air termination and connections. For additional information refer instructions provided with the CE111S coil cabinet.

## E. ALCOVE INSTALLATION

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

Alcove installations must use the No. 70 mobile home base.

Refer to section **G. COMBUSTION AIR** for additional combustion air requirements.

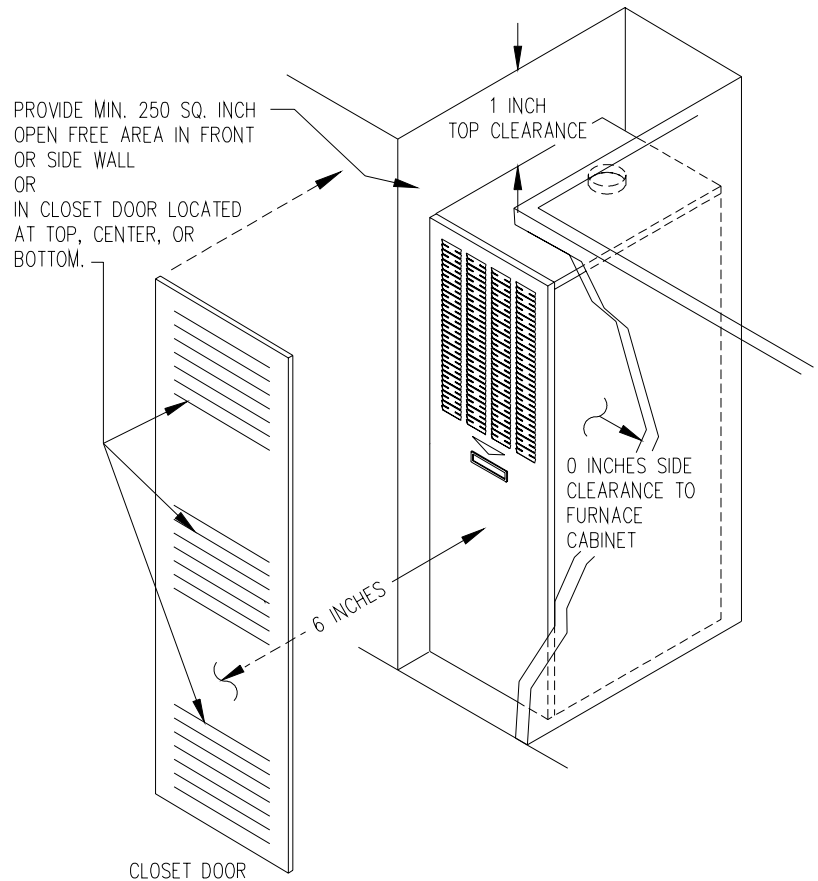


**Figure 4**

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

## F. CLOSET INSTALLATION

**⚠ WARNING: HAZARD OF ASPHYXIATION:** A suction effect will occur when the furnace is operating inside the closet with the closet door closed. For proper operation, the furnace blower shall create no more than a 0.05-inch water column pressure differential between the closet and the adjoining space.



**Figure 5**

1. The return air opening into the closet is to have a minimum free area of 250 square inches, (refer to Figure 5).
2. The return air opening may be located in the top, the center or (ideally) the bottom of the closet door, or sidewall.

**⚠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 temperature limit and shutdown, or it may cause asphyxiation.

3. The cross-sectional area of the return air grille leading into the closet (when located in the floor or ceiling) shall not be less than 250 square inches.



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

4. The total free area of openings in the floor or ceiling registers serving the return air 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 any other objects.
5. Materials located in the return air system must have a flame spread classification of 200 or less.
6. Wiring materials located in the return air duct system must conform to Article 300-22 of the latest edition of the National Electrical Code, NFPA 70.
7. Gas piping shall not be located in, or extend through, the return air duct system.
8. Refer to section G. COMBUSTION AIR for additional combustion air requirements.

## **G. COMBUSTION AIR**

The furnace requires the proper amount of combustion airflow through the combustion air intake to combust the fuel cleanly and efficiently. An inadequate combustion air supply can result in unsafe and erratic operation of the burner, sooting of the combustion chamber and the heat exchanger, and possibly, offensive fuel odors. Refer to chapter 5.3 of the National Fuel Gas Code, ANSI Z223.1 / NFPA 54-1999, or latest edition for application specific combustion air requirements.

The preferred location of the outside combustion air intake terminal (e.g. an optional stainless steel intake hood, part no.370183) is through the side of the structure, skirting, or enclosure. An acceptable alternate location is under the structure in the skirted or crawlspace area providing a minimum of 50 square inches of free area exists around the perimeter for outside combustion air to be drawn through. The opening of the termination must be at least 7 inches below the top of the floor.

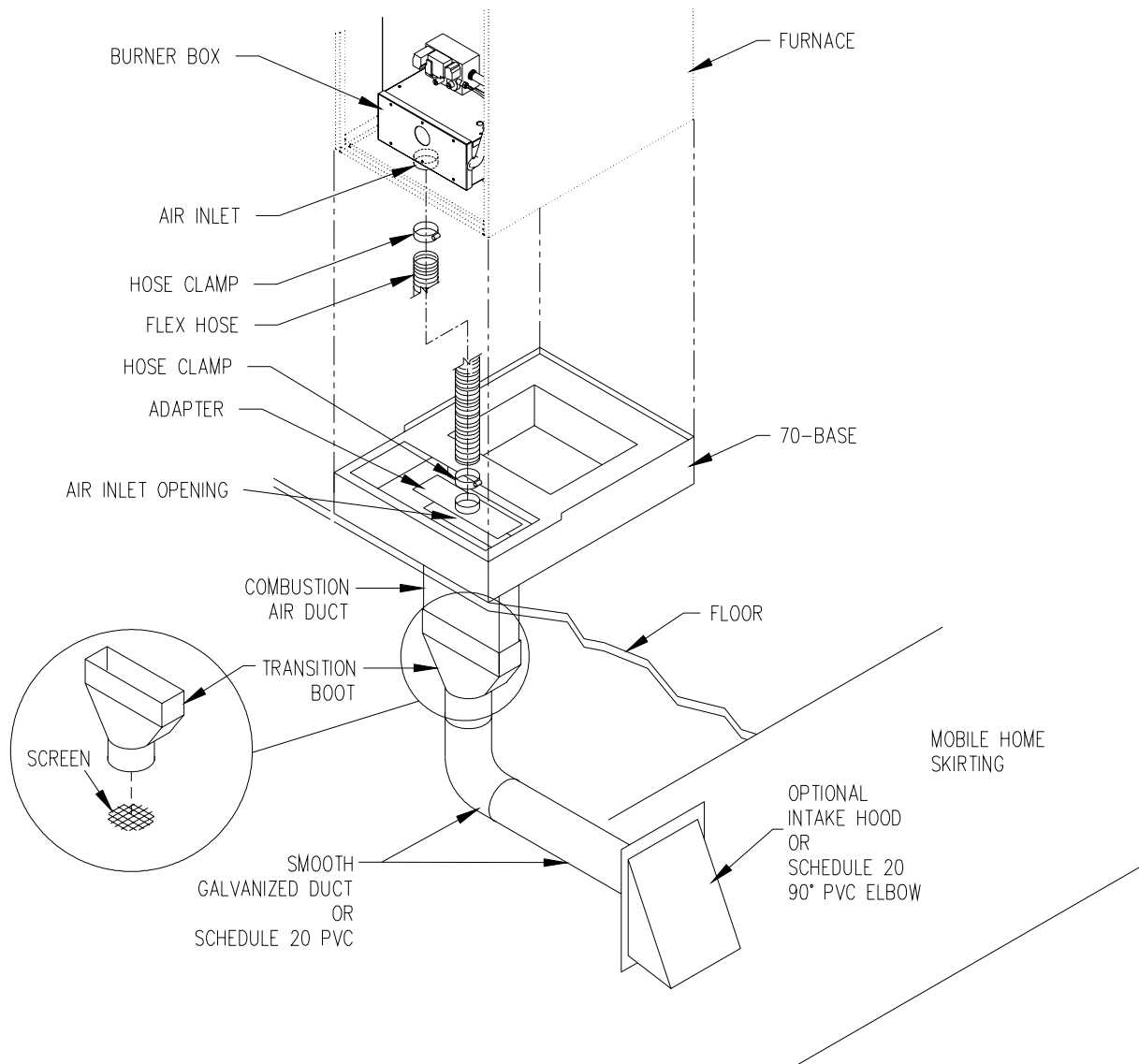
The 70-base/coil cabinet is shipped with a combustion air duct that must be installed in the bottom of the base enclosure, before the furnace is installed. This 2-inch by 7-inch duct is shipped in two pieces. High temperature silicone sealant should be applied to both vertical seams, before it is snapped together with all four flanges on the same end. High temperature silicone must be applied to the flanges. The combustion air duct can then be inserted through the opening in the floor base model no.70. When the combustion air duct has been inserted completely, secure the duct to the combustion adapter with self-tapping sheet metal screws, refer to Figure 6. Make certain that the flanges, duct, and adapter are completely sealed to the burner enclosure base with high temperature silicone caulk. A 3-inch round to 7-inch x 2-1/4 inch rectangular adapter plate is supplied with the furnace for adapting the 3-inch round flex combustion air duct to the 2-inch x 7-inch combustion air duct.

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

Recommended materials for the combustion air duct are smooth, round, galvanized steel duct or schedule 20 PVC pipe. The maximum intake duct length allowed is equivalent to 40-feet of straight duct. Reduce this length by 6-feet for the intake hood and each 90-degree elbow used, and by 3-feet for each 45-degree elbow used the combustion air duct. **⚠ CAUTION:** Flexible, spiral, or corrugated duct is not recommended, due to the relatively high-pressure drop associated with air movement through this type of passageway.

Optional combustion air- a 4" round duct may be used by connecting a 3 x 4 reducer to the 3" flex duct supplied with the furnace.

**Figure 6**



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

## H. GAS PIPING

**⚠WARNING:** *Because of the potential of the odorant to 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:** *With the gas piping pressurized, all gas piping connections must be leak tested using a strong soap and water solution. 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.*

**⚠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 (13.9 inches W.G.). The furnace can be isolated from the gas supply by closing the manual gas shutoff valve serving the appliance at test pressures equal to, or less than, 1/2 PSIG or (13.9 inches W.G.).*

**⚠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.*

Sizing and installation of fuel lines must be in accordance with federal, state, and local regulations.

A qualified installer or service person must install all gas piping and perform all required testing.

Piping from the natural gas meter to the furnace shall be in accordance with requirements of the local gas utility. Piping from the propane tank to the furnace must follow the recommendations of the gas supplier. In the absence of local codes governing gas piping selection and installation, follow the National Fuel Gas Code, ANSI Z223.1 / NFPA 54-1999, or latest edition.

A readily accessible, manual gas shutoff valve (design-certified for the applicable gas) with a non-displaceable rotor member shall be installed within six (6) feet of the furnace.

A pipe 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 corrosive effects of LP gases. Pipe dope or sealant

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

design-certified to be resistant to the action of the LP gases should be used on all threaded joints.

The burner is setup to be piped to the gas supply through the left-hand side of the furnace. For service purposes, it is recommended the gas union be located inside the furnace.

A drip leg must be used on both propane and natural gas installations immediately upstream of the furnace in order to trap oil, condensate, and other impurities which might otherwise lodge in the gas valve, or plug the main 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 drip leg(s) may void the manufacturer's limited warranty on the furnace.

For natural gas, the maximum supply pressure is 14.0 in. W.G. and the minimum supply pressure, for purposes of input adjustment, is 5.5 in. W.G.

For propane gas, the maximum supply pressure is 14.0 in. W.G. and the minimum supply pressure, for purposes of input adjustment, is 11.0 in. W.G.

## **I. ELECTRICAL WIRING**

***⚠CAUTION: When testing electrical equipment, always follow standard electrical procedures and precautions.***

All electrical wiring must be installed in strict accordance with local ordinances and codes. In the absence of local ordinances and codes, all electrical wiring must conform to the requirements of the National Electric Code, ANSI/NFPA 70-1999, or 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.

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

f. Reinstall and secure the junction box cover with the original mounting screws.

### 3. Connection Of Room Thermostat Wires

**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 GMD (refer to the thermostat literature for additional information).

Five-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.
  1. Increase the thermostat setting, or create a "call for heat".
  2. Read the value of the thermostat current, in milliamps.
  3. 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.

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

## J. PROPANE CONVERSION

Parts are included with this furnace to convert from natural to propane gas. See table 1

### **WARNING**

**This conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. 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. The qualified service agency performing this work assumes responsibility for the proper conversion of this furnace with this kit."**

The installation of this conversion kit must be done only by qualified service personnel. These instructions must be read in their entirety before converting the furnace. Follow the start-up and operation section of this manual for instructions on the test fire subsequent to this conversion. The following instructions will outline the procedure for converting the existing burner from natural to propane gas.

**When making a gas conversion, it is necessary to replace and/or modify several of the existing components. Table 1, shown below, describes these components and shows the correct model or size for each type of gas, propane, or natural.**

**Table 1: Contents of the Thermo Pride Gas Conversion Kits**

<b>CONTENTS</b>	<b>QUANTITY</b>	<b>(NAT. TO PROPANE)</b>
Main Burner Orifice Diameter	3	#53 DMS (0.0595in)
Gas Valve Pressure Regulator Kit (White-Rodgers Part No.)	1	92-0659

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

## MANIFOLD REMOVAL AND ORIFICE CHANGE

**⚠WARNING:** Make sure that pipe dope or sealant certified to be resistant to the action of liquefied petroleum gases is used on all threaded joints.

**⚠CAUTION:** The gas supply shall be shut off prior to disconnecting the electrical power before proceeding with the conversion.

1. Shut off gas to the furnace at the main manual gas shut off valve and power to the furnace at the disconnect switch.
2. Disconnect the furnace from the gas supply system at the pipe union.
3. Remove the burner box cover by removing the outer row of screws holding the cover.

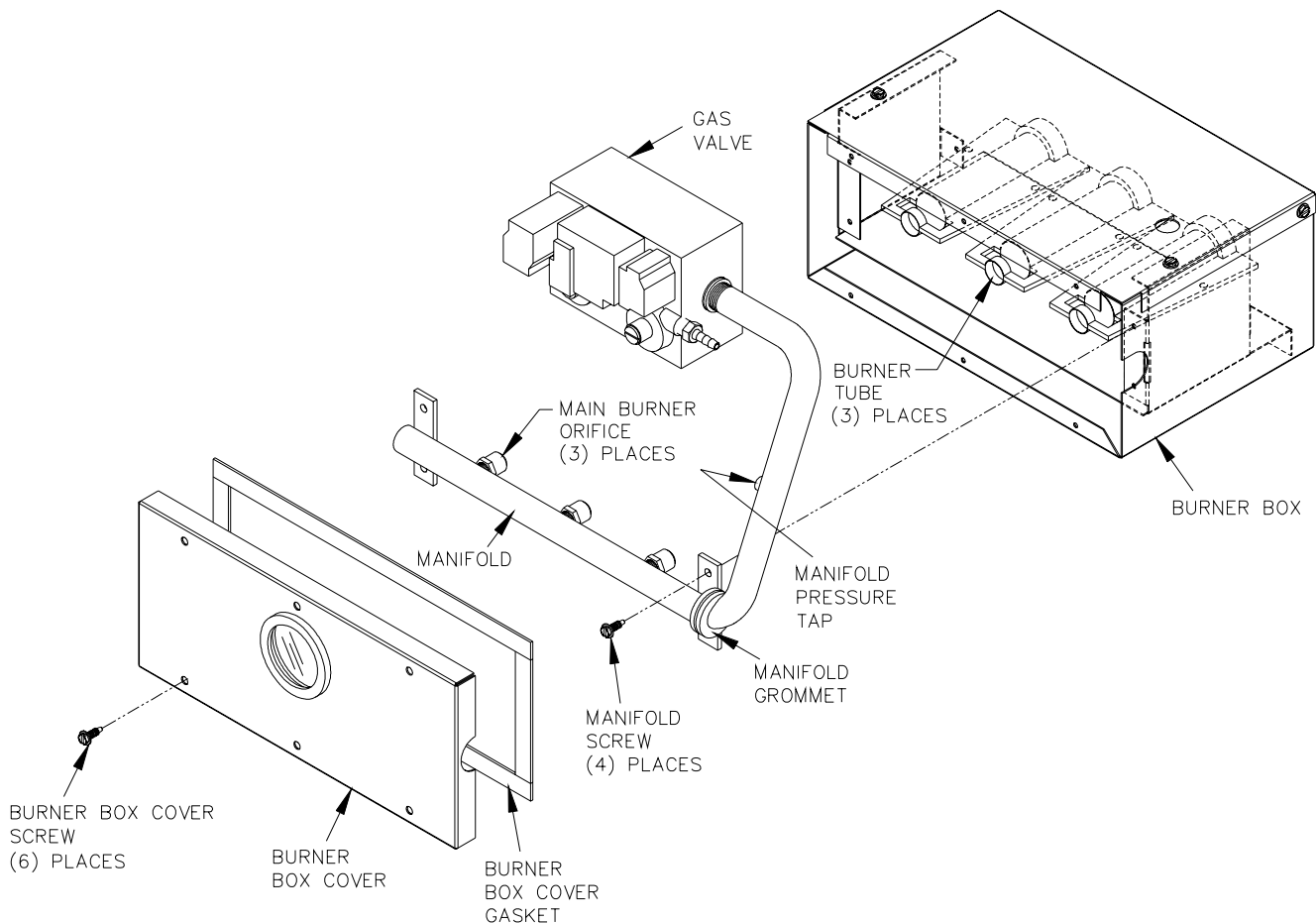


Figure 8

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

4. Remove the four screws securing the manifold in the burner box. Pull the manifold far enough out of the burner box to access the burner orifices. (See figure 8)
5. Remove the main burner orifices from the manifold using a 1/2-inch wrench. Replace the existing main burner orifices with conversion orifices as indicated in table 1.
6. Refer to the instructions provided in the gas valve conversion kit for regulator spring change out instructions.
7. Reinstall the manifold into the burner box. Make sure that all orifices go into their respective burners and the groove of the rubber grommet on the manifold lines up on the edge of the burner box to seal around the manifold. Secure it with four screws. (See figure 8).
8. Inspect the seal on the burner box cover and if damaged replace it. Install and secure the burner box cover. Make sure all the fastening screws are used.
9. Check to make sure that the electrical connections to the gas valve are tight.
10. Check that the plastic hose from the pressure switch is attached securely to the hose barb at the outlet of the gas valve without being kinked.

**⚠CAUTION:** The regulator of the gas valve will not function properly if this hose connection is not made.

11. Reconnect the furnace to the gas supply.
12. Refer to initial start-up and operating instructions for test fire and burner adjustments.



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

#### K. 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 proper hook up. Tighten any loose connections.
2. Using a soap solution, leak test gas piping connections.
3. Check all tubing connections to the pressure switch, inducer, burner box, and gas valve and make sure they are connected firmly at all their connection points.
4. Check flue pipe, combustion air inlet, and all joints 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 are free from blockage.

#### 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 IV, H, 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. A qualified heating contractor should do this. 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. Propane gas is especially dangerous because the specific gravity of propane 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 be set at highest setting.*
3. *The furnace remains running at conditions 1&2 for 30 minutes or until odor has dissipated.*

#### L. ADJUSTMENT OF HEAT INPUT RATE:

The orifices for this furnace were 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 rating label 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,

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

it is mandatory 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 80,000 BTU at sea level must be reduced to a firing rate of 64,000 (80,000 x .80 = 64,000) 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 may supply you with the correct orifice sizing information.

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

- a. Call your gas supplier and ask for the BTU content (heating value) of one cubic foot of the gas, supplied to the installation area. An alternate approach is to assume a value of 1025 BTU/Cu Ft, which is the national average.
- b. With all other gas appliances turned off and using a stopwatch, clock the time required for the (small) dial on the gas meter to make one full revolution. The meter 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:** 
$$\frac{1025 \text{ BTU/Cu Ft} \times 2 \text{ Cu Ft} \times 3600}{93.80 \text{ Seconds}} = 78,678 \text{ BTU Input}$$

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 GMD1-80N model and the input rate is 78,678 BTU/hr. The input rate would be acceptable because it was within  $\pm 2\%$  of the listed input of 80,000.

- c. 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 shown in figure 8.

### GAS PRESSURE CHART FOR ALL GMD1-80 MODEL FURNACES

	SUPPLY PRESSURE	MANIFOLD PRESSURE
NAT	MAX 14" WC MIN 5.5" WC	3.5 $\pm$ .3" WC
PROPANE	MAX 14" WC MIN 11" WC	10.0" $\pm$ .3" WC

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

## TABLE 2

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 unmetere 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.

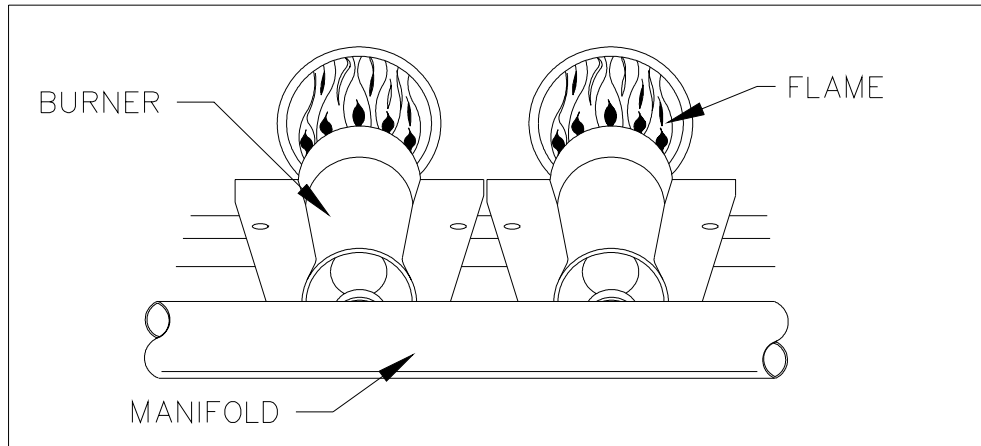
If the rated input cannot be obtained with the present orifice at the correct pressure, your local gas supplier may assist in sizing the proper orifice. Thermo Products Engineering Department will gladly assist in sizing the orifice if you provide them with the heating value in BTU per cubic foot and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

## M. BURNER ADJUSTMENT

**⚠ CAUTION:** *The GMD1-80N furnace model utilizes an in-shot burner design that 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.*

This unit is designed to not require any burner adjustment. The flames should be checked by looking through the sight glass located on the burner box. Burner flames should be clear, blue, and almost transparent in color. (See Figure 9). **NOTE:** It is not unusual to have mostly blue flames with yellow or orange tips visible in the tube for propane gas.

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



**Figure 9**

## **N. SETTING TEMPERATURE RISE**

The GMD1-80N is designed and wired at the factory for a heating blower speed that should result in an approximate temperature rise of 70°F. The blower motor is wired on medium 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.

After 10 to 15 minutes of continuous operation, the temperature rise through the furnace must fall within a range of 55°F to 85°F. If the outlet or supply duct temperature is too high, check to make sure the return air filter is clean, the return air registers are free from obstruction, the outlet registers are properly adjusted and clear, and the 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 blower door. The speed of the blower must be increased by changing the speed tap from the motor (see wiring diagram). This is accomplished by locating the control panel attached to the blower housing and switching blue (med. low) blower lead, which should be connected to the "Heat" terminal on the White-Rodgers 50A65-143 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.

## **O. 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 section IV. H. Gas Piping of this manual.

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

**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 high air 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 until the pressure switch functions shutting off the main burners.
4. Block the inlet gradually until pressure switch functions shutting off the main burners.

**IMPORTANT:** Remove flue or air inlet blockages when done.

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

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

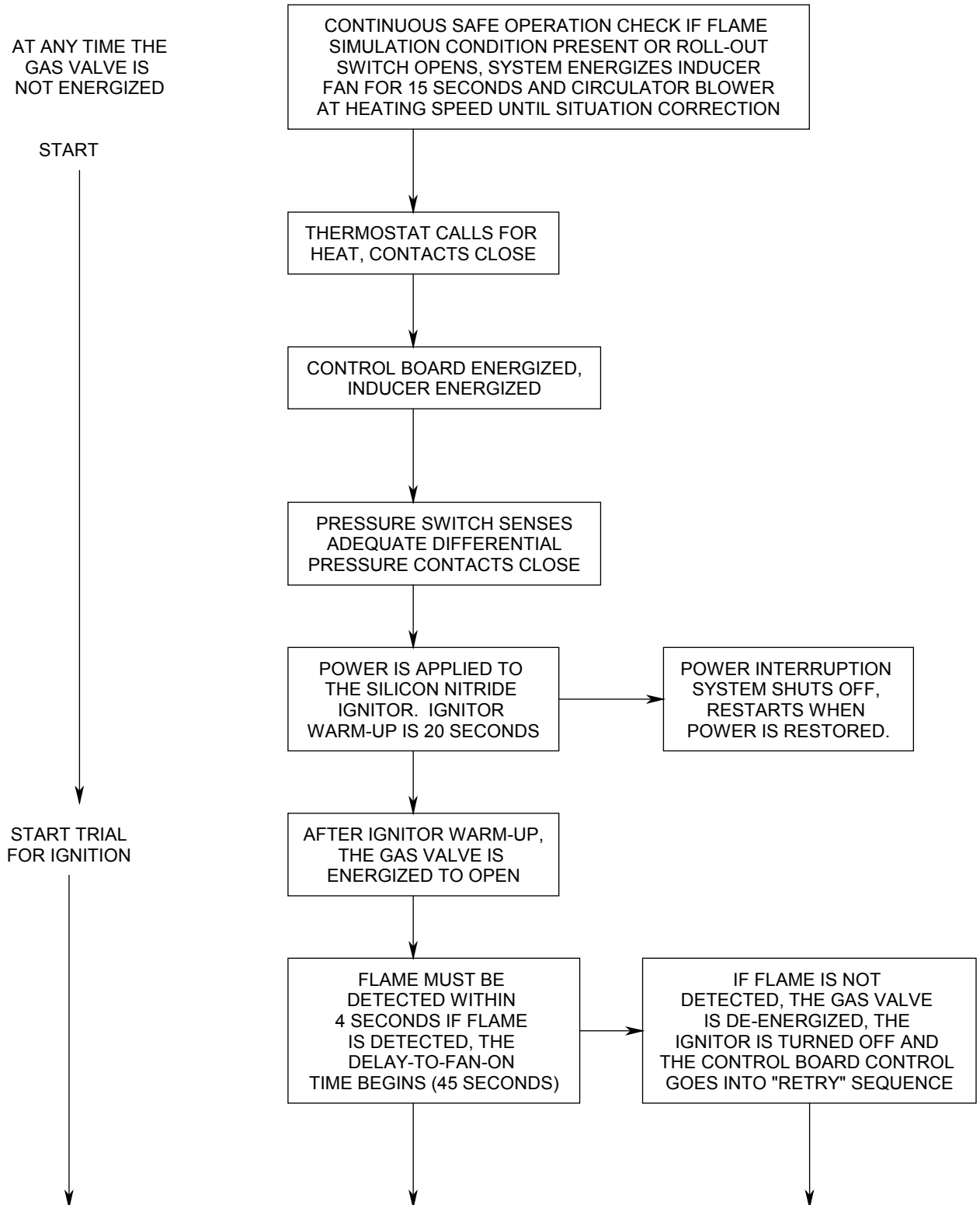
After completing the installation, the installer shall inform and/or demonstrate to the homeowner:

1. The location of all the instructions in the furnace must be kept along with instructions for any accessories in the plastic pouch near 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 section of this manual.
5. That failure to maintain and operate this furnace in accordance with these instructions could result in hazardous conditions, bodily injury, and 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 section of this manual.
7. Recommend the user has a qualified heating contractor inspect the furnace at the start of each heating season. Inform the user of the frequency of inspection required for each item in the User Information Section of this manual.

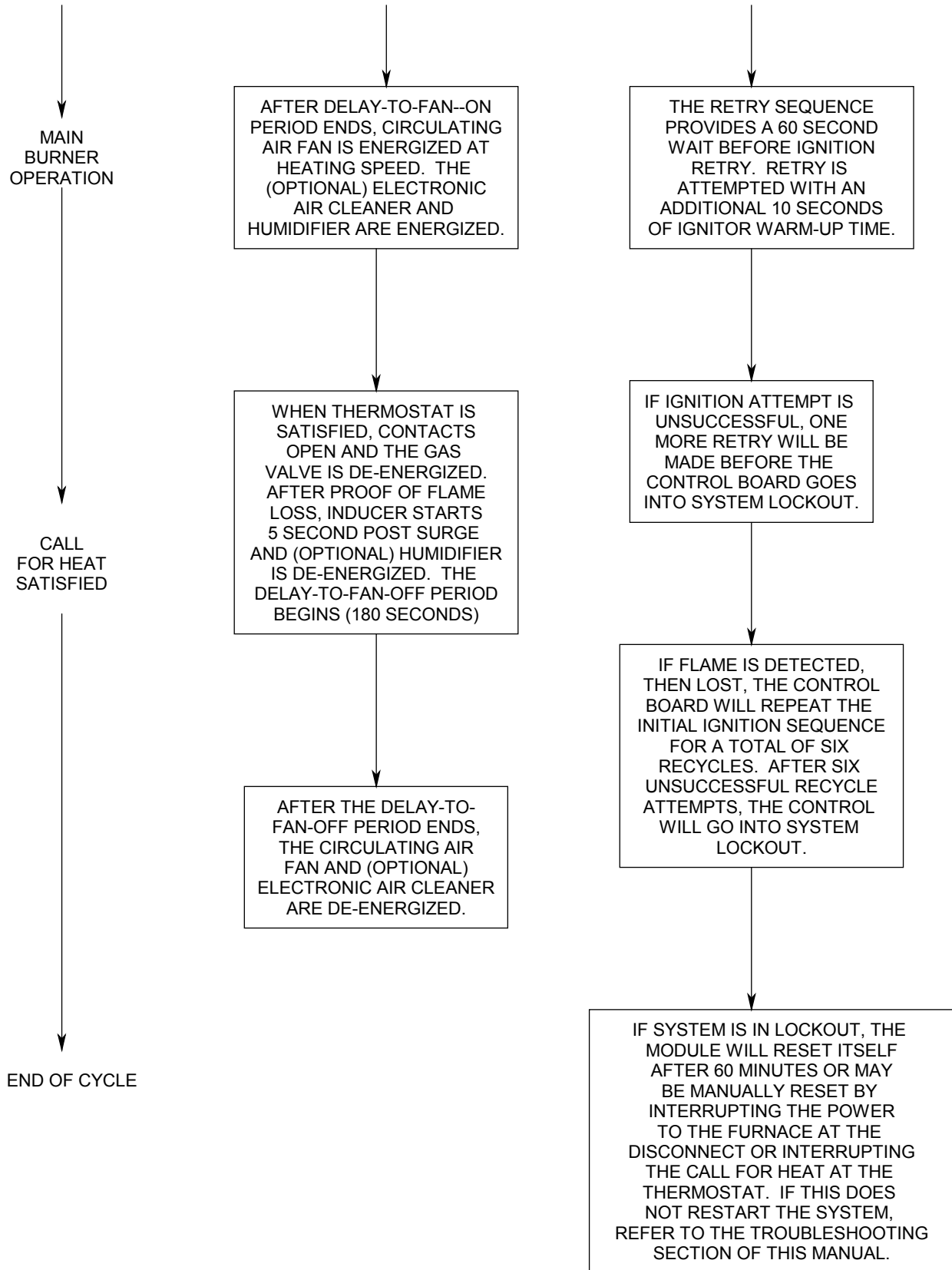
All installations and services must be performed by qualified service personnel.

## VI. 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.**

## **VII. TROUBLESHOOTING**

**THIS SECTION IS ONLY TO BE PERFORMED BY TRAINED, QUALIFIED SERVICE PERSONNEL, AND NOT BY THE FURNACE OWNER.**

**NOTICE:** BEFORE TROUBLESHOOTING, FAMILIARIZE YOURSELF WITH THE START UP AND CHECKOUT PROCEDURE. ALL INSTALLATION AND SERVICES MUST BE PERFORMED BY QUALIFIED HEATING CONTRACTORS

***When testing electrical equipment, always follow standard electrical procedures and precautions.***

1. Check for line voltage (110-120VAC) to the furnace. If there is no line voltage applied to the furnace, check that disconnecting switch is "on", fuses or circuit breakers have not blown or tripped.
2. Make sure thermostat is "calling for heat".
3. Check for adequate fuel supply and pressure. Are all the fuel shutoff valves open?
4. To assist you in troubleshooting this furnace, it is equipped with an integrated ignition control with diagnostics. These diagnostics evaluate what malfunction the control system has experienced and will activate a flashing light on the control in different sequences to help pinpoint the failure.

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

## DIAGNOSTIC FEATURES

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

The 50A65-143 control continuously monitors its own operation and the operation of the system. If a failure occurs, the LED will indicate a failure code as shown below. **If the failure is internal to the control, the light will stay on continuously. In 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).

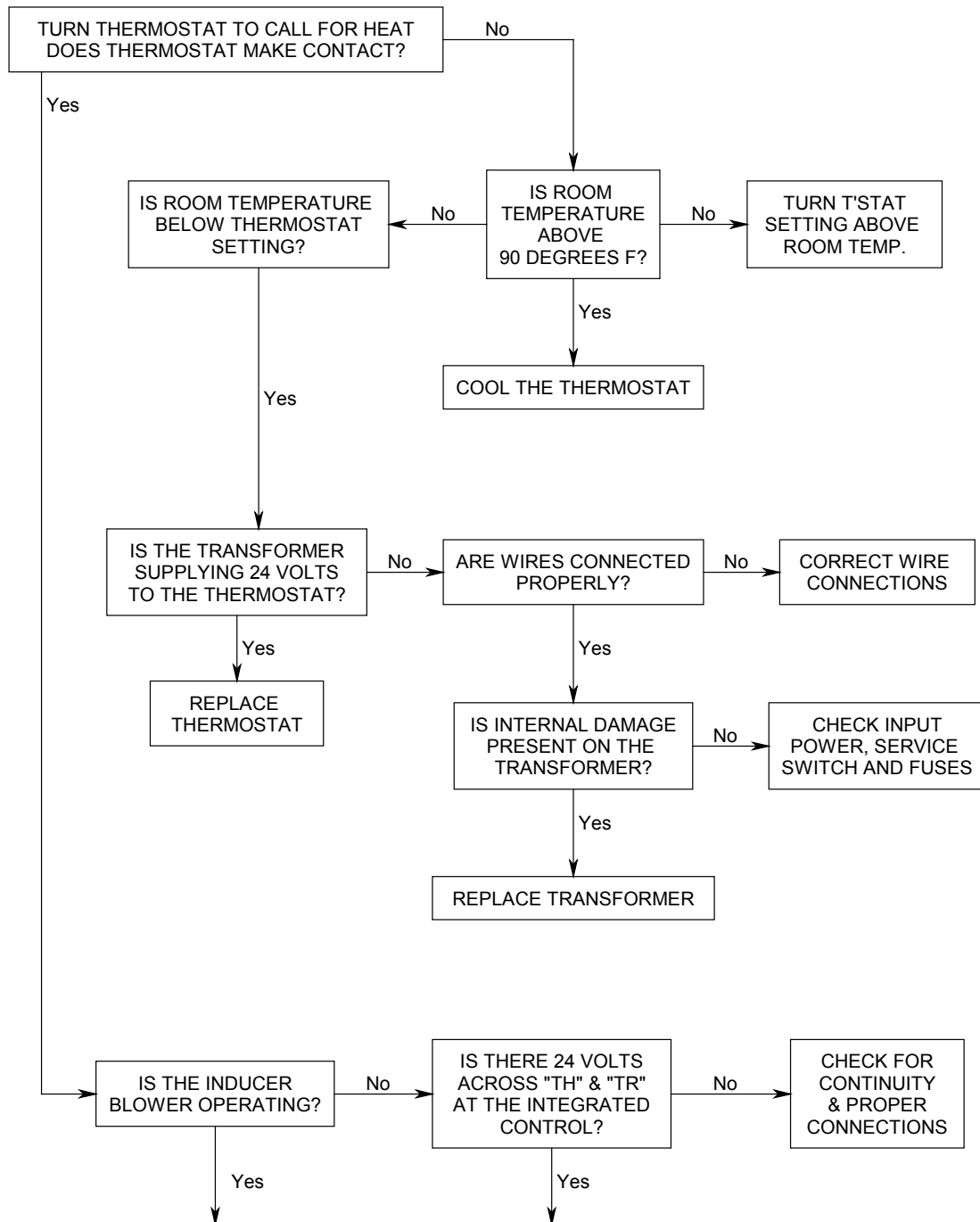
1 flash, then pause	System lockout
2 flashes, then pause	Pressure switch stuck closed
3 flashes, then pause	Pressure switch stuck open
4 flashes, then pause	Open limit switch or rollout switch
6 flashes, then pause	115 Volt AC power reversed
7 flashes, then pause	Low flame sense signal
8 flashes, then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

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

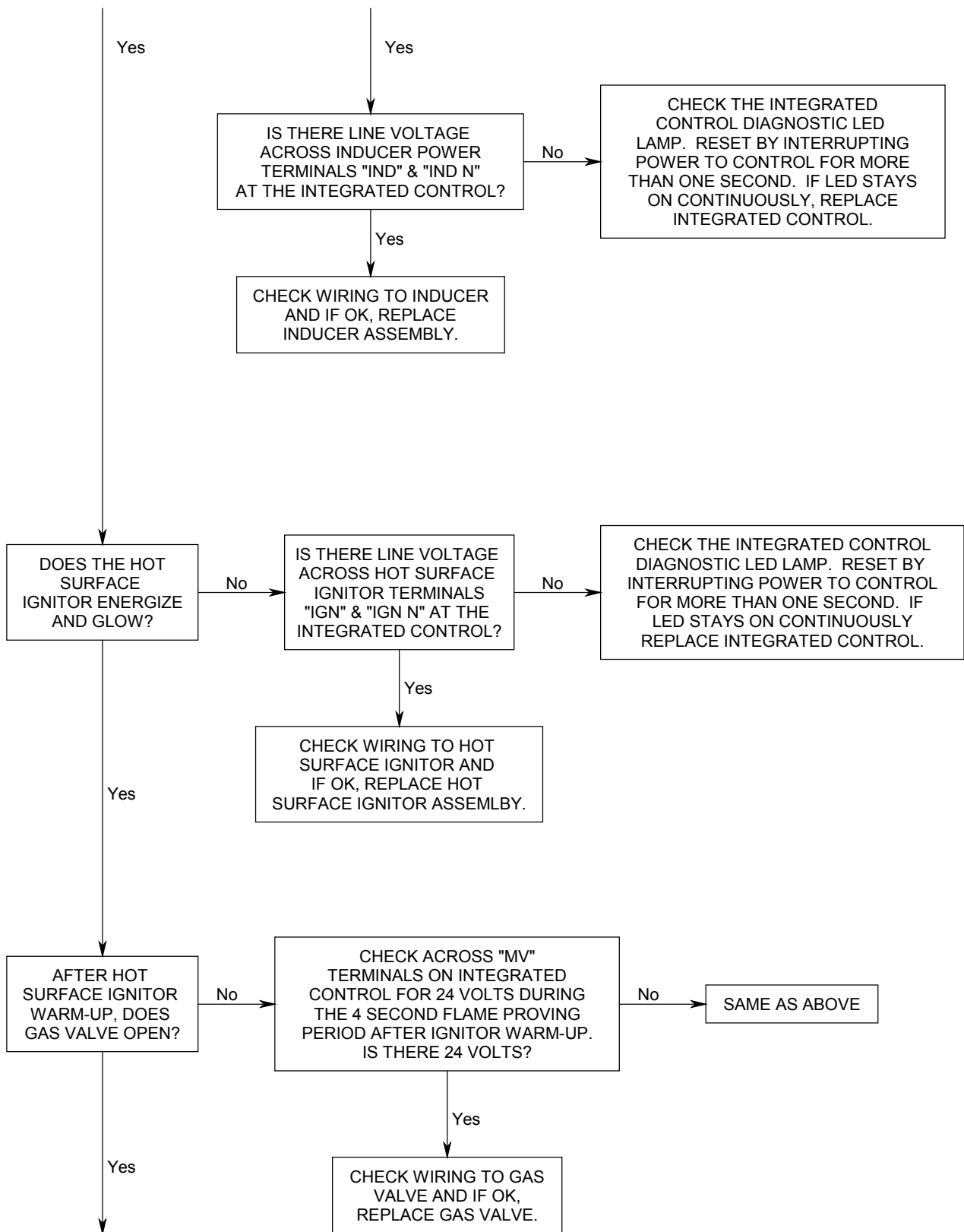
**All installations and services must be performed by qualified service personnel.**

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

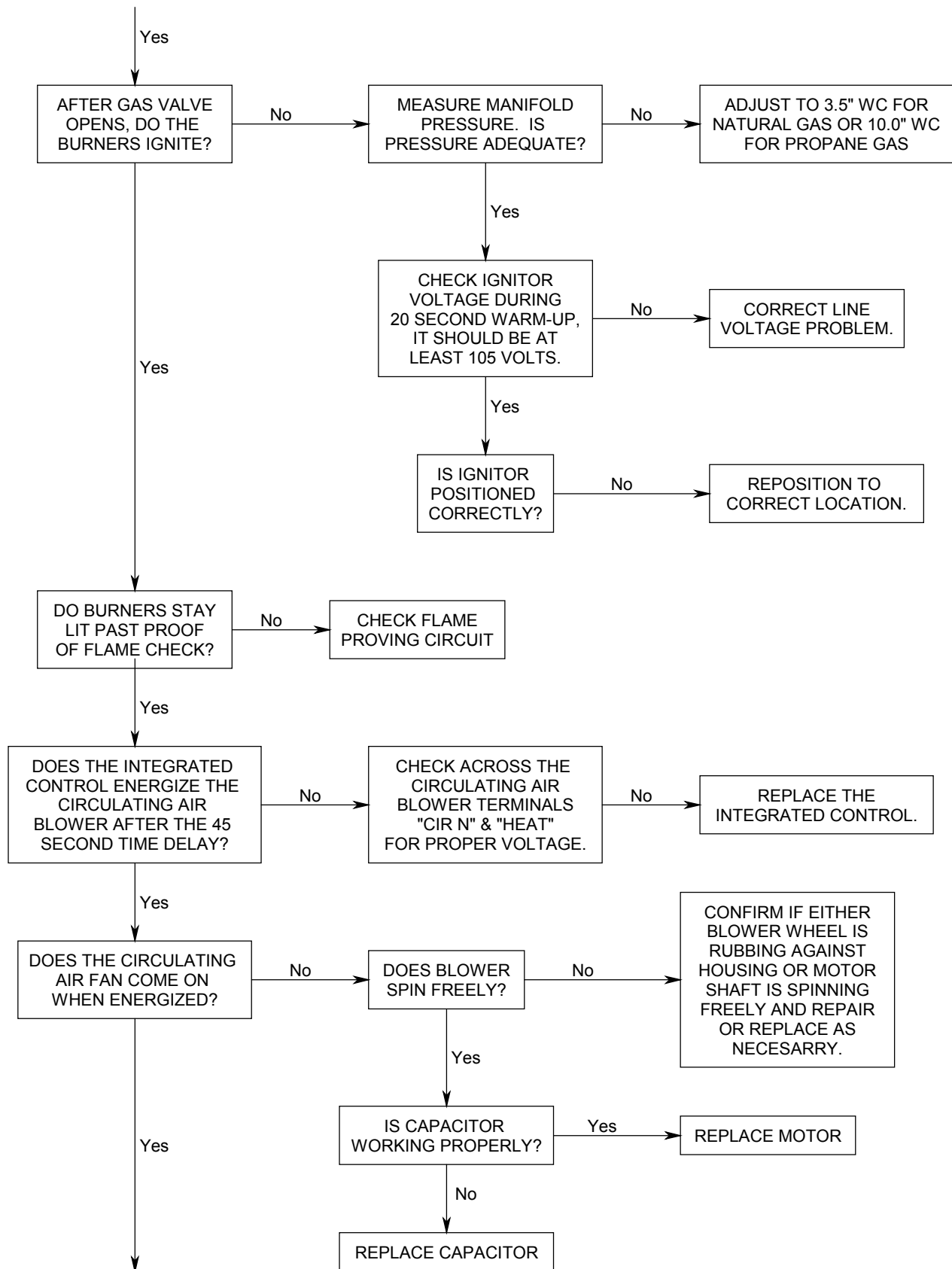
TO USE THIS DIAGRAM, FOLLOW THE INSTRUCTIONS IN THE BOXES.



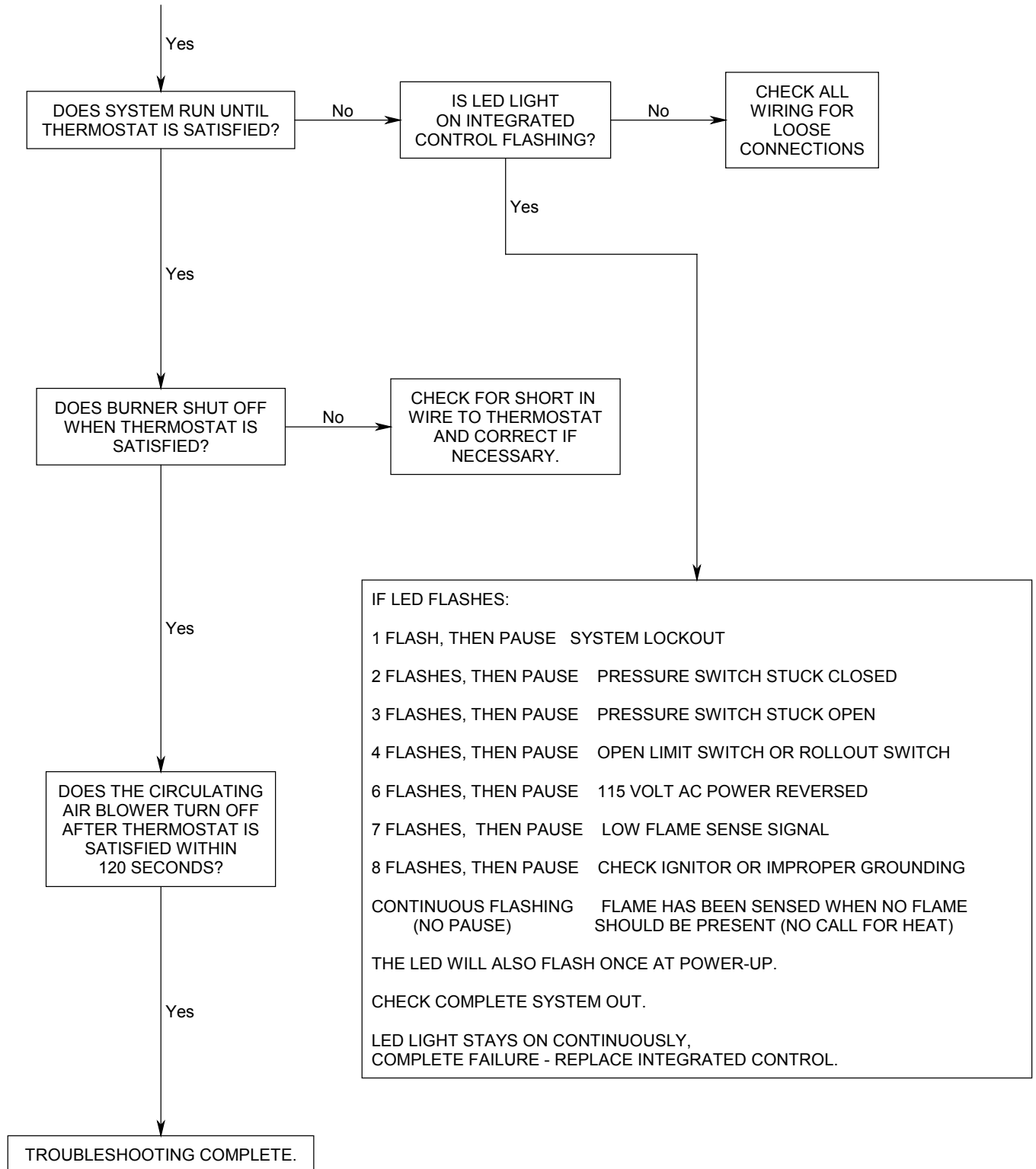
**All installations and services must be performed by qualified service personnel.**



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## **VIII. DEALER MAINTENANCE**

**A qualified heating contractor should perform the following maintenance procedures at the beginning of each heating season. 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. Only the homeowner/user routine maintenance described in the Users Information Manual may be performed by the user.***

**⚠ 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.***

### **A. ELECTRICAL:**

1. Check all wiring for loose connections and any signs of damage or unusual wear.
2. Check for correct voltage at the furnace when operating.
3. Check amp-draw on blower motor and inducer motor to assure they are not exceeding nameplate amp rating.
4. Check for correct operation and proper settings (if manually adjustable) of all controls.

**Shut off gas and disconnect power before continuing.**

### **B. 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. If necessary, the burners assembly can be removed by taking out the two screws/one on each bracket on top of burner box and removing the burner manifold assembly. Assembly must be pulled & tilted down 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.

### **C. INDUCER BLOWER ASSEMBLY**

Inspect the pressure switch and 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.

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#### **D. INSPECTING THE VENTING SYSTEM**

The venting system should be inspected during the annual maintenance check-up or during each subsequent service call.

Check all vent pipes for restrictions due to soot, or carbon build-up, as well as foreign matter, or any materials, that cause the venting system to restrict the proper venting of combustion products. If a restriction is found, the flue vent **must** be cleaned or replaced to ensure proper venting.

Vent pipes should also be inspected for any signs of corrosion, deterioration, or leakage that may cause combustion by-products to infiltrate the home or indoor environment.

If signs of corrosion, deterioration, or leakage are evident, the vent pipe **must** be replaced with a properly sized, agency-approved, vent pipe.

#### **E. GASKETS/SEALING MATERIALS**

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

#### **F. 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.

#### **G. HOUSE AIR BLOWER**

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

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

#### **H. EXTENDED SHUTDOWN**

If this furnace is shut down or off for an extended period of time, several steps can be taken to help insure a smooth and reliable start.

ON SHUT DOWN:

1. Close the gas supply shutoff valve(s).
2. Turn the furnace power switch "off" and disconnect electrical power to the unit.



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ON START-UP:

8. Have the heating system (and furnace) inspected and started by a qualified service person.
9. Set the room thermostat above room temperature.
10. Open all shutoff valves in the gas supply line.
4. Turn “on” the main power at the disconnecting switch and at the furnace power switch to start the inducer.
5. Follow the “BURNER OPERATION AND ADJUSTMENT” procedure in Section L.

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## IX. USER INFORMATION SECTION

### A. WARNINGS AND CAUTIONS:

**⚠WARNING:** *If you suspect there is a problem with the furnace, pertaining to the venting system or any other related problem, immediately contact a qualified service agency. If a service agency is not available, contact your fuel supplier.*

**⚠WARNING:** *Personal injury or property damage could result from major repair or service of this furnace by anyone other than a qualified contractor. The user should only perform the routine maintenance described in the user section of this manual.*

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

**⚠CAUTION:** *Do not block or obstruct air openings on the furnace casing. Do not block or obstruct air openings communicating within the area in which the furnace is installed.*

**⚠CAUTION:** *Do not allow the outside air intake to be blocked or obstructed by vegetation, ice, snow, or any other materials.*

**⚠WARNING:** *Do not use this furnace if any part has been underwater. Immediately call a qualified service agency to inspect the furnace and to replace any part of the electrical or control system, which has been underwater.*

**⚠WARNING:** *Should overheating occur or the fuel supply fail to shut off, shut off the manual fuel supply valve to the furnace before shutting off the electrical supply.*

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## B. COMPONENT LOCATIONS

The following diagram shows a typical furnace installation and typical position of the components referenced in these instructions.

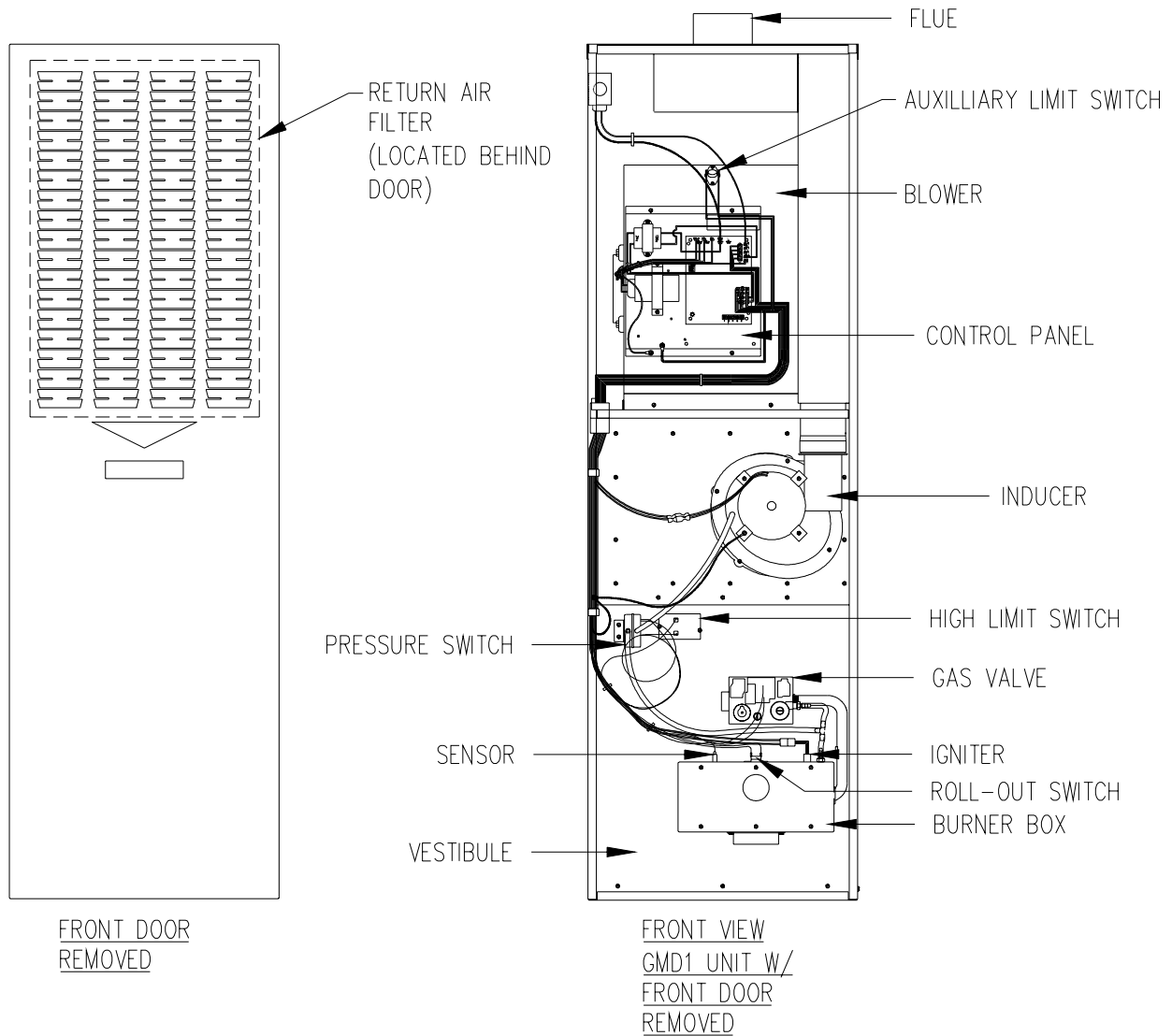


Figure 10

## C. INSPECTION AREAS

**IMPORTANT:** 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.

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1. **VESTIBULE:** The furnace vestibule areas or burner compartment should be inspected by removing front door of the furnace and looking for signs of excessive heat such as discoloration of components, materials damaged from rust or corrosion, soot or carbon build-up.
2. **EXTERIOR OF FURNACES:** The furnace exterior should be inspected for signs of excessive heat such as discoloration of materials or damage from rust or corrosion.
3. **VENT CONNECTOR:** The furnace vent pipe should be inspected for signs of rust, corrosion pitting, or holes in the pipe. Check for leakage around seams in pipe indicated by soot or condensate streaks.
4. **ROOF JACKS:** The furnace roof jack should be inspected for signs of rust or corrosion, pitting or holes, signs of excessive condensation or moisture leaking from roof jack.

#### **D. FILTER LOCATION AND CLEANING**

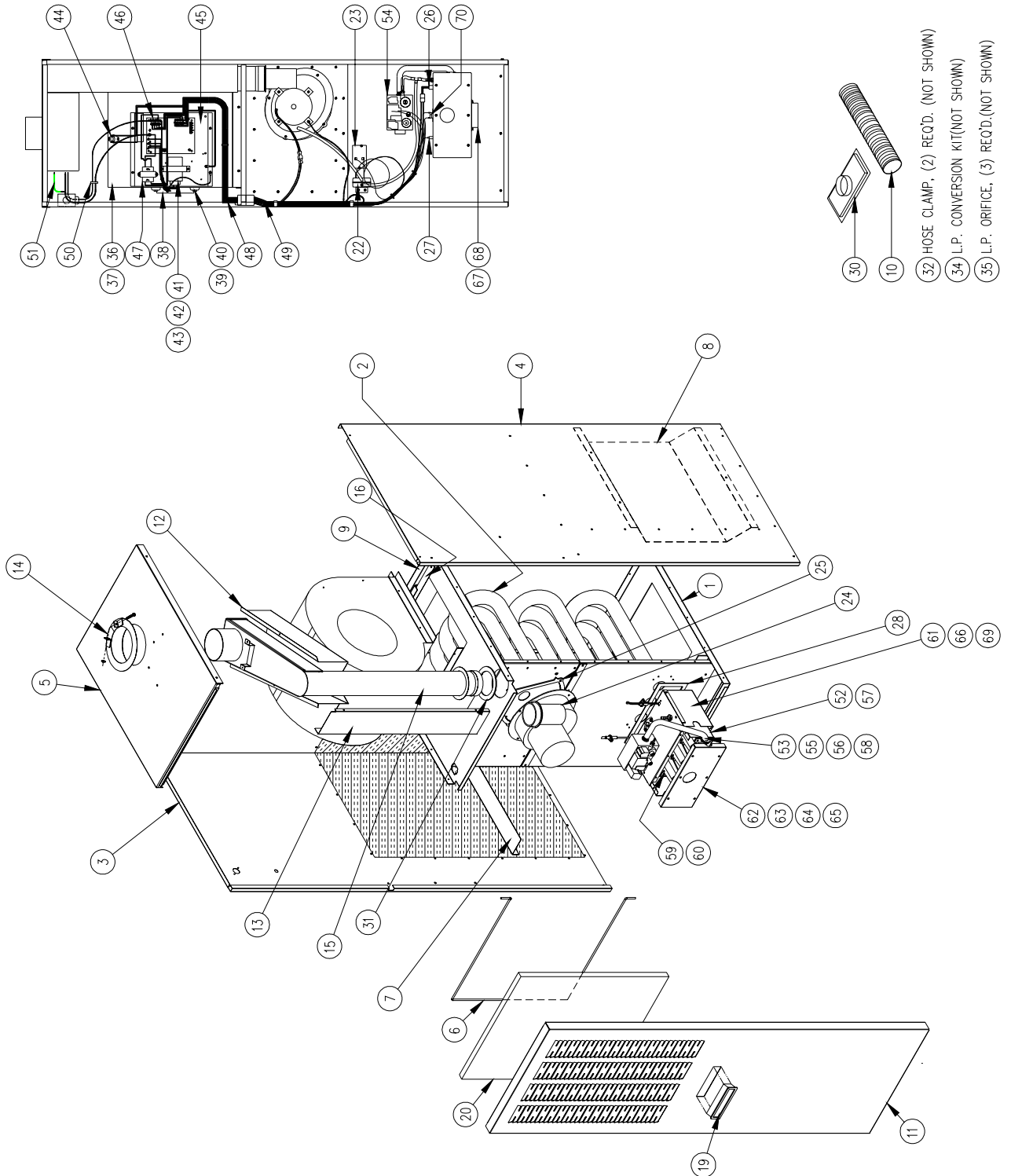
**⚠ CAUTION: To avoid injury from moving part, hot surfaces or electrical shock, shut off the power to the furnace and allow the furnace to cool before removing furnace access door to service filter.**

The air filter should be inspected each month and cleaned when dirty. Clean the filter by soaking it in water with a mild detergent and rinsing it with clean water. Allow the filter to air dry before reinstalling it in the furnace. Cleaning the air filter frequently may prevent airborne contaminants from going through the furnace and depositing in the furnace, duct system, and interior of the building.

See Figure 10, in this section, for the location of the return air filter.

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

## APPENDIX A. REPLACEMENT PARTS LIST



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

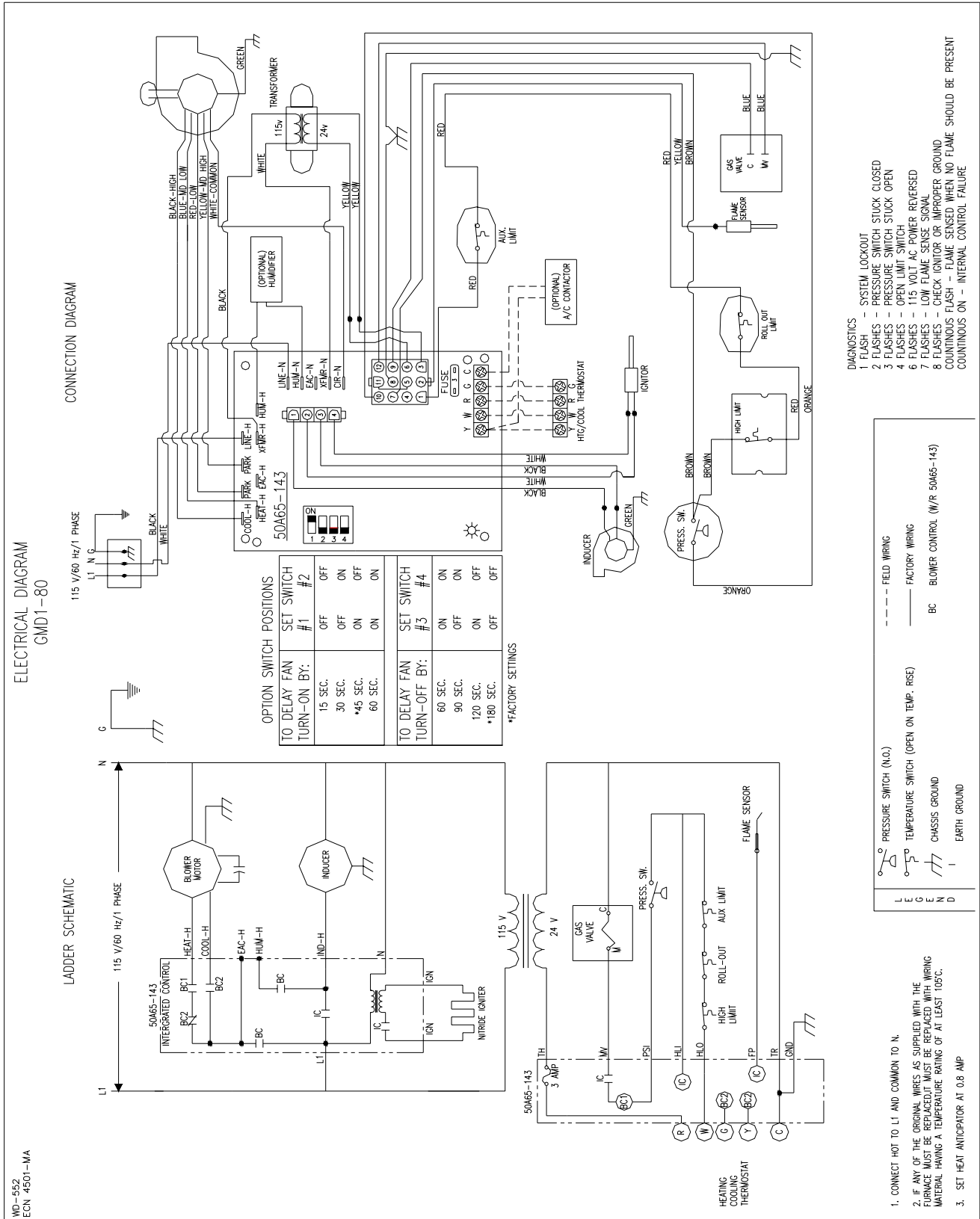
ITEM	PARTS DESCRIPTION	PART NO.	QTY.
1	BASE	18188	1
2	HEAT EXCHANGER	38191	1
3	SIDE CASING, LEFT	18196	1
4	SIDE CASING, RIGHT	18197	1
5	TOP	18198	1
6	FILTER RETAINER ROD	14809	1
7	BAFFLE, SIDE	18195	1
8	BAFFLE, SIDE	18186	1
9	BLOWER PAN	18190	1
10	FLEX HOSE	11239	1
11	FRONT DOOR	18199	1
12	FLUE COVER, TOP	18293	1
13	FLUE COVER	18201	1
14	DRAW COLLAR	24100	1
15	FLUE CONNECTOR ASSEMBLY	38230	1
16	BAFFLE, BLOWER PAN	18324	1
17			
18			
19	DOOR PULL	320157	1
20	FILTER	370192	1
21			
22	PRESSURE SWITCH	350483	1
23	HIGH LIMIT SWITCH	350495	1
24	INDUCER	340337	1
25	INDUCER GASKET	330181	1
26	IGNITOR	380650	1
27	SENSOR	350759	1
28	GASKET, BURNER BOX	330189	1
29			
30	INLET PLATE	320807	1
31	GASKET, FLUE	330187	1
32	HOSE CLAMP	300322	2
33			
34	LP CONVERSION KIT	380605	1
35	LP ORIFICE	380684	3

ITEM	PARTS DESCRIPTION	PART NO.	QTY.
36	BLOWER SUB-ASSEMBLY	S00S4137	1
37	DIRECT DRIVE BLOWER	340080	1
38	MOTOR	350346	1
39	MOTOR MOUNT BAND	350818	1
40	MOTOR MOUNT LEG	350819	3
41	CAPACITOR INSULATING BOOT	350036	1
42	CAPACITOR MOUNTING BRACKET	18000	1
43	CAPACITOR	350073	1
44	AUX. LIMIT SWITCH	350891	1
45	CONTROL PANEL SUB-ASSY	S00S4403	1
46	INTEGRATED CONTROL	350836	1
47	TRANSFORMER 24v	350464	1
48	WIRE HARNESS, BLOWER	350781	1
49	WIRE HARNESS, VESTIBULE	350489	1
50	WIRE HARNESS, SUPPLY	350893	1
51	WIRE HARNESS, GROUND	350892	1
52	BURNER DRAWER SUB-ASSEMBLY	S00S8209	1
53	MANIFOLD	380670	1
54	GAS VALVE	380639	1
55	NAT. ORIFICE	380617	3
56	GROMMET	360434	1
57	BURNER BRACKET	16016	1
58	BUSHING, REDUCER	320806	1
59	BURNER TUBE	380595	3
60	BURNER HOLDER	16015	1
61	BURNER BOX SUB-ASSEMBLY	S00S8210	1
62	BURNER BOX COVER	16030	1
63	SILICONE SPONGE GASKET, 1/2"	330141	28.5"
64	SIGHT GLASS GASKET	330135	1
65	SIGHT GLASS	15887	1
66	BURNER BOX TOP	18193	1
67	AIR INLET ASSEMBLY	35908	1
68	INLET FLANGE GASKET	330158	1
69	BURNER BOX WRAP	18194	1
70	ROLL-OUT SWITCH	350484	1

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APPENDIX B – WIRING DIAGRAM



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