

# **YUKON EAGLE**

## **OWNER'S MANUAL**

- **Assembly**
- **Installation**
- **Operation**
- **Repair Parts**

**Model No.  
LW-000 Series**

**CAUTION:**  
Read Rules And  
Instructions  
Carefully For  
Safe Operation

**IMPORTANT:**

Installation must be made in accordance with state and local ordinances which may differ from this installation manual.



# **YUKON KLONDIKE EAGLE IV**

## **WOOD/COAL BURNING FURNACE**

**FOR YOUR SAFETY:**

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.



# DANGER

## RISK OF FIRE OR EXPLOSION

Do not burn garbage, gasoline, drain oil, kerosene, thinners, etc.

# WARNING

## RISK OF FIRE

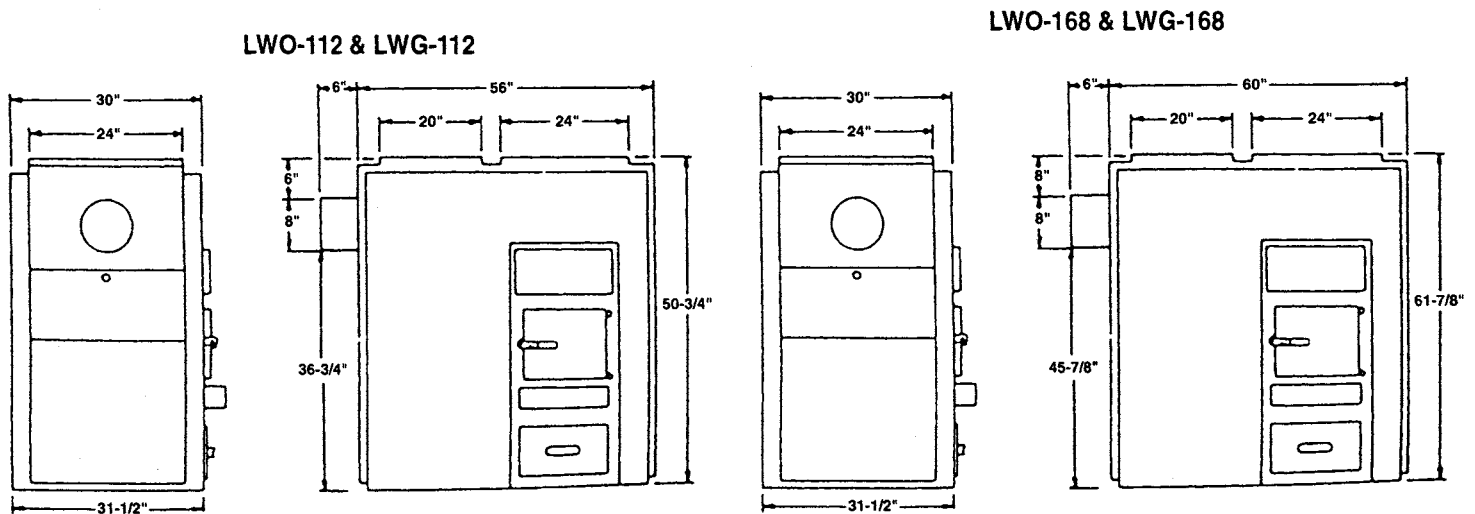
- Firing door and ash door must be tightly closed during operation.
- Do not operate with flue draft exceeding .03" W.C.
- Do not store flammable materials within marked installation clearances.
- Frequently inspect and clean heat exchanger, smoke pipe, and chimney of soot and/or creosote.
- Do not connect this unit to a chimney flue serving another appliance.

# CAUTION

## BLACK SURFACES ARE HOT

Keep children away. Do not touch.

### FURNACE DIMENSIONS



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## MAINTENANCE

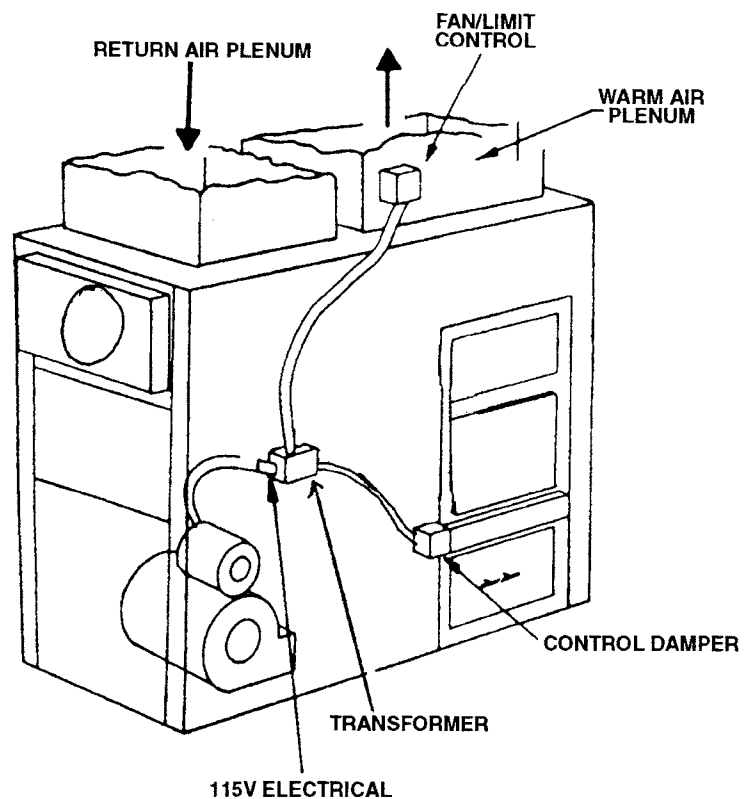
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Areas of this manual refer to Underwriters Laboratories (UL) and the National Fire Protection Association (NFPA).

UL & NFPA are non-profit organizations.

UL is the oldest and largest public safety testing laboratory in the world. All furnaces in this manual are Listed by UL. They have passed all of the safety requirements in both the U.S. and Canada. The UL Listing label is also your assurance that UL employees inspect our furnaces during the manufacturing process several times a year on an unannounced basis.

NFPA Codes, Standards, recommended practices, and guides referred to in this document have been developed through a consensus process approved by the American National Standards Institute. State and local codes are adopted from these standards.



## INTRODUCTION

This manual provides installation, operation, maintenance instructions and parts ordering information for the model LW series wood, coal burning furnace.

### IMPORTANT

Please read all instructions carefully before attempting installation of this unit. Installation should only be done by a qualified installer.

## UNPACKING AND INSPECTION

Inspect the unit for visible damage. The furnace is shipped in two cartons. Contents of items shipped is as follows:

- Carton One:** The basic furnace comes in the carton with the fire brick and grates installed. Inside the furnace wood-firing door is the smoke pipe draw collar, the primary air draft tube, and a bag containing the wood firing door latch assembly and handle, the ash door latch handle and the ash door pull handle. Remove these items and set aside for later installation.
- Carton Two:** The accessory package contains the thermostat, barometric damper, fan and limit control, damper control, transformer and owner's manual.

## RULES FOR SAFE INSTALLATION AND OPERATION

- Read these rules and the instructions carefully. Failure to follow these rules and instructions could cause a malfunction of the furnace. This could result in death, serious bodily injury and/or property damage.
- Check your local codes. The installation must comply with them.
- Use only the type of fuel approved for this furnace. Over-firing will result in failure of heat exchanger and cause dangerous operation.
- You must have a sufficient supply of combustion air to the area in which the furnace is located. (page 4)
- Factory Built Chimneys: Connect this furnace to a

chimney that complies with NFPA 211 3-1.2. Factory built chimneys for use with wood-burning appliances shall comply with the HT requirements of UL 103 or CAN/ULC-S629-M87. This means you must install what is referred to as type HT all fuel chimney.

Masonry Chimneys: Connect this furnace to a chimney that complies with NFPA 211 3-1.2. A field constructed chimney of solid masonry units, bricks, stones, listed masonry chimney units, or reinforced Portland cement concrete that is lined with suitable chimney flue liners and built in accordance with the provisions of Chapter 4 of this standard.

- Follow a regular service and maintenance schedule for efficient and safe operation.
- Before servicing, allow furnace to cool. Always shut off electricity and fuel to furnace when working on it. This will prevent electrical shocks or burns.

### FURNACE SPECIFICATIONS

Blower Size	10" x 10"
Blower C.F.M.	800 - 1800
Motor Size	1/3 - 1/2 - 3/4 HP
Firebrick Lined	YES
Cast Iron Grates	YES
Wood Fire Door	11" x 10"
Air Filter	20" x 25" x 1"
Wood Combustion Chamber Size	24" x 16"

### LOCATING THE FURNACE

Locate the furnace as close to the chimney and flue as possible and near the center of the heat distribution center.

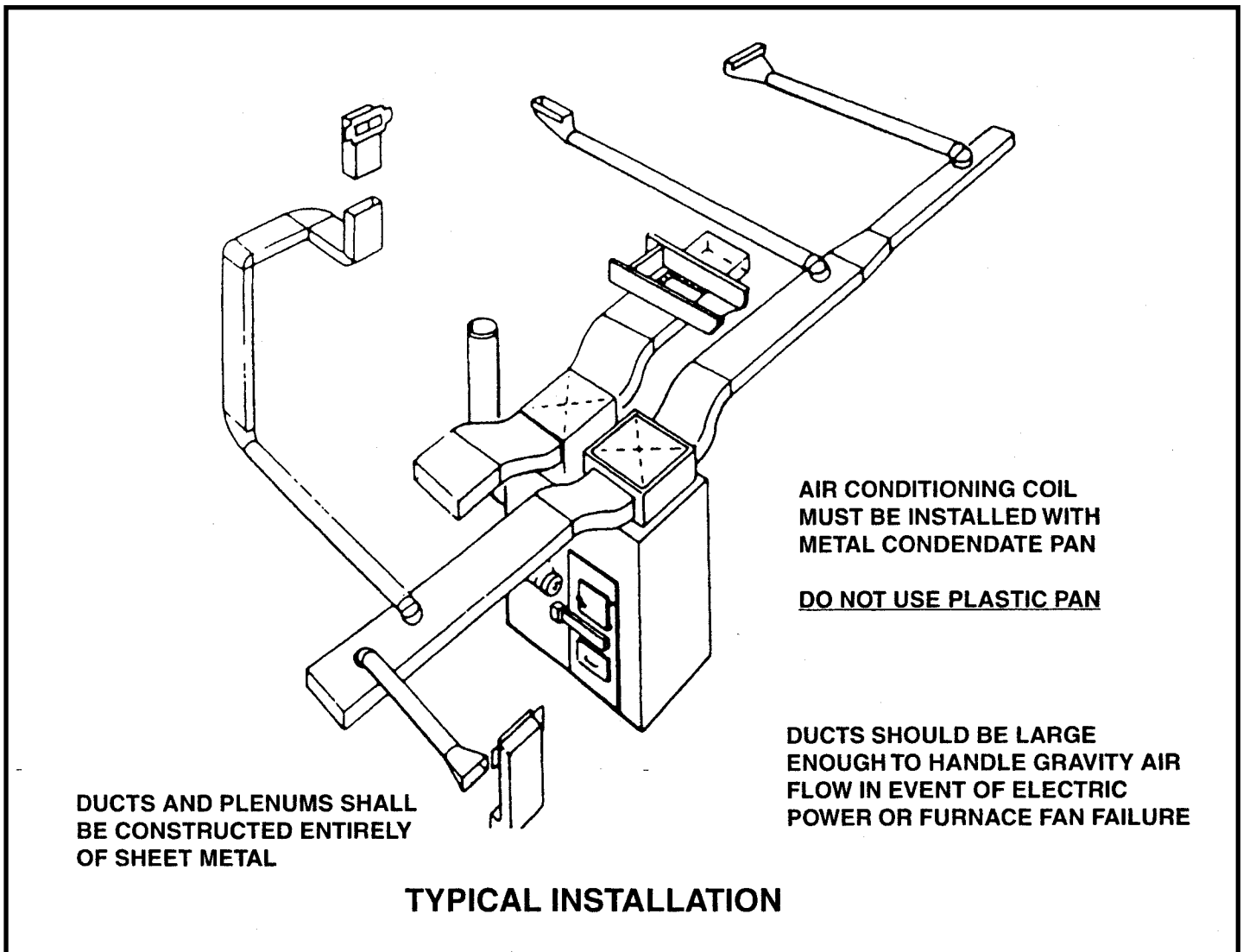
Furnace should be located so that sufficient air is available for proper combustion and ventilation. Location must comply with minimum clearances required for fire protection and accessibility. See Fig. 2 on page 6 for typical installation. See Combustion Air, page 13

### NOTE

It is recommended that a 2", noncombustible raised pad be used for the furnace. This will prevent moisture from getting under the furnace and causing corrosion.

## FURNACE RATINGS IN BRITISH THERMAL UNITS (BTU) PER HOUR

Input Rating	Output Rating	Register Output	MINIMUM RECOMMENDED DUCT SYSTEM (HEATING ONLY)			
			Supply Runs		Return Grille Louver Area (sq. in.)	
			6" Round or 3-1/4 x 12"	8" Round	Wall	Floor
140,000	112,000	100,000	12	6	629	517



## **DANGERS - CAUTION - FIRE HAZARDS**

**(Burn wood logs or coal only)**

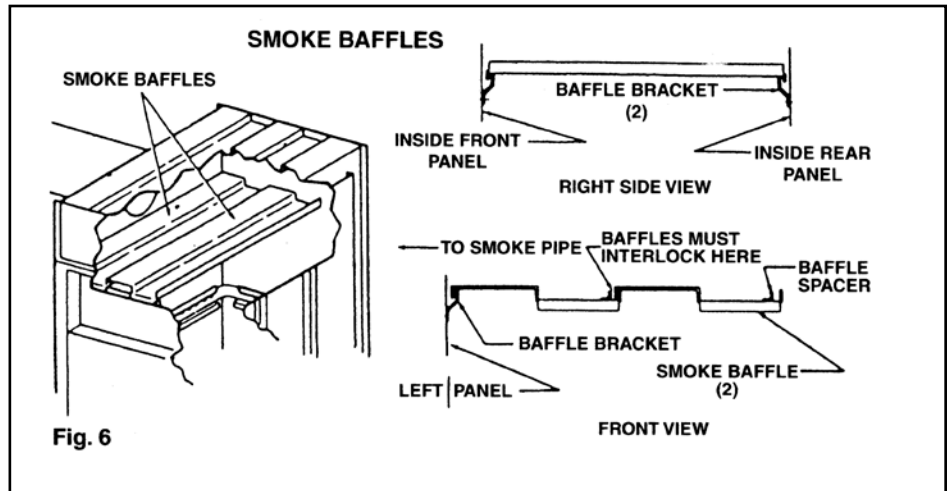
- Do not install a power humidifier on the warm air plenum.
- Do not load wood above secondary air tube. Doing so will cause over-fire and damage to combustion chamber will result.
- Do not attempt to light a wood or coal fire when oil or gas vapors are present. An explosion or flashback could cause personal injury.
- Do not install on combustible floor.
- Load wood or coal carefully or damage may result to fire brick or refractory pot liner.
- Inspect air filter regularly. Clean or replace as necessary. Filter size is 20" x 25" x 1".
- If an over-fire situation should occur, be sure ash door and fire door are closed. Turn thermostat down to close primary air damper.
- In the event of an electrical power failure, be sure ash door and fire door remain closed.
- In the event of a soot or creosote fire, call your fire department immediately. Turn thermostat down to close primary air damper and make sure ash door and fire door are closed.

**If duct system cannot accommodate gravity air flow in the event of an electrical power or furnace fan failure, a UL Listed spring loaded damper placed in the warm air plenum, equipped with a fusible link that melts at excessive temperatures and then opens the damper, can be used to reduce the heat in the warm air ducts.**

## SMOKE BAFFLES

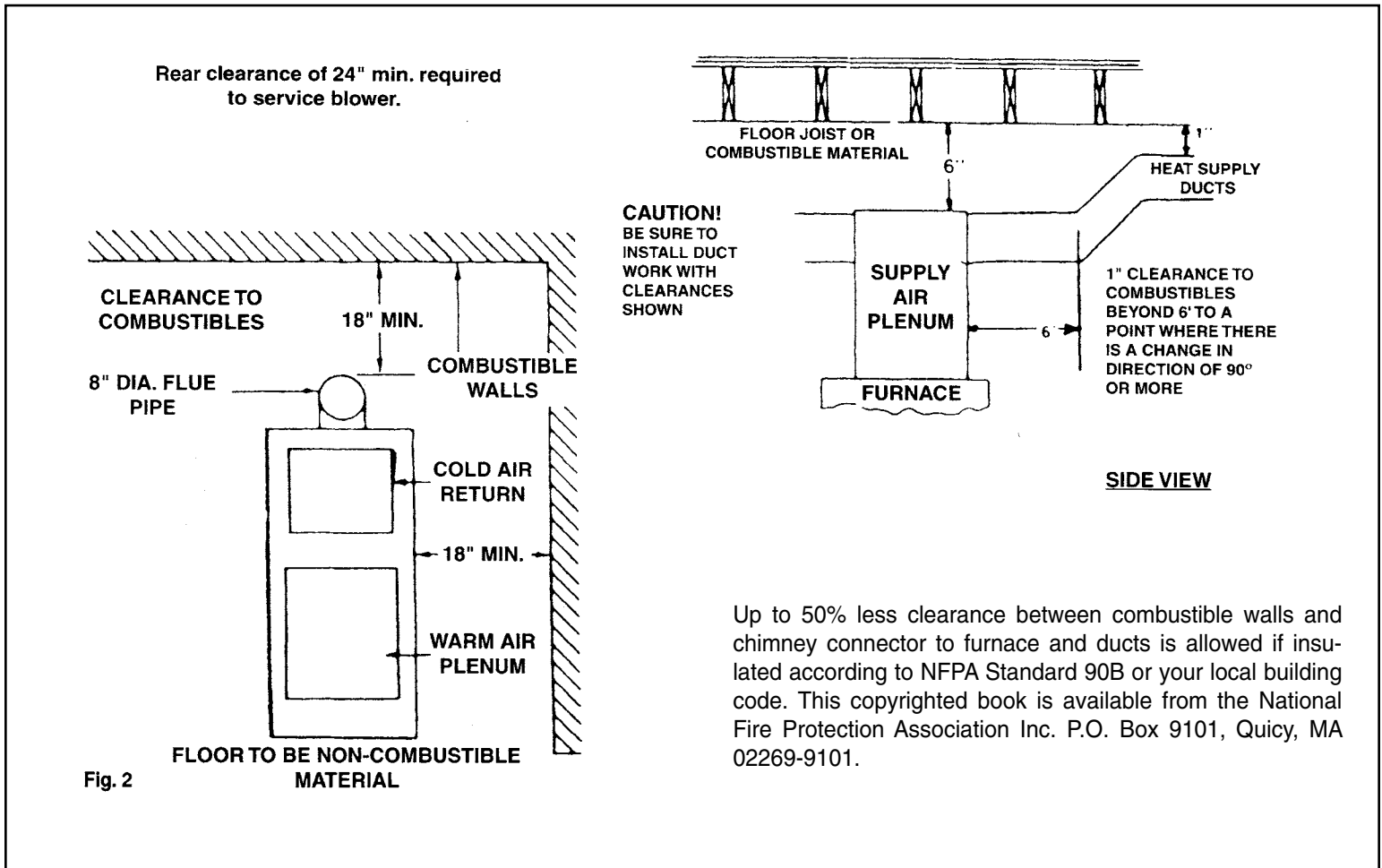
The smoke baffles are factory installed and must be checked to see that they have not become dislodged during shipping. Refer to Fig. 6 for proper installation and, if necessary to reposition, proceed as follows:

1. Holding baffle in proper position, tilt rear up to clear baffle mounting brackets.
2. Push baffle up to top of combustion chamber above all three brackets, level off, slide left and lower onto mounting brackets.
3. Check to see that all three brackets are engaged.
4. Repeat with second baffle, making sure baffles interlock as shown in Fig. 6. When properly installed, baffles will not move more than 1/4" in any direction. Failure to have baffles properly installed will severely affect combustion efficiency.



## CLEARANCES TO COMBUSTIBLES

Above Top of Warm Air Plenum	From the Front	From Sides and Back	From Chimney Connector	6 Ft. of Plenum	6 Ft. of Plenum
6"	48"	18"*	18"	6"	1"



Up to 50% less clearance between combustibles and chimney connector to furnace and ducts is allowed if insulated according to NFPA Standard 90B or your local building code. This copyrighted book is available from the National Fire Protection Association Inc. P.O. Box 9101, Quincy, MA 02269-9101.

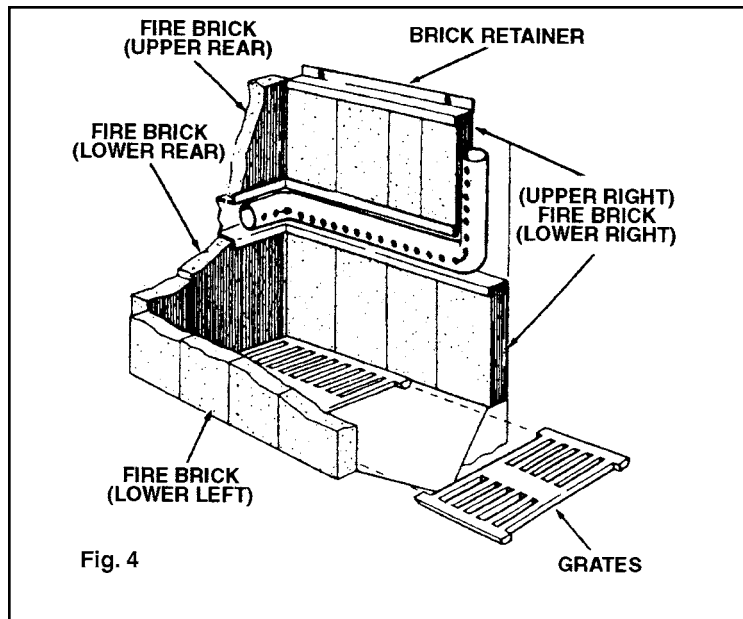
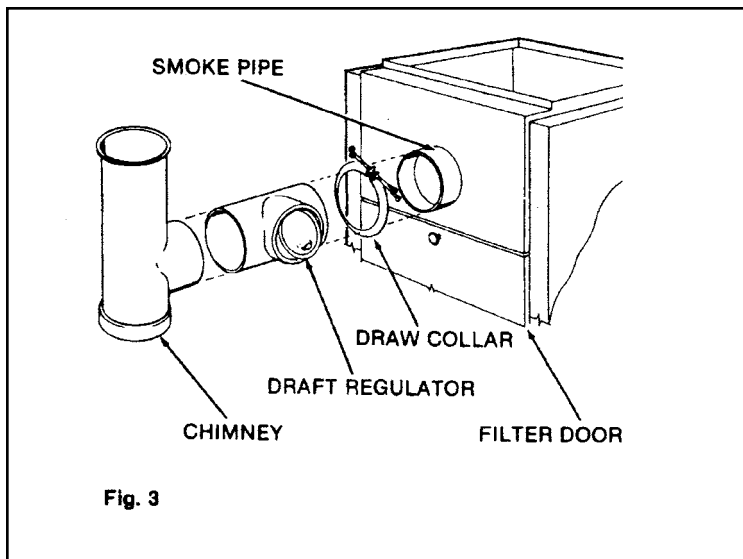
## INSTALLATION

Typical furnace installation is shown in Fig. 2 (page 6). Place your furnace in the pre-selected location, making sure it is level. Proceed as follows:

### Before Installing - check:

#### DRAW COLLAR

Attach the draw collar around the smoke pipe and tight against the furnace cabinet so room air cannot leak into the return air cabinet. Refer to Fig. 3 for installation. Check that a factory installed draw collar is installed over smoke pipe and against inner panel divider.



#### DOOR HANDLE

Install door handle as follows:

1. Remove steel handle, spacer, screw and washer from plastic bag.
2. Assemble washer and spacer over screw and insert into hole on door steel handle. Place washer on back side of steel handle.
3. Insert screw into threaded hole on door on fire door furnace front and tighten. Washer should be between weldment and door.
4. Screw wood handle (packaged with draft tube) to steel handle.

#### LOWER FIREBRICK

Refer to Fig. 4 for proper installation. (Factory installed)

1. Place three large firebrick along lower rear of the firebox. Center the end bricks.
2. Next place four large brick in lower left and lower right of firebox.

#### GRATES

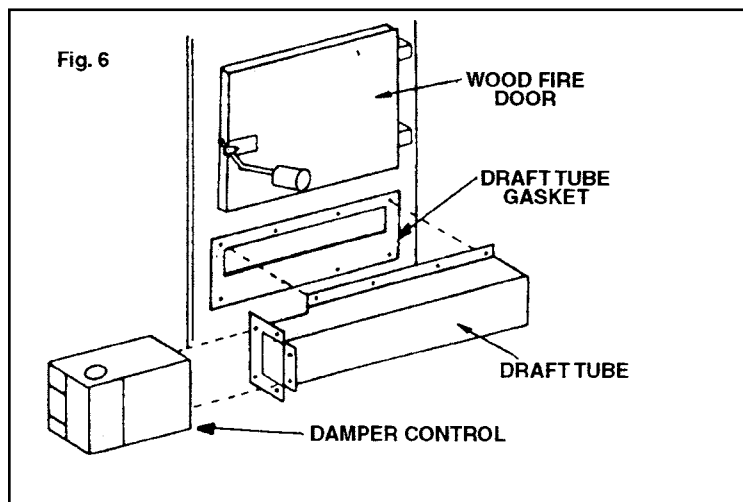
Refer to Fig. 4 for proper installation. (Factory installed)

To install the grates, start at the rear of the furnace and work toward the front. Install grates with the wide side up as shown in Fig. 4.

#### UPPER FIREBRICK

Refer to Fig. 4 for proper installation. (Factory installed)

1. Loosen the upper brick retainers if necessary and install three 9 x 6 bricks along the upper rear of the firebox.
2. Install four 9 x 6 bricks along the upper right and left sides of the firebox.
3. Tighten brick retainers to hold brick in place.
4. See Fig. 4 for completed assembly.



#### CONTROLS

Remove control from accessory box and install as follows:

1. Remove the four screws that hold the gasket to the damper panel.
2. Mount the damper control to the draft tube using screws removed above. Make sure gasket stays in place. (Fig. 6)
3. Loosen the two screws located at slotted end of draft tube, and remove remaining 10 screws. Make sure gasket stays in place.
4. Mount damper control and draft tube assembly to furnace as shown in Fig. 6.

## INSTALLING THE HONEYWELL FAN/LIMIT CONTROL

1. After attaching the warm air sheet metal plenum to the furnace, using the fan/limit control white mounting flange as a template, place it on the top edge of the furnace casing above the fire door so that the holes in the furnace casing and the flange are aligned with each other. Attach the screws to secure the flange. (See Fig. 7)
2. Using the flange as a template, mark the center of the large hole and the two smaller holes, remove the bracket and drill a 7/8" hole and two 1/8" holes in the sheet metal plenum.
3. Replace the flange and reattach it with the mounting screws.
4. Mount the fan/limit control ridged bracket (furnished with the fan/limit control) with two 1/2 x 7 sheet metal screws.
5. Insert the fan/limit control into the bracket. Align so that it is straight. Tighten setscrew to secure control.

## ELECTRIC WIRING

All electrical wiring must be done in accordance with the National Electrical Code and the code in effect in your area. The electric power supply to the furnace must be through a circuit protector device switch located near the furnace. Use No.14 or heavier wire in circuit. All furnaces covered by this manual operate on 115 Volts, 60 Cycle, 1-Phase Alternating Current with a 15 amp Circuit Protector device.

### WARNING

Turn off electric power at circuit protector device before making any line voltage connections.

## WIRING THE FURNACE

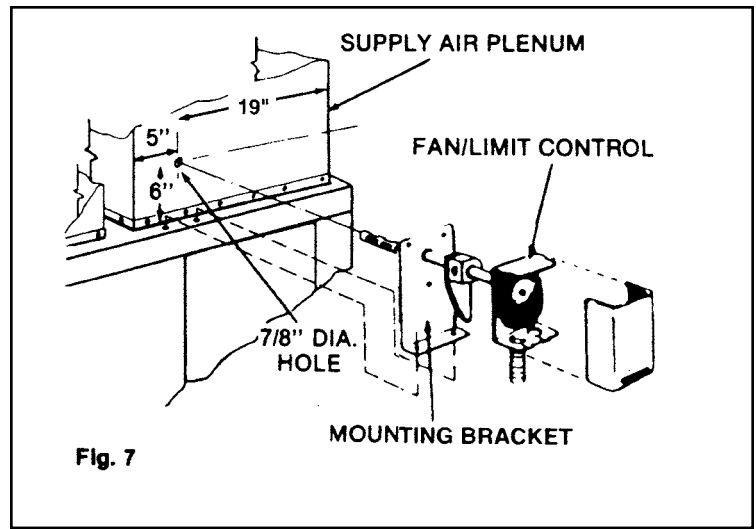
On the front of the furnace, next to the wood feed door, is the end of the wiring harness coming from the blower motor. Remove the lock-nut on the cable connector and place the 4" square box the furnished wiring harness over cable connector and replace the lock-nut. Secure the square box to the furnace with two sheet metal screws.

Connect the 34" long conduit to the fan/limit switch previously mounted in the warm air plenum.

Connect the main power supply to the 4" square box. This must be through a 15 amp circuit protector device. No lighter than No.14 wire may be used in the furnace electric power supply circuit. Wire blower motor, fan/limit and transformer per Fig. 9 page 14.

### CAUTION

This furnace is not approved for use with aluminum wire.



## ASH PAN HANDLES

Install ash pan handle as follows:

1. Remove pull handle, 10- 24 x 2" screws from plastic bag.
2. Insert 2 No.10 -24 x 2" screws through pull handle into threaded holes on ash pan and tighten.
3. Remove tapered handle from plastic bag and screw to steel handle.

## MOUNTING THE THERMOSTAT

The thermostat must be mounted on an interior centrally located wall away from direct sunlight and drafts and approximately 5 feet above the floor.

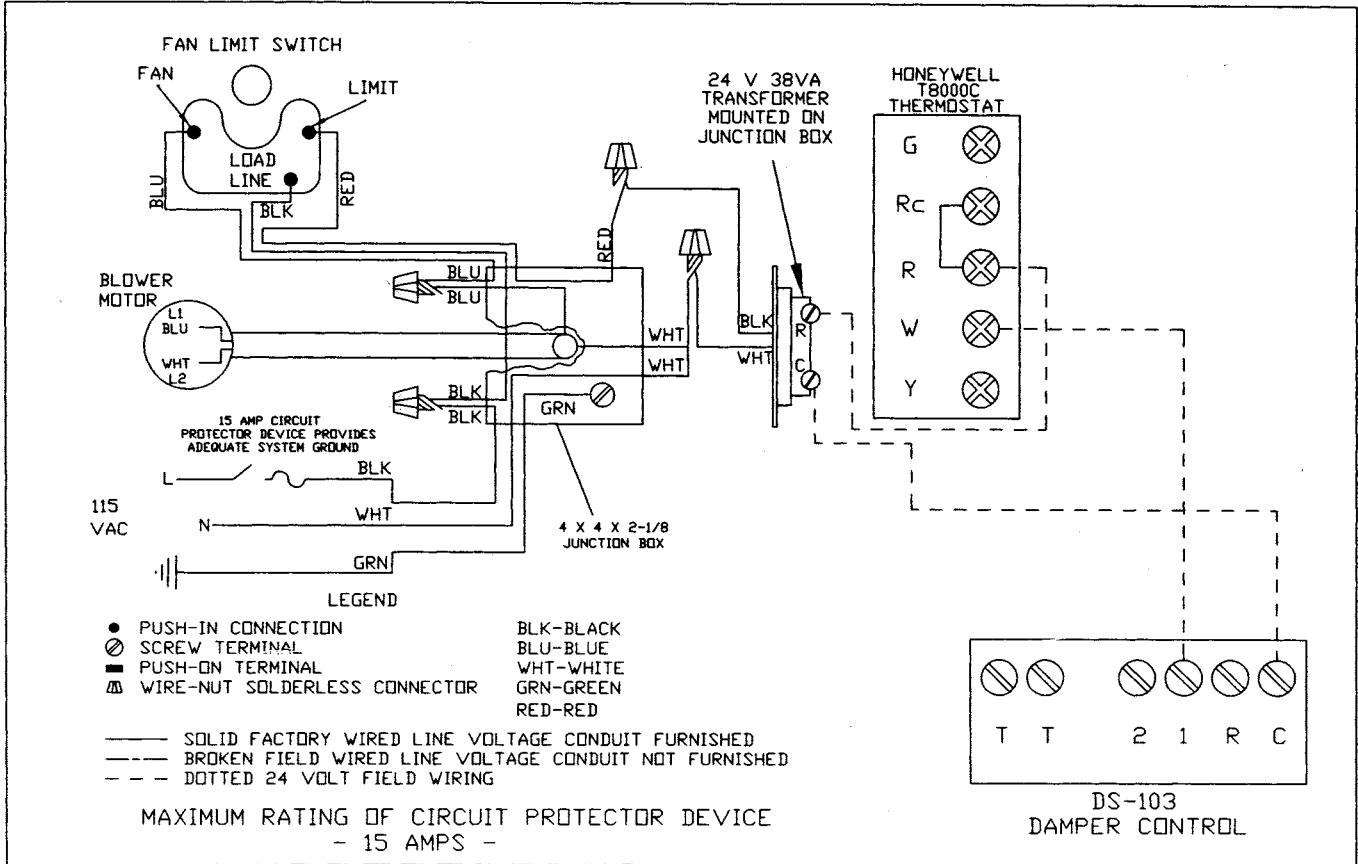
1. Run 2 conductor thermostat wire (4 wire if you intend to add air conditioning) from the damper control unit to the thermostat. Leveling of the thermostat is not necessary as it is digital.
2. Connect the wires as outlined on page 14.

## INSTALLING AIR CONDITIONING COIL

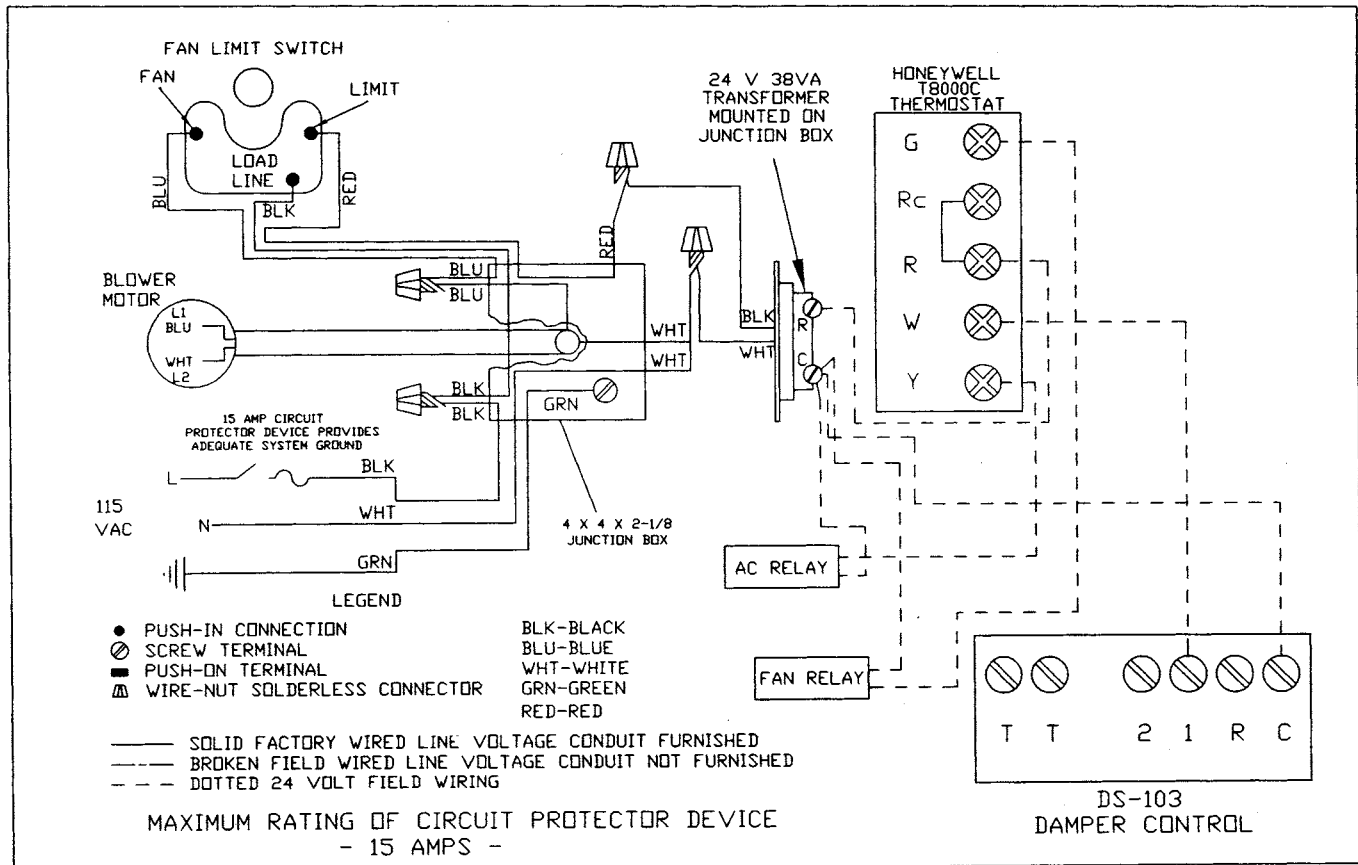
The coil should always be installed in the warm air plenum. The metal condensate pan should be at least 2 inches above the fan limit control probe so that the heated air flow direction is not changed. The air flow needed for gravity operation in the event of an electric power or furnace fan failure must not be restricted. It is recommended that you install manual dampers along side of the condensate pan that can be manually removed or opened for winter operation.



# KLONDIKE/ EAGLE IV WOOD HEATING ONLY



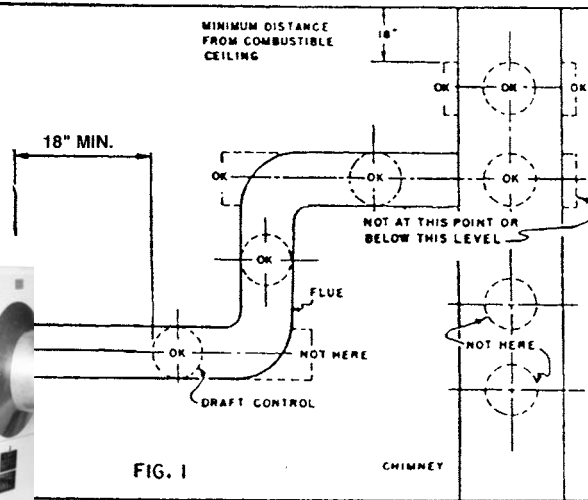
# KLONDIKE/ EAGLE IV WOOD HEATING WITH A/C



# INSTRUCTIONS FOR INSTALLING

## FIELD R-C BAROMETRIC DRAFT CONTROLS CHOOSING THE LOCATION

Do not attach draft control to top or bottom of flue pipe, nor in room separated from appliance. Best location is as close to appliances as possible.



### INSTALLATION

**Important: Make these adjustments when installing.**

#### VERTICAL FLUE:

1. Adjustment weight must be in RIGHT HAND SLOT (marked "V") in bracket on gate.
2. The arrow on flap at bottom of gate must line up with letter "V" on lower right part of gate. If it does not, remove flap, turn over and snap on to gate again.

Flap can be removed by inserting small screw driver at the back side of the gate between the gate and the flap, then pulling downward on flap.

#### HORIZONTAL FLUE:

1. Adjustment weight must be in LEFT HAND SLOT (marked "H") in bracket on gate.
2. The arrow on flap at bottom of gate must line up with letter "H" on lower left part of gate. If it does not, remove flap, turn over and snap on to gate again.

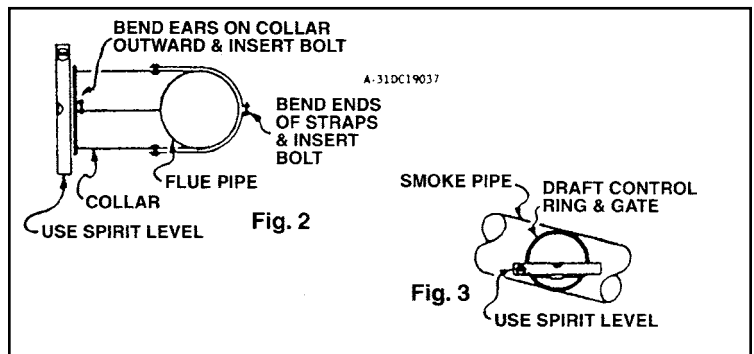
Bend outward the two ears at the front corners of collar and insert clamping screw. Bolt the remainder of the collar together. See Figure 2. Hold the collar against the flue in the EXACT position and mark the outline of the collar on the flue. Cut a hole in the flue about half an inch smaller than the marks.

Then cut a series of short slits (about 3/8" or 1/2" deep) around the edges of the opening. After the collar is strapped on the flue the cut edges can be bent outward into the collar and thus make a better joint. WHEN FINISHED, THE OPENING INTO THE FLUE MUST BE EQUAL IN SIZE TO THE COLLAR OF THE DRAFT CONTROL. If flue pipe is made of material too heavy to bend out

into the collar, the opening into the flue must be within 1/4" of the same diameter as the collar.

Strap the collar to the flue pipe and place the draft control into the collar, fastening it there by tightening the clamping screw in the collar.

Use a spirit level to make sure that the control does not lean forward or backward but instead is plumb in both directions, regardless of whether the flue is horizontal, vertical or sloping.



### INITIAL SETTING OF BAROMETRIC CONTROL

Set the control at a maximum of .03 or as low a draft as will give good combustion and meet the requirements for heat. Turn adjustment weight counter-clockwise to loosen, then slide in slot to proper position and tighten. Bracket is marked 2, 4, 6, and 8, which indicates draft settings of .02, .04, etc. (These are drafts in flue adjacent to control, not over-fire drafts.) A monometer must be used to accurately adjust flue draft.

### CAUTION

Do not use any smoke pipes less than 24 gauge between furnace and chimney.

### CONNECTING SMOKE PIPE

Set the smoke pipe end of the furnace as close to the chimney as possible. For every foot of lateral pipe, the rise of the smoke pipe toward the chimney must be at least one inch. Do not exceed 10 feet in length. A cleanout tee should be installed for removal of soot and fly ash. (See Fig. 3, page 7)

Do not install the smoke pipe longer than necessary to reach the chimney for purposes of trapping heat. The smoke outlet temperature is designed so that the heat emitted is needed to carry the by-products of combustion out through the chimney.

The smoke pipe must not pass through any combustible material.

### WARNING

No damper, heat saver or automatic vent damper device except the barometric draft regulator should be installed in or on the smoke pipe.

The smoke pipe entrance into a masonry chimney should be at least 2 feet above the cleanout. The smoke pipe must not extend into the chimney beyond the inner face of the chimney liner.

### LESSER CLEARANCES TO COMBUSTIBLE MATERIALS ALLOWED

This furnace is UL Listed thus requiring 18 inches from the smoke pipe to a combustible surface. A reduction of 9 inches from a combustible ceiling and 12 inches from a combustible wall is allowed if the space is insulated according to NFPA 90B, table 6-5.1.2.

### DO NOT CONNECT THIS FURNACE TO A CHIMNEY SERVING ANOTHER APPLIANCE

The chimney should be no less than 8 inches inside diameter or equal.

### WARNING

Check your chimney. The chimney is a very important part of your heating system. It must be the right size, properly constructed and in good condition. No furnace can function properly with a bad chimney. The chimney must supply a draft of at least .03 Water Column. If possible, use a 15 foot or higher chimney. Add an additional foot to the chimney for each 1,000 feet of elevation above sea level.

### PROPER CHIMNEYS

The National Fire Protection Association (NFPA) requires that all factory built chimneys be Listed and installed in accordance with conditions of the Listing in the manufacturers instructions. NFPA also requires that your chimney extend at least three (3) feet above the highest point when it passes through the roof and at least two (2) feet higher than any portion of the building within ten (10) feet of the chimney.

Factory built chimneys must be what NFPA refers to NFPA 211 1-5.2.17.4\* as Type HT. HT is an abbreviation meaning high temperature.

Masonry Chimneys as referred to in NFPA 211 1-5.2.17.6, a field constructed chimney of solid masonry units, bricks, stones, listed masonry chimney units, or reinforced concrete that is lined with suitable chimney flue liners and built with the provisions of Chapter 4 of this standard.

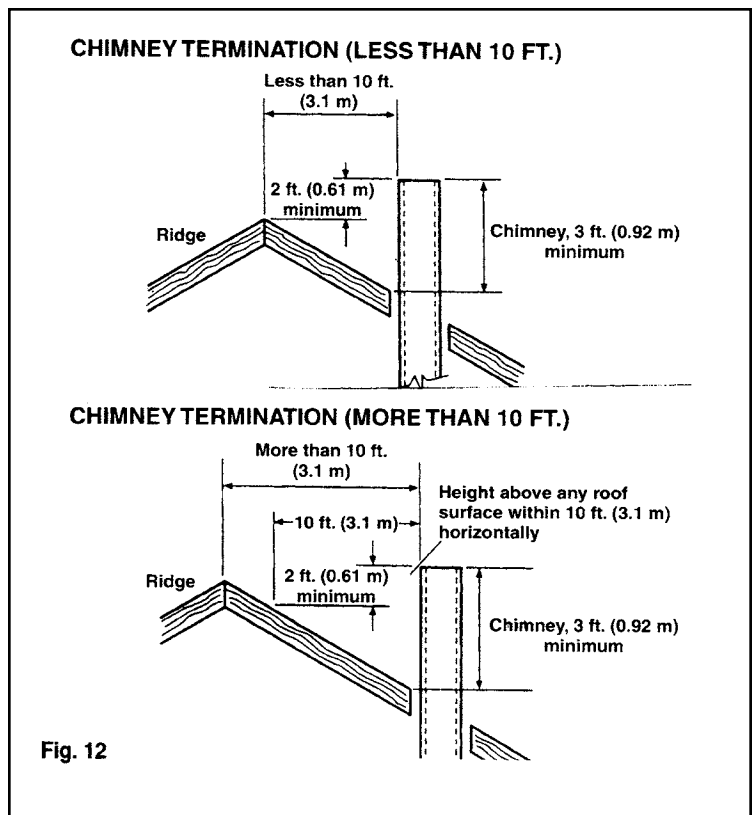


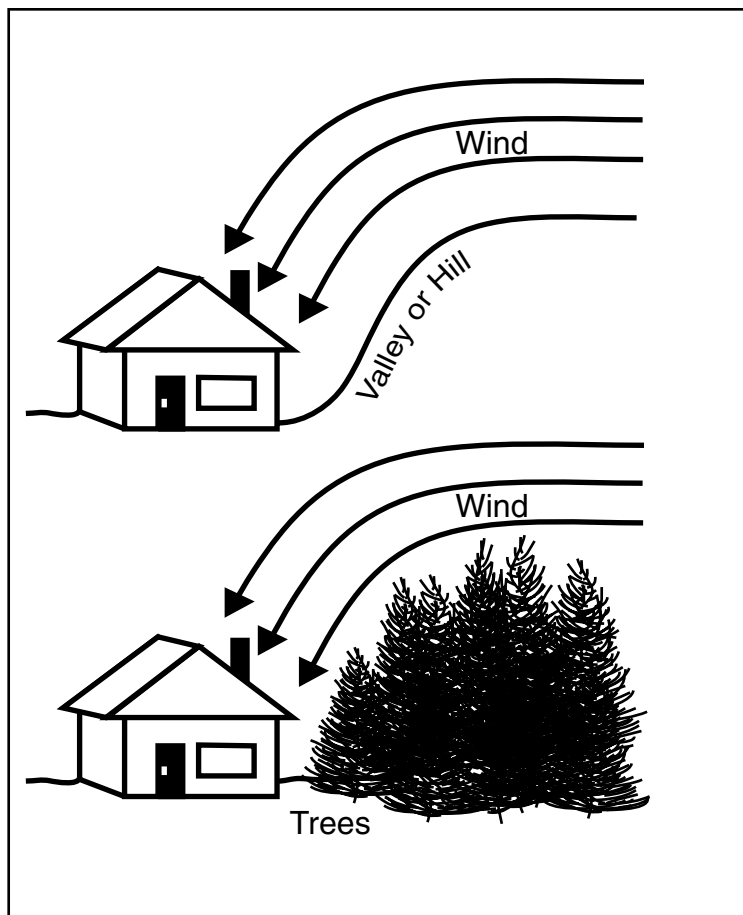
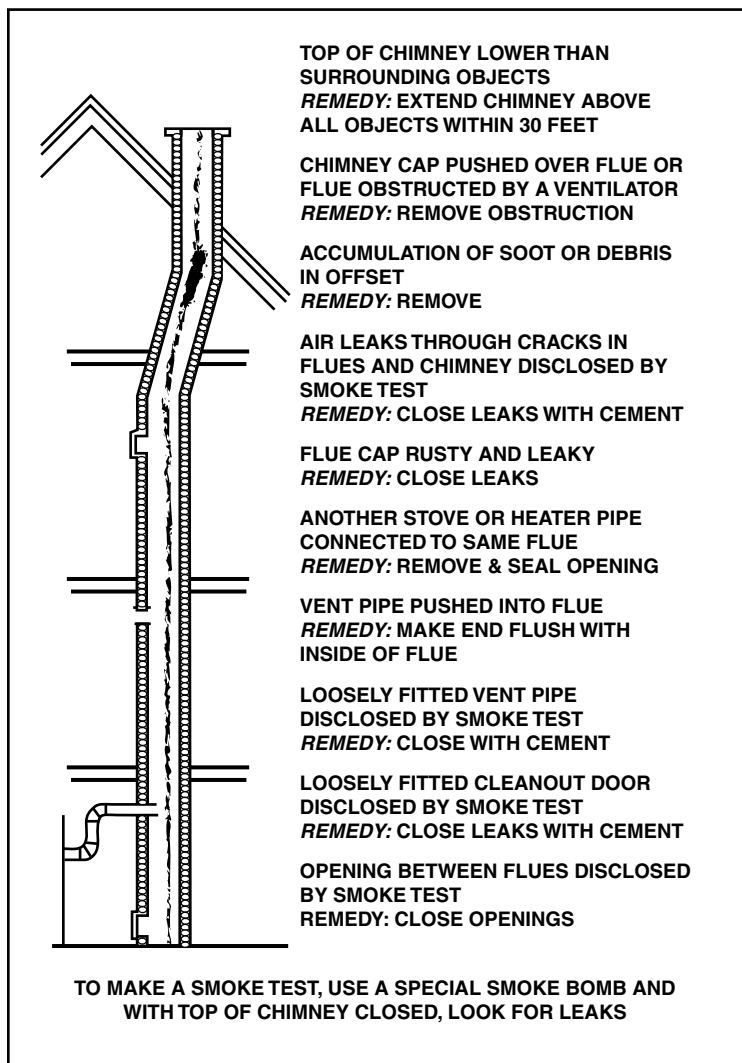
Fig. 12

## FAULTY CHIMNEY AND/OR DRAFT PROBLEMS - CAUSES AND CURES

A sound chimney system is imperative, especially when burning wood. Indoor chimneys, either masonry or type "HT" metal chimneys are best. Because warm air rises, a warm chimney allows the smoke and other by-products of combustion a natural exit up and out the chimney. Outdoor chimneys should be your last choice. Cold air naturally falls right down the cold chimney. Until the heat from the furnace warms the chimney, there is no natural draft to allow the smoke and by-products of combustion to rise naturally up the chimney. Outdoor class "A" triple wall is not acceptable because their thermo-siphon design will not allow the chimney to heat up, causing heavy creosote build-up and possible chimney fires.

If you know your chimney is sound and you still have downdraft problems such as smoke or smell in the room in which the furnace is located, your chimney may not be operating properly. One or more of the following suggestions may be necessary.

1. Barometric draft control- This control must be set at .03. This is just a guide. It must be set with a draft gauge to prove that the chimney is drawing .03.
2. Combustion air -You must have outdoor combustion air introduced into the room where the furnace resides in the manner described on page 17. This method supplies air for combustion as well as replacing air that is drawn out by the chimney. Leaky doors and windows will not provide acceptable results.
3. Cold outdoor chimney -Sometimes in the spring or fall, or if you live in a mild climate, your heat demands are small and your chimney just does not heat up enough to induce a natural exit up draft, you may want to consider a power vent to force a draft up the chimney. A Model D-3 or AD-1 power venter is available from Tjernland Manufacturing Co. in White Bear Lake, Minnesota or Model D1-2 is available from Field Controls Co., Kinston, North Carolina.
4. Chimney not tall enough -Your chimney must terminate at least 2 feet above the peak of the roof. Adding more chimney height sometimes cures the problem. (See Fig. 12, page 14)
5. Home located on side of hill- When the wind blows over a hill toward your home, the wind will fall. This could cause a downdraft into your chimney. Some common solutions to correct downdrafts are to add a chimney cap with a weather vane, add height to the chimney or add a power venter.
6. Tall trees near your home -If you have trees that are near and higher than your home, a downdraft can occur when the wind blows. Correct the same way as if you live on the side of a hill or in a valley.
7. Chimney too large -Your chimney should not be more than 8 inches in diameter or the equivalent. If too large, the sides of the chimney may not heat up to create a natural draft. When this happens, the smoke and gases cool. They become heavy and other gases from the fire try to penetrate this heavy column of cool air. This results in back puffing, poor combustion or burning and may cause odors in your home. The solution is to improve your chimney or line it with 8-inch type 304 stainless steel flue liner. If your large chimney is outside masonry, insulate between the masonry and 8-inch flue pipe.



## FURNACE LOCATED IN CONFINED SPACE

When the furnace is in a utility room, install two open grilles in a wall or door opening to the rest of the house. One grille will supply combustion air. Locate it near the floor. The other grille is for ventilation. Locate it close to the ceiling. Each grille must have a free area of not less than one square inch for each 1000 BTU/hr. of the total input rating of all the appliances in the confined space. (See Fig. 16 below)

FOR EXAMPLE: Your furnace is rated at 150,000 BTU per hour. The water heater is rated 30,000 BTU per hour. The total is 180,000 BTU per hour.

You need two grilles, each with 180 square inches of free opening. Metal grilles have about 60% free (open) area, so you need two metal grilles with 300 square inches each of louvered area. The height should be about half the width.

## FRESH AIR DUCT CAPACITIES

Fresh air duct capacities for duct supplying fresh air.

### BTU Per Hour Input\*

Size	1/4 in. Mesh Screen BTU	Wood Louvers BTU	Metal Louvers BTU
3-1/4 x 12 in.	144,000	36,000	108,000
8 in. round	200,000	50,000	150,000
8 x 12 in.	382,000	96,000	288,000
8 x 16 in.	512,000	128,000	384,000

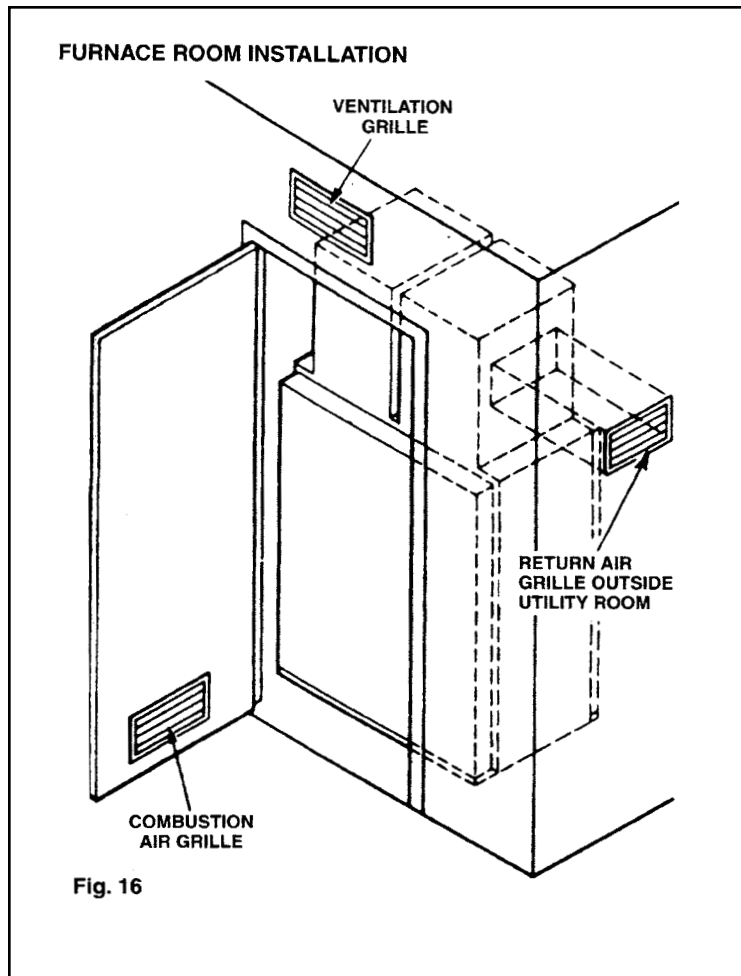
\* Based on opening covered by 1/4 inch mesh screen, wood or metal louvers.

### WARNING

Enough air insures proper combustion and assures that no hazard will develop due to the lack of oxygen.

### NOTE

If you have a fireplace, a kitchen, bath fan or water heater that vents to the outside, add enough duct size to your fresh air requirements to accommodate their air needs.



### WARNING

Return air MUST NOT be drawn from inside the room where the furnace is located.

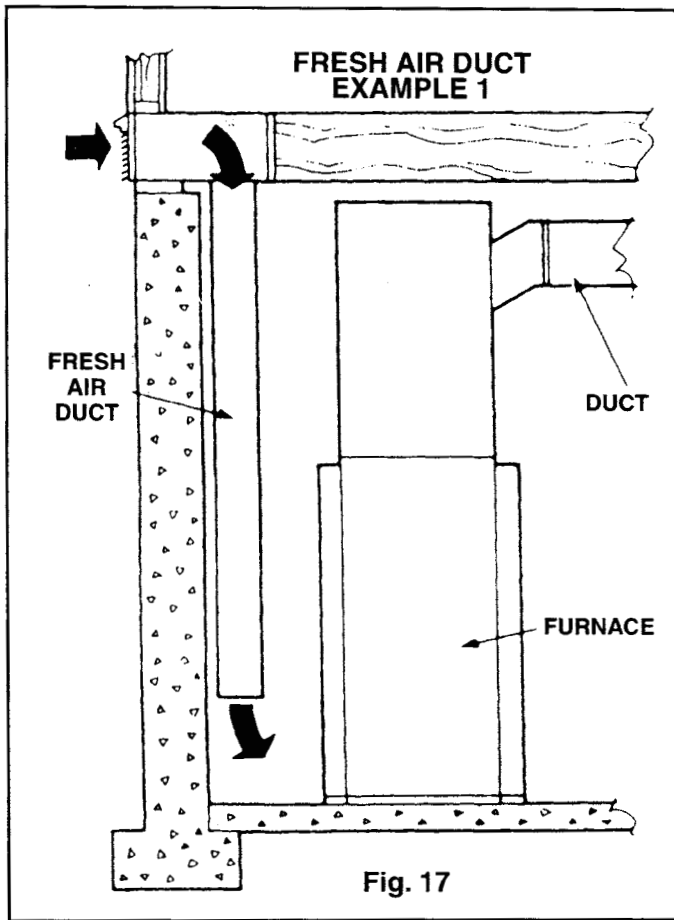
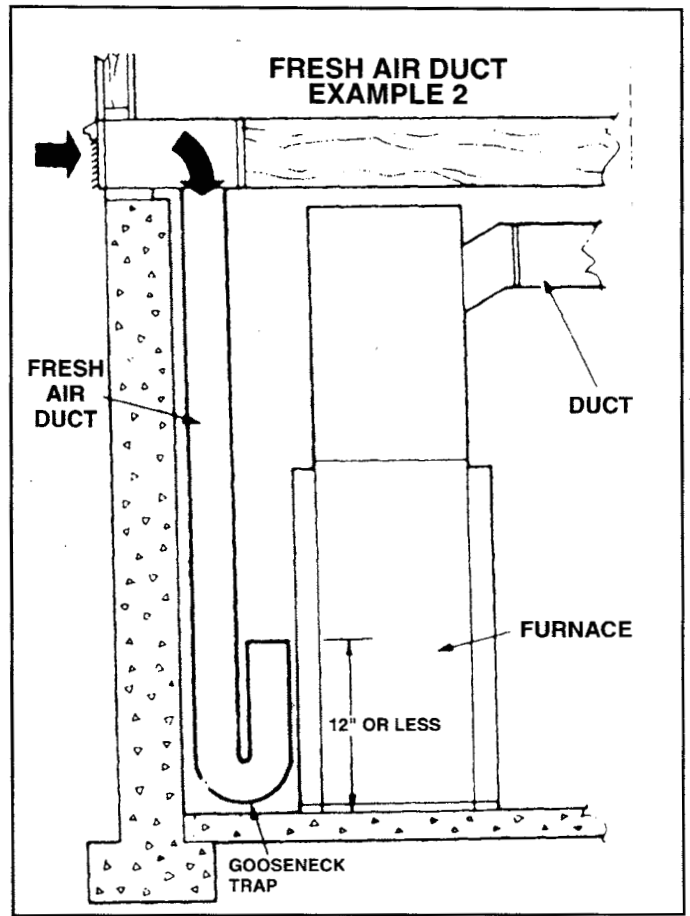


Fig. 17



## COMBUSTION AIR

Make-up outside air to the furnace for proper fuel combustion must be provided by openings to the outside of the building. The openings of ducts supplying such make-up air shall have unobstructed areas not less than the area of the flue pipe.

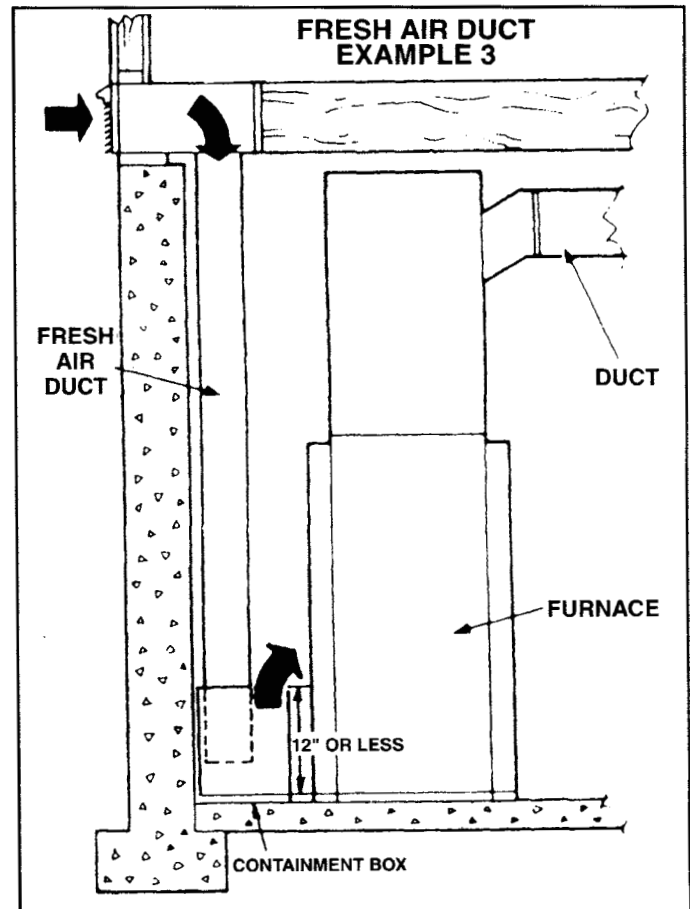
### NOTE

Outside air is needed to replace the air used by the burner and wood combustion process. Outside air is also required to replace the air used for taking the by-products of combustion of the gas or oil burner and wood/coal smoke out the chimney. Outside air is also needed to replace any air expelled by kitchen or bathroom fans as well as water heater chimneys or fans.

Failure to provide outside air to the area in which the furnace is located will result in a negative pressure or vacuum in the home. Smoke from the wood fire may not be drawn up the chimney, causing creosote buildup and sometimes causing smoke to enter the furnace room.

### WARNING

You must provide for enough fresh air to assure proper combustion. The fire in the furnace uses oxygen and must have a continuous supply. The air in a house contains only enough oxygen to supply the furnace for a short time. Outside air must enter the house to replace that used by the burner.



## HAND FIRING WOOD

Set the small thermostat above room temperature. Set the larger thermostat below room temperature. The damper to the firebox should now be open.

Place paper and kindling in the firebox as you would in a fireplace or campfire. Add logs to top of fire once kindling is burning. Reset small thermostat to desired room temperature.

Never leave ash drawer open, either to start fire or to provide more heat. The furnace is designed to provide adequate heat with the ash drawer closed.

### WARNING

Never operate furnace with ash drawer open. It could cause the fire to burn at extreme temperatures, causing metal fatigue and firebox failure.

### CAUTION RESTRICTED USE DURING ELECTRIC POWER OR FURNACE FAN FAILURE

Furnace may be converted to a gravity system. Directions must be followed carefully to avoid an over-fire situation.

Remove access door to blower compartment and remove air filter. Then replace access door. Keep ash drawer tightly closed. Do not tamper with wood primary air control. Load wood to half the recommended normal height, approximately 4 inches above grate .

Do not overload, as no furnace fan is available to rapidly carry away the heat. Load small amounts of wood frequently until power is restored.

Open all air registers and remove all obstructions near them. Keep children away from air registers or burns could result. Primary air damper and burner will operate automatically when electric power is restored .

### IMPORTANT

Keep ash drawer empty. Primary air to the wood chamber travels under the grate. Also, if ashes are permitted to build up above the grates, the grates will warp and eventually burn out.

### DANGER

Never burn materials other than coal or wood logs, preferably split and dried. A chimney fire or heat exchanger failure could result. This includes large amounts of corrugated boxes, wood shavings, paper scraps, dried Christmas trees, coke, garbage, tires or other burnable products.

### CAUTION OVERLOADING WITH WOOD

Do not overload your furnace with wood. Failure or damage to the firebox could result. Never allow the hot coals to build up above the lower firebricks.

## BEST WOOD TO BURN

All solid fuel, whether it is coal, pine, oak or any grain has about 12,000 BTU's per pound if it's moisture content is zero. Wood that has been cut, split and air dried for 2 years has about 8,000 usable BTU's per pound. Hardwood such as oak or hard maple has nearly twice the BTU's per cord as pine or aspen because it is nearly twice as heavy.

Freshly cut wood has about 50% moisture content. Wood that has been cut and split for 2 years has about 20% .Wood must reach at least 435Q to ignite. High moisture content wood does not allow the gases in wood to get hot enough to provide complete combustion, thereby creating smoke and creosote, which is usable energy, but wasted because of incomplete combustion.

Yukon/Eagle furnaces are designed to wring the most energy possible from each log. Your furnace is designed to allow the primary air under the grate to create the initial burning. As the wood burns, gases, which contain 40% of the energy in the wood, escape to the top of the flame. The patented secondary air system (the round tubes between the firebrick) draws room air into the tubes and provides oxygen to the firebox to burn these gases. The result is you will use up to 75% less wood than stoves, furnaces or outdoor boilers without these features.

Type	Pound Weight per Cord	BTU's Per Cord Air Dried Wood	Equivalent Value #2 Fuel Oil Gallons
White Pine	1800	17,000,000	120
Aspen	1900	17,500,000	125
Spruce	2100	18,000,000	130
Ash	2900	22,500,000	160
Tamarack	2500	24,000,000	170
Soft Maple	2500	24,000,000	170
Yellow Birch	3000	26,000,000	180
Red Oak	3250	27,000,000	195
Hard Maple	3000	29,000,000	200
Hickory	3600	30,500,000	215

### CAUTION

REMOVE AIR CONDITIONING COIL FROM WARM AIR PLENUM IF USING FURNACE DURING FAN FAILURE OR ELECTRIC POWER FAILURE.

If for any reason there should be an electric power failure, either from high limit cutoff or electrical power outage, the damper will automatically close, preventing over-fire with no blower, thus preventing heat exchanger damage.

## BURNING COAL ON 1/2-INCH OPENING GRATES

(Optional)

### GENERAL INFORMATION

This information contains the instructions for burning various types of coal, storage of coal, and the cleaning of the furnace.

Some coal is oil-treated at the mine and some users have indicated that it tends to make the coal more difficult to start.

Burning coal requires some patience and a regular procedure. With improper tending, a coal fire can go out in a short time. Once the fire starts to go out, it is almost impossible to reverse. After a coal fire goes out, all the coal must be removed from the furnace before the starting process can be repeated.

Our coal burning instructions are general, as coal comes in various sizes and types. Anthracite coal is most recommended as it burns with little smoke when burning properly.

### OPERATING INSTRUCTIONS FOR BURNING COAL GENERAL INFORMATION

#### CAUTION

Burn Anthracite - Bituminous - Lignite coals only

#### DO NOT BURN

Petroleum - Coke - Cannel Coals

### IGNITION TEMPERATURE OF COAL AND WOOD

How hot does coal have to get to ignite? Following are examples of the ignition points of various materials:

<b>COAL:</b>	Paper ignites @	350° F
	Wood ignites @	435° F
	Western lignite ignites @	630° F
	Low volatile bituminous ignites @	765° F
	High volatile bituminous ignites @	870° F
	Anthracite ignites @	925° F

## WHAT SIZE COAL SHOULD I BURN?

The air space between the furnace grates is 1/2 inch; therefore, coal smaller than 1/2 inch can fall through the grates into the ash pan.

Pea size coal ranges from 9/16 to 11/16 inches.

Nut size coal ranges from 1-3/16 to 1-5/8 inches.

Stove size coal ranges from 1-5/8 to 2- 7/16 inches.

Nut size is preferred by most people and is recommended for use in this furnace.

Anthracite coal is hard and burns like the charcoal that is used in your barbecue grill. The coals must touch each other to ignite. Therefore, the smaller the coal, the easier to ignite. Stove coal is not as likely to touch each other because of its size.

Bituminous coal is soft and not as desirable as hard coal. It creates dust when handled and produces large amounts of smoke and soot when burned at a slow rate. Also, soft coal from some areas of the country contains higher sulfur content, but a large portion of it may be removed if the coal is cleaned .

### HOW TO START A COAL FIRE

#### CAUTION

Do not use kerosene, gasoline, thinners, etc. to start a coal fire.

To start a coal fire, place a small amount of crumpled paper and sticks of kindling wood on the ash-covered grates.

Ignite the paper and after the wood is burning briskly, cover with a thin layer of coal. As the first layer of coal becomes ignited, add more coal gradually until the fire bed is built up to approximately 6 inches deep. As fresh coal is added always leave some of the glowing coal uncovered.

Draw the top red coals toward the front of the firebox and pile fresh coals toward the back.

The grates must be protected from direct contact with the fire by a layer of ash, one (1) or two (2) inches thick. The ash left on the grate will help prevent overheating of the cast iron grates and coal from falling through the grate's opening.

### MAINTAINING A COAL FIRE

Bituminous coal should be built into a cone shape once the fire has started. When refiring, break up the cone a little using a poker, especially if it has caked over to form a crust. Be careful not to mix the coal as this increases the chance of forming clinkers.

Western lignite coal should be burned the same way you would burn wood. (Refer to wood burning instruction.)



## SHAKING THE GRATES

Shaking a fire should only be done if room is needed for fresh coal or if the ash accumulation on the grates is excessive. Generally, the grates need only be shaken once or twice a day.

Shake the grates using a few short strokes and stop when the first red coals appear in the ash pan. Under-shaking restricts the amount of air that reaches the fire and over-shaking may cause the fire to go out.

A coal fire should never be poked or broken up as this serves to bring ash to the surface of the coal bed where it may fuse into lumps or clinkers which interfere with proper burning.

### IMPORTANT

Never smother fire when adding fresh coal.

**Anthracite Coal** — To bank the fire for the night, pile the coal higher to the back of the firebox and allow it to slope toward the fire box door. Always leave some red or burning coals uncovered in the front of the firebox.

**Bituminous Coal** — To bank the fire for the night, shake the fire and add coal, forming the center cone. Allow enough time for the volatiles to burn off before closing the fire door.

## GRATE CARE — ASH REMOVAL

It is necessary that ashes be removed from the ash pan on a daily basis and should never be allowed to accumulate high enough to come in contact with the grates. Such a condition could cut off necessary air circulation and could also result in a warping or burnout of the grates.

## ASH DISPOSAL

Unlike wood ashes, coal ash should not be spread on the garden. The minerals in coal ash contain several chemicals which could be harmful to plant life.

## RECOVERING UNBURNED COAL

Screen coal ashes through a piece of 1/4 inch or 3/8 inch mesh hardware cloth to recover any unburned coal that has fallen through the grates.

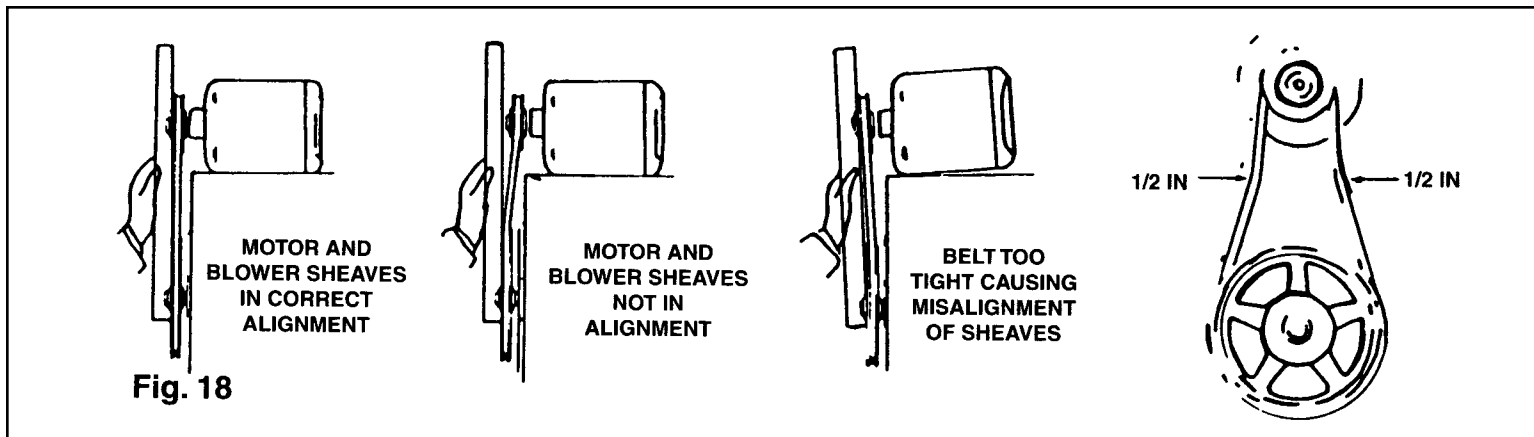
## STORAGE OF COAL

Coal may be stored indoors or outdoors, with some precautions:

1. The storage area must be free of materials that are easily burned, such as paper, wood, rags and leaves.
2. Alternate wetting and drying of coal should be avoided. Outside storages should be protected from rain or snow. Wet coal should not be piled on dry coal.
3. Locate the storage area in a cool, 75Q F or lower, area.
4. Nut coal weighs approximately 58 lbs. per cu. ft. A storage bin 4-feet square by 4-feet high will hold 2 tons.

## CLEANING FURNACE AND CHIMNEY FLUE PIPES

Be sure to check and clean the furnace heat exchange flue pipes and chimney on a frequent basis. Soot and fly ash should not be allowed to build up on any of these surfaces. Chimneys are best cleaned professionally.



**Fig. 18**

## CHECKS AND ADJUSTMENTS

If you have installed your own furnace, we ask that you call for an inspection by a Service Technician. The peace of mind and assured performance are well worth the cost involved. A technician has the proper instruments to make the necessary checks and adjustments.

## FURNACE BLOWER ADJUSTMENT

Set adjustable motor pulley so blower will give approximately 90° F temperature rise through furnace. After pulley has been adjusted check bolt as follows: (see Fig. 18)

The belt is drawn tight during shipment; therefore both belt tension and sheave alignment must be rechecked by the installer when the furnace is placed in service.

Improper belt tension and pulley misalignment are the major causes of furnace fan noise and failure of belts and bearings.

Sheave alignment is easily determined with a straight edge held across the outer face of the fan sheave. The face of the motor sheave should also be parallel to the straight edge at all points.

Proper belt tension is more difficult to determine accurately. Too little tension will permit slippage causing belt wear and may cause noise or squealing when the motor starts. Excessive tension increases motor load and may cause the oil film between shaft and bearing to fail. This, in turn, causes the bearing to seize or burn out.

The proper belt tension is the minimum which will drive the blower without slippage. This varies with sheave diameter, fan size, and motor starting torque characteristics. The practical belt tension can best be determined by actual experience, but when in doubt it is better to have the belt too loose rather than too tight. Belt tension can be judged by grasping the belt as shown. The belt should be deflected approximately one inch when moderate pressure is applied.

## AIR CONDITIONING

See air circulating fan performance curve charts on page 21. Service factors for factory furnished motors are 1/3 HP = 1 .35, 1/2 HP = 1.25, 3/4 HP = 1.15. All motors are Class A with Class B insulation.

## DUCT WORK AND BLOWER SPEED ADJUSTMENT

Supply and return duct system should be sized properly for efficient operation. Normal air temperature rise through the furnace should be adjusted to approximately 90° F. Proper blower speed adjustment, in conjunction with adequate duct work are necessary to achieve this.

A high temperature rise will result in excessive fuel usage, due to the high stack temperature that always accompanies a high air temperature rise. It can also cause premature heat exchanger failure.

To perform temperature rise check, start furnace and let it run a minimum of 10 minutes (be sure all duct work is complete and furnace is in its normal operating condition) .Place #1 thermometer in the return near the furnace. Place #2 thermometer in the supply duct near the furnace, but not in the plenum. After 10 minutes or more operation, take thermometer readings. Supply air temperature should be no more than 90Q higher than return air temperature.

Air temperature rise can be lowered by:

1. Increasing blower speed.
2. Additional supply or return outlets .
3. Lowering firing rate.

## TESTING INSTALLATIONS FOR EFFICIENCY

### IMPORTANT

Draft gauge must be used. Draft in smoke pipe must be set at .03 Water Column updraft. Failure to set properly will cause fuel to be wasted, heating will not be satisfactory, fast build-up of creosote in heat exchanger and chimney may occur, and cause damage to your heating system.

The draft regulator will afford the user maximum fuel efficiency, however, the finest draft regulator in the world cannot increase the efficiency of a heating system if the system as well as the regulator is not in proper adjustment.

Many common tests are available to establish the efficiency of the system. One such test is outlined on page 9.

## MAINTENANCE INSTRUCTIONS

### CAUTION

Before cleaning chimney, smoke pipe furnace, be sure to turn off electrical power to furnace. Be sure wood fire is out and inside of furnace is cool.

#### A. At the start of the heating season:

1. It is advisable to have a service technician inspect and service your furnace for the coming heating season.
2. Furnace, smoke pipe and chimney should be cleaned and checked for repairs.

#### B. Emergency stops:

1. Cut off all electrical current to the furnace by turning off electrical power in main fuse panel.

#### C. Air filter:

1. Check and clean monthly. Change filter at least twice a year.

#### D. Blower motor:

1. Check belt for proper tension.

#### E. Grates:

1. Keep ash drawer emptied. Failure to do this will cause grates to warp.

#### F. Smoke Pipe, Chimney and Furnace Heat Exchanger:

1. Do not burn green or freshly felled wood. If you do, creosote and soot may build up in the chimney, smoke pipe and furnace heat exchanger. This should be checked and cleaned several times each heating season. Soot will act as an insulator which will cause less heat to be transferred into your duct system thus reducing the efficiency of the wood being burned.

### HOW TO PREVENT RUST AND CORROSION

At the end of each heating season, clean heat exchanger and ash pan thoroughly. Paint the inside of the heat exchanger with automobile crankcase oil. This will decrease rusting caused by summer moisture.

If black paint on firing door area wears or burns off, it can be repainted with a high temperature, flat black, air-drying paint.

### DISPOSAL OF ASHES

Ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be placed on a noncombustible floor or on the ground, well away from all combustible materials, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have thoroughly cooled.

### CLEANING THE CHIMNEY, SMOKE PIPE AND HEAT EXCHANGER

Avoid chimney fires. On a regular schedule, check for creosote and soot buildup in the chimney, smoke pipe and heat exchanger. They must be kept clean. Keep a professional chimney sweep in mind if you have access to one.

Steel brushes are the safest for cleaning metal surfaces. Salt solutions and some chemicals may damage metal surfaces. Do not overfire your furnace. Do not burn anything that combusts in seconds. Excessive flue temperatures may result, thereby igniting creosote.

To clean the chimney, obtain a stiff brush with an extendible handle and insert the brush into the chimney from the top. Continue brushing and sweeping downward until entire length of chimney is cleaned.

After cleaning, the debris will be at the bottom of the chimney at the clean-out opening. Open the clean-out door and sweep the debris out into a metal container.

The smoke pipe from the furnace to the chimney can be cleaned with a steel brush.

The primary heat exchanger can be cleaned with any steel brush. A furnace vacuum cleaner may be used.

### IN CASE OF CHIMNEY FIRE CALL THE FIRE DEPARTMENT IMMEDIATELY!

EXTINGUISH THE FIRE IN FURNACE BY SETTING THE THERMOSTAT ALL THE WAY TO THE LEFT TO CLOSE PRIMARY AIR DAMPER. EMPTY FIRE CHAMBER AND ASH PAN INTO SAFE, FIREPROOF CONTAINER.

DO NOT USE YOUR FURNACE UNTIL A PROFESSIONAL INSPECTION HAS BEEN MADE OF YOUR FURNACE, SMOKE PIPE AND CHIMNEY.

### CREOSOTE — FORMATION AND NEED FOR REMOVAL

When wood is burned slowly, it produces tar and other organic vapors, which combine with expelled moisture to form creosote. The creosote vapors condense in the relatively cool chimney flue of a slow-burning fire. As a result, creosote residue accumulates on the flue lining. When ignited, this creosote makes an extremely hot fire.

The chimney connector and chimney should be inspected at least twice monthly during the heating season to determine if a creosote buildup has occurred.

If creosote has accumulated it should be removed to reduce the risk of a chimney fire.

## SERVICE HINTS

## NOTE

Multiple coats of paint on registers and grilles may reduce the amount of free air opening causing restriction of air flow and reduction of warm air circulation. Registers and grilles in this condition should be replaced.

### If floors are cold...

#### POSSIBLE CAUSE

Return (cold) air grilles blocked

Air filter is dirty

System is out of balance

#### WHAT TO DO

Check to make sure rugs and carpets are not covering return air grilles.

Clean or replace air filter, as necessary.

Check supply pipe dampers or registers to balance system.

### If blower/motor is noisy...

Check motor bearings

Check blower bearings

Air filter is dirty

Replace motor if necessary

Replace bearings if necessary

Clean or replace air filter, as necessary

### Smoke puffs out through doors...

Chimney draft incorrect

Soot and creosote buildup in heat exchanger or chimney

Chimney too low

Obstruction in chimney

Not enough fresh air to furnace room

Chimney diameter too large

Chimney clean-out door partially open

Other fuel burning device connected to same chimney

Check chimney draft. With normal wood fire, chimney should draw .03 inch water column between furnace and barometric control

Clean if necessary.

Increase chimney height.

Check for obstruction such as loose mortar, bird nests and squirrel nests. Clean chimney to eliminate obstructions.

Check for obstructions in combustion air inlet. See page 14.

Too cold a chimney will chill flue gases as they rise up the chimney. As this gas cools, it becomes heavy and other gases from the fire try to penetrate this heavy column of cool air. This results in back puffing, and may cause odors in your home. Obviously, the solution lies in improving your chimney.

Make sure chimney clean-out door is tightly closed.

Install separate chimney.

Reset thermostat above room temperature.

Check fuse or circuit breaker. If fuse is blown, replace. If breaker is tripped, reset. Check to make sure that electrical switch is on.

Baffles in firebox out of place or barometric damper set too high. Check baffle position, page 6, Fig. 6. Set barometric control to .03 or less.

Recheck field wiring against wiring diagram.

Check 24 Volt side of transformer, check 115 Volt power to transformer. Check for burn spot on damper control relay. Replace board if defective.

Check power to solenoid. Replace if defective.

### If your furnace is not giving you enough heat...

Thermostat not set correctly

No electric power to furnace

Using excessive amount of wood, but not heating

### Damper control fails to open...

Improper thermostat wiring

No power to damper control

Damper does not open

### If you don't seem to be getting enough air circulation...

Air filter is dirty

Registers and grilles are obstructed

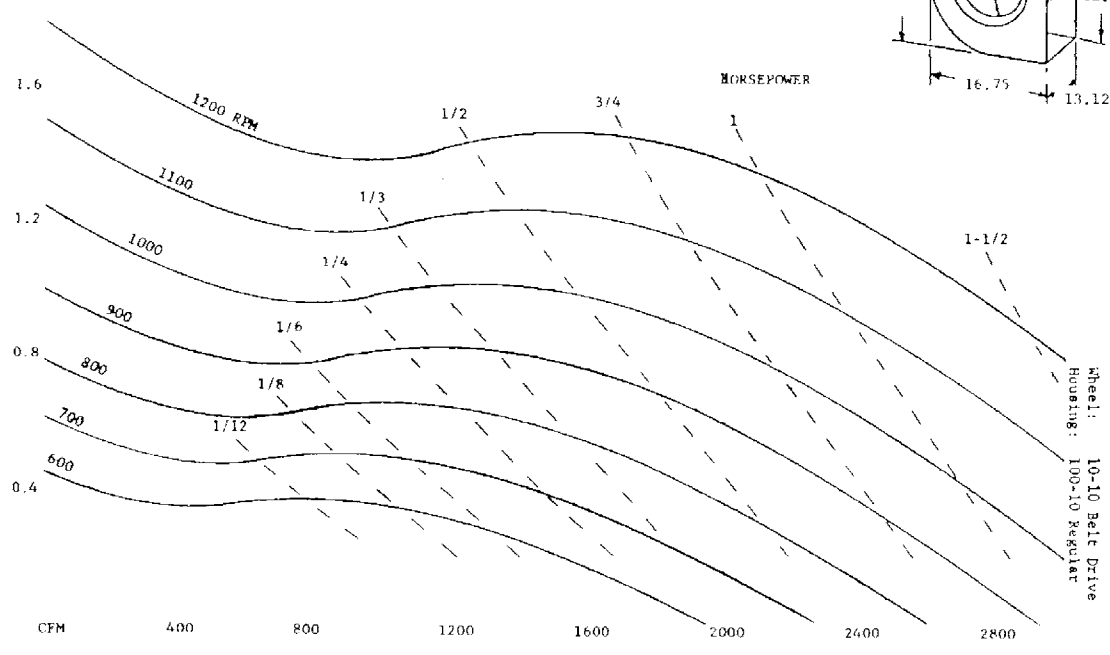
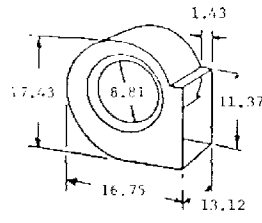
Clean or replace filter, as necessary.

Check supply pipes or damper positions. Check registers and grilles to make sure they are not closed or obstructed by carpet, draperies, furniture or clothing. Remove obstructions.

SP  
INCH

Performance Curve 28104070

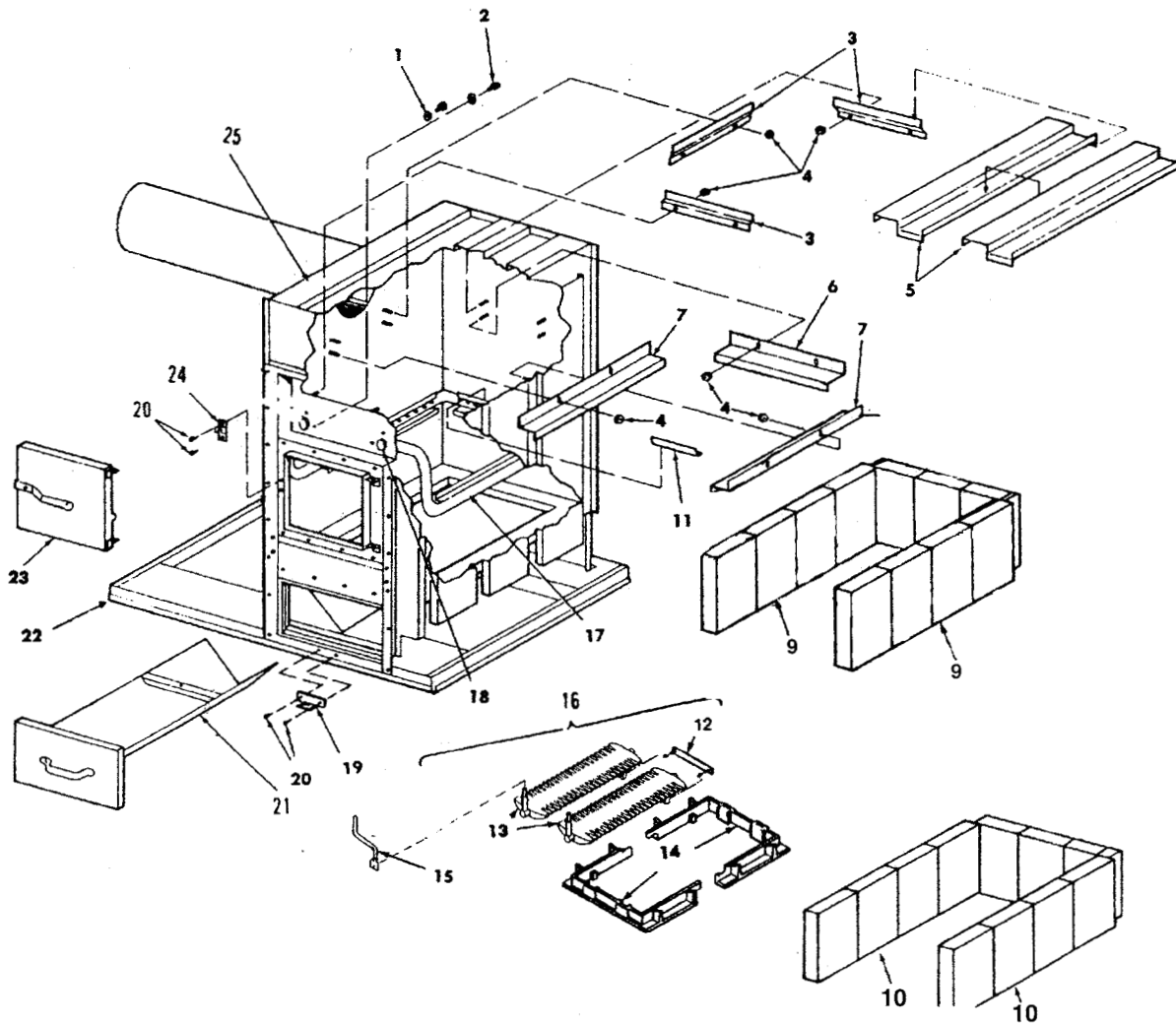
MORRISON PRODUCTS, INC.



Wheel: 10-10 Belt Drive  
Housing: 100-10 Regulator

**THIS CIRCULATING FAN PERFORMANCE CURVE CHART IS FOR DETERMINING MOTOR HORSEPOWER NEEDS FOR THE LW SOLID FUEL FURNACE**

## Repair Parts — Fire Box & Heat Exchanger Assembly



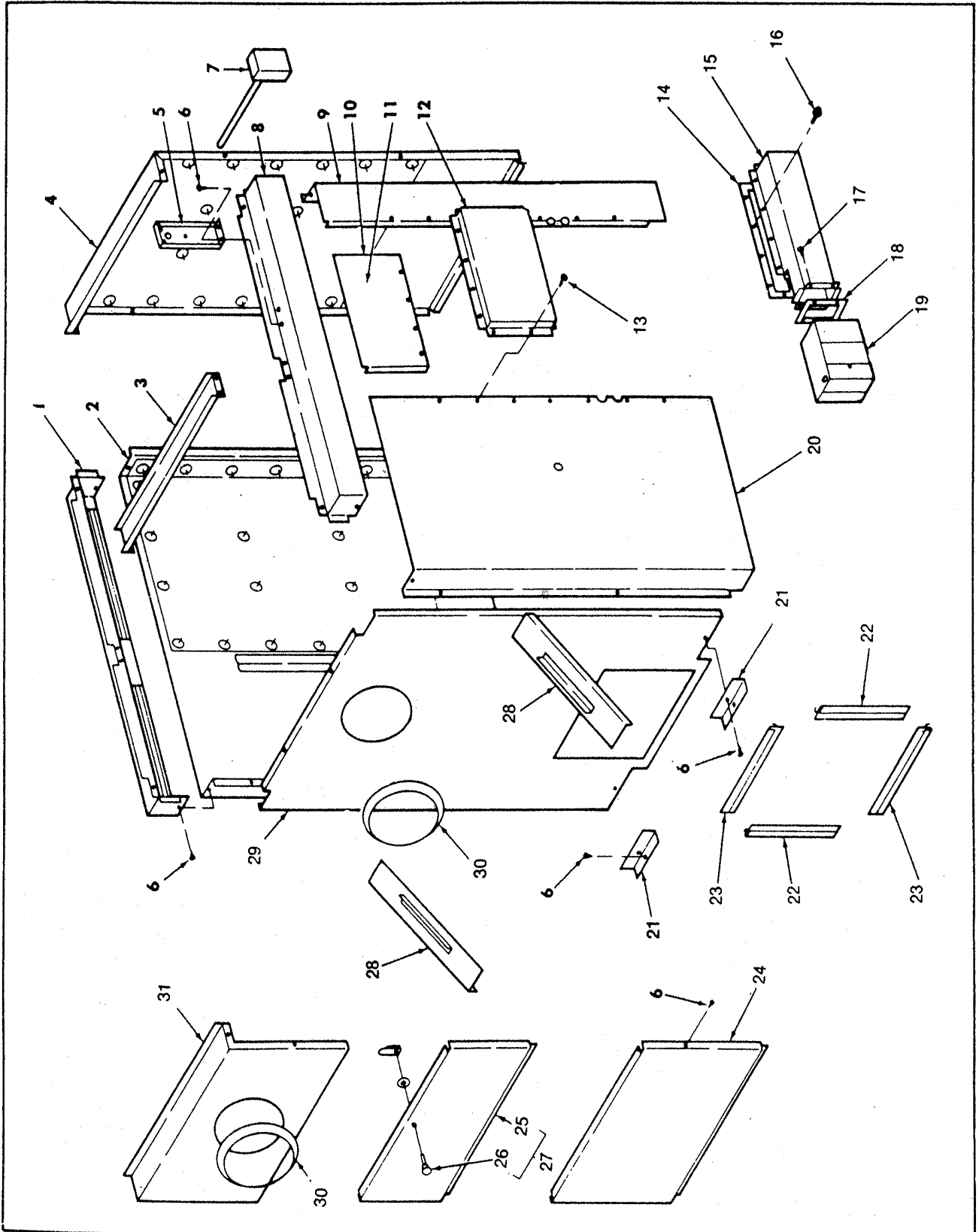
## Repair Parts — Combustion Chamber Assembly

Key No.	LEFT HD	RIGHT HD	Description
1	10110500	10110500	Fender Washer 5/16" I.D. × 1" O.D. (2 Req'd)
2	10104900	10104900	Screw, Thread Cutting, Hex Washer Hd 1/4-20 × 3/4" (2 Req'd)
3	20102200	20102200	Bracket, Baffle (3 Req'd)
4	10105300	10105300	Nut, Hex 1/4-20 (14 Req'd)
5	20105900	20105900	Baffle, Smoke (2 Req'd)
6	20102640	20102640	Top Brick Retainer, Rear
7	20102650	20102650	Top Brick Retainer, Side (2 Req'd)
9	10100700	10100700	Fire Brick 9" × 6" × 2" (11 Req'd)
10			Fire Brick 6" × 2" (11 Req'd)
11	30103000	30103000	Tube Retainer
12	20108400	20108400	Connecting Rod Ass'y (Includes 2 lower upper
	10100700	10100700	5/16" Locknuts)

Key No.	LEFT HD	RIGHT HD	Description
13	10122400	10122400	Coal Grate (2 Req'd)
14	10122500	10122500	Grate Frame (2 Req'd)
15	10122900	10122900	Handle, Coal Grate
16	10123200	10123200	Coal Grate Ass'y
17	30103600	30103600	Secondary Air Tube
18	10110700	10110700	Gasket, Secondary Air Tube (2 Req'd)
19	20107003	20107003	Latch, Ash Pan
20	10105000	10105000	Screw, Machine, Rd Hd 1/4-20 × 3/4" (4 Req'd)
21	20107503	20107503	Ash Pan Ass'y
22	30300603	31300603	Base, Weldment
23	20104903	20104903	Fire Door Ass'y
24	10139700	10139700	Door Latch
25	30107003	30107003	Combustion Chamber
-	10100900	10100900	Wood Grates (3 Req'd)

# repair parts

## EXTERIOR BODY ASSEMBLY



# repair parts

## CASING ASSEMBLY

Key No.	LEFT HD	RIGHT HD	Description
1	30402342	31402342	Top Panel, Rear
2	30402002	31402002	Panel, Rear
3	30401901	30401901	Divider, Plenum
4	30402401	30402401	Panel, Right Side
5	20403501	20403501	Bracket, Mounting, Fan & Limit Switch
6	10106400	10106400	Screw, Drill-in, Hex Washer Hd 8 x 1/2 (31 Req'd)
7	10107000	10107000	Switch, Fan & Limit L4064 J1008
8	30402332	31402332	Top Panel, Front
9	20402602	21402602	Panel, Corner
10	30402502	31402502	Front Panel, Upper
11	10107300	10107300	Nameplate
12	30101203	30101203	Intake Cover
13	10106300	10106300	Screw, Drill-in, Hex Washer Hd 10 x 3/4" (22 Req'd)
14	10103700	10103700	Gasket, Draft Tube
15	20105603	20105603	Draft Tube
16	10104900	10104900	Screw, Thread Cutting Hex Washer Hd 1/4-20 x 3/4" (12 Req'd)
17	10111400	10111400	Screw, Pan Hd No 10-32 x 3/4" (4 Req'd)
18	10103600	10103600	Gasket, Draft Control
19	10140500	10140500	Control Unit, DS103
20	30402102	31402102	Panel, Front

Key No.	LEFT HD	RIGHT HD	Description
21	20401702	20401702	Angle Divider (2 Req'd)
22	20403200	20403200	Felt Clip, Side 12" (2 Req'd)
23	20403290	20403290	Felt Clip, Top and Bottom 13-3/8" (2 Req'd)
24	20400701	20400701	Panel, Blower
25	20400801	20400801	Filter Door
26	10101400	10101400	Filter Door Latch
27	20402901	20402901	Filter Door Ass'y (Includes Items 25, 26)
28	20403102	20403102	Filter Rack (2 Req'd)
29	30402602	30402602	Panel Divider
30	10102800	10102800	Draw Collar 8" (2 Req'd)
31	30400601	30400601	Side Panel, Left
*	10102600	10102600	Filter 20" x 25" x 1"
*	10111501	10111501	Owners Manual
*	10106600	10106600	Barometric Damper—8"
*	10109400	10109400	Thermostat
*	10109500	10109500	Filter Door Tag T-8000
*	10109600	10109600	Caution Tag
*	10115200	10115200	Rating Plate









# **YUKON EAGLE**

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## **OWNER'S MANUAL**

**Model No.  
LW-000 Series**

**CAUTION:**  
Read Rules And  
Instructions  
Carefully For  
Safe Operation

**IMPORTANT:**

Installation must be made in accordance with state and local ordinances which may differ from this installation manual.

# **YUKON KLONDIKE EAGLE IV**

## **WOOD/COAL SOLID FUEL FIRED CENTRAL FURNACE**

### **HOW TO ORDER REPAIR PARTS**

**WHEN ORDERING REPAIR PARTS,  
ALWAYS GIVE THE FOLLOWING INFORMATION:**

- PART NUMBER
- PART DESCRIPTION
- MODEL NUMBER
- NAME OF ITEM

**ALL PARTS MAY BE PURCHASED FROM ANY  
HEATING CONTRACTOR, ONLINE AT OUR WEBSITE  
OR FROM OUR FACTORY.**

PHONE: 1-800-358-0060  
FAX: 1-800-440-1994  
E-MAIL: yukon@mlecmn.net  
WEBSITE: www.yukon-eagle.com