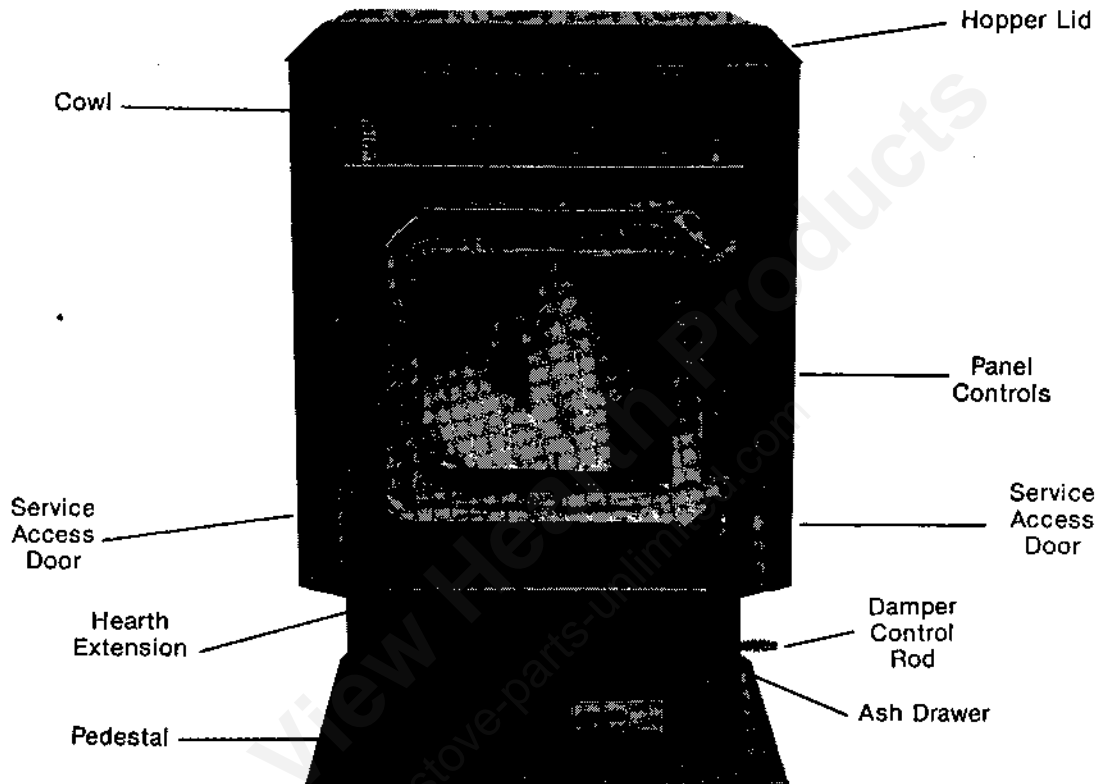


C A D E T

B Y B R E C K W E L L



OWNERS MANUAL

Manufactured by
National Steelcrafters of Oregon, Inc.
P.O. Box 2501
Eugene, Oregon 97402

8-90

SAFETY NOTICE: If your appliance is not properly installed a house fire may result. For your safety, follow the installation directions. Contact local building or fire officials about restrictions and installation inspection requirements in your area.

ALL UNITS TESTED AND LISTED BY

IC.B.O. TL-128



NVLAQ
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OF OREGON, INC.
1990

Thank you for purchasing the Breckwell Pellet Burning Stove. You are now prepared to burn wood in the most efficient, convenient way possible. To achieve the safest, most efficient and most enjoyable performance from your stove, you must do three things; 1) Install it properly, 2) Operate it correctly

and 3) Maintain it regularly. The purpose of this manual is to help you do all three. **PLEASE read this manual thoroughly before beginning your installation and KEEP IT in a handy place for future reference and future owners.**

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1.0 INTRODUCTION

This stove has been independently tested and approved in accordance with the specifications and procedures outlined in Underwriters' Laboratories, Inc., standards for safety UL 1482, solid fuel type room heaters, April 1987, and HUD requirements for installation as a stove heater, plus Oregon new rules for mobile homes (814-23-900 through 814-23-909). Also, the P20 has been tested to EPA Method 28A and has been proven exempt from EPA regulations.

This appliance is designed specifically for use only with pelletized wood. It is approved for residential installation according to current national and local building codes as a free standing room heater and as a mobile home heater which is designed for connection with an outside air source.

The stove will not operate using natural draft, or without a power source for the blower systems and fuel feeding systems and must not be burned with any coal type of artificial fuels.

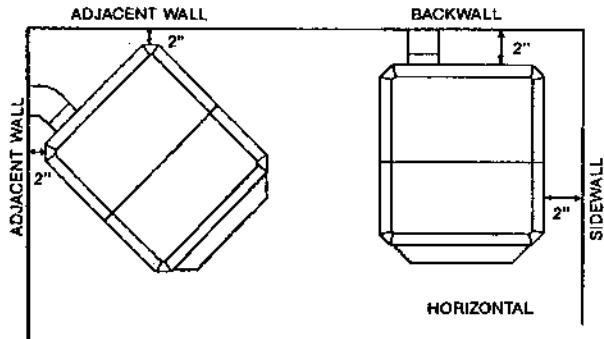
This stove is designed to provide the optimum proportions of fuel to air to the fire and will burn free of smoke and soot. Any blockage of the air supply to or from the stove will seriously degrade the performance and will be evidenced by a smoking exhaust and a sooting window. For the best operation APFI approved and listed fuel should be used. The ash content of the pellet fuel should be less than 1% and the calorific value approximately 8200 BTU/LB. Avoid high ash content fuels as this will rapidly fill up the burn pot and eventually cut off the combustion air supply.

2.0 INSTALLATION

The Breckwell P20 has been tested and listed for installation in residential, mobile home and alcove applications.

2.1 Clearances

CLEARANCE TO COMBUSTIBLES



ALCOVE
MINIMUM DIMENSIONS:
24½" (W) x 60" (D) x 72" (H)

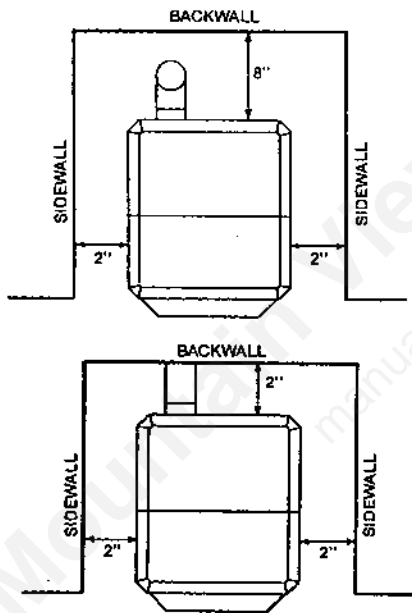


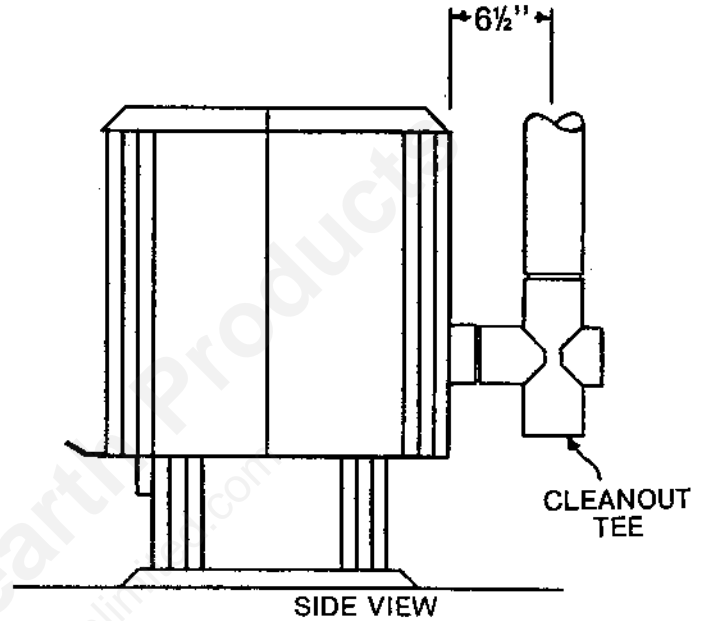
FIGURE 1

Stove must sit on a minimum 20" (W) x 25" (D) non-combustible hearth pad. Pad must extend 6" in front of stove face.

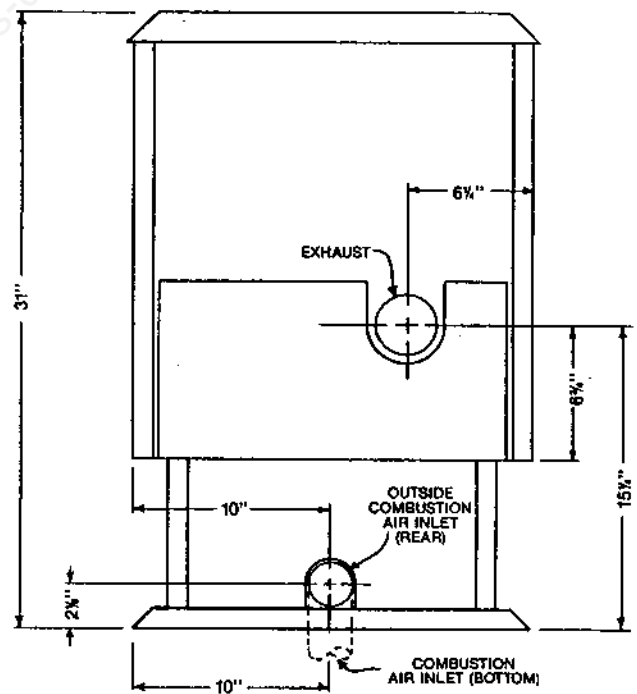
2.2 Combustion Air Supply

For mobile home installation the stove must be connected to an outside source of combustion air. A 2" inside diameter metallic pipe, either flexible or rigid, should be used when outside air is to be connected. It attaches to an outlet on the stove's rear

(see figure 2) and its terminus should have a wind hood or be turned 90° to prevent back draft. It should also terminate with a rodent guard. If outside air is not provided, air should NOT be restricted to the combustion air inlet.



SIDE VIEW



BACK VIEW

FIGURE 2

Sources of Outside Combustion Air

1. Hole in floor to accommodate outside air pipe.
2. Hole in rear wall to accommodate outside air pipe.

3. When installed in front of a fireplace
 - a. Ash cleanout door on exterior wall.
 - b. Hole drilled in rear wall of firebox when fireplace is on an exterior wall (masonry fireplace only).
 - c. Within chimney above vent terminus.

2.3 Venting

Venting should be with 3" or 4" diameter pellet vent (L-Vent) chimney. Stove was tested with Simpson Duravent Brand. Class A chimney is not required. On runs over 10 feet, 4" is recommended. Refer to the instructions provided by the chimney manufacturer, especially when passing through a wall, ceiling or roof.

2.31 HORIZONTAL REAR EXHAUST INSTALLATION (Through Wall)

1. Position stove, adhering to clearances shown in section 2.1.
2. Locate position of hole in wall, directly behind stove's exhaust vent (see figure 2).
3. Cut opening in wall, 9 1/2" round for 3" L-Vent, 10 1/2" round for 4" L-Vent. This provides space for thimble which fits between wall studs. Attach thimble.
4. Attach enough pipe to penetrate and extend at least 3" beyond exterior walls.
5. Attach cap and seal outside wall thimbles with non-hardening waterproof mastic.

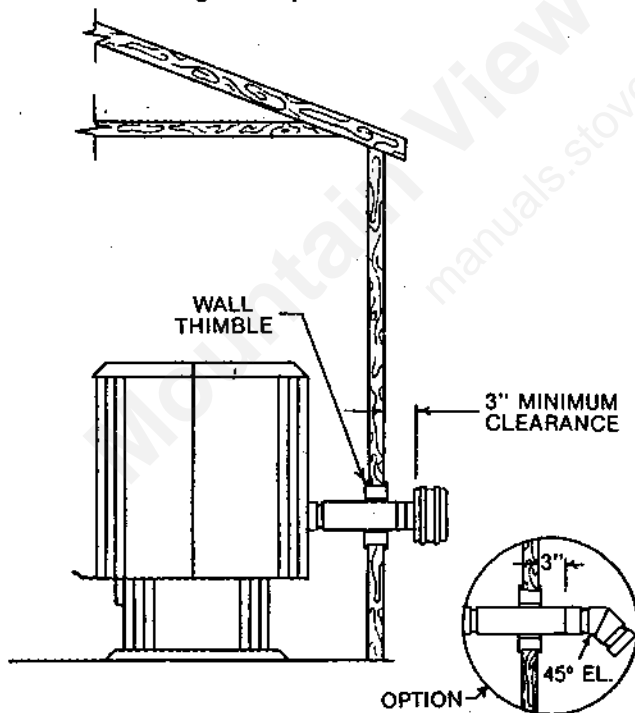


FIGURE 3

2.32 VERTICAL INSTALLATION

New Chimney System (see figure 4)

NOTE: Follow L-Vent Chimney manufacturer's instructions.

1. Use a cleanout tee to adapt to vertical.

2. Locate stove, drop plumb bob to center of appliance flue, mark center point on ceiling. Cut square hole in ceiling for firestop support assembly (for 3", cut 9 1/2" square; 4", cut 10 1/2" square).
3. Connect chimney sections from stove upwards.
4. When pipe passes through firestop at ceiling, tighten bolt and clamp around pipe.
5. Always maintain 3" clearance from combustible materials. When passing through additional floors or ceilings always install firestop spacer.
6. After lining up for hole in roof, cut either round or square hole in roof, always 3" larger all the way around pipe. Install upper edge and sides of flashing under roofing materials, nail to the roof along upper edge. Do not nail lower edge. Seal nail heads with non-hardening waterproof mastic.
7. Apply non-hardening, waterproof mastic where the storm collar will meet the vent and flashing, slide storm collar down until it sets on the flashing and put cap on, twist to lock.

2.33 VERTICAL INSTALLATION

Existing Chimney System (figure 5)

Adapters are available to adjust from 3" to 6" or 8". As an alternative, 3" or 4" pipe can be run inside existing chimney.

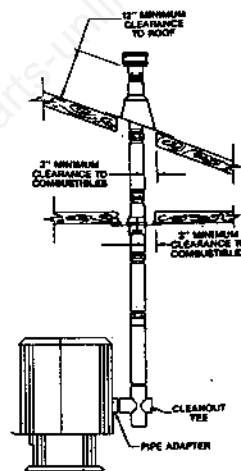


FIGURE 4

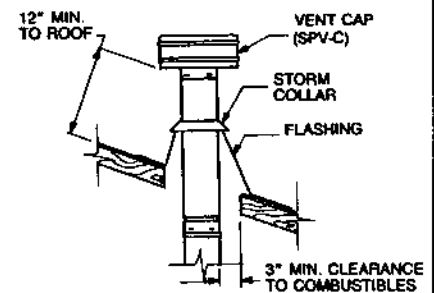


FIGURE 5

2.34 FIREPLACE INSTALLATIONS (See figure 6)

P20 may be installed in front of a fireplace and vented through the fireplace chimney. This installation is approved for both masonry and factory-built (zero clearance) fireplaces. L-Vent pipe should be used. A chimney top for the fireplace is recommended.

1. Determine how much pipe you will need. A cleanout tee is recommended.
2. Build an airtight blanking plate to cover the fireplace throat. Cut a hole for the vent.
3. Install and carefully seal blanking plate. Failure to properly seal may result in smoke spillage.
4. Slide vent pipe through blanking plate. Seal after connection to stove is made. Note: Vent should extend at least six inches above blanking plate.

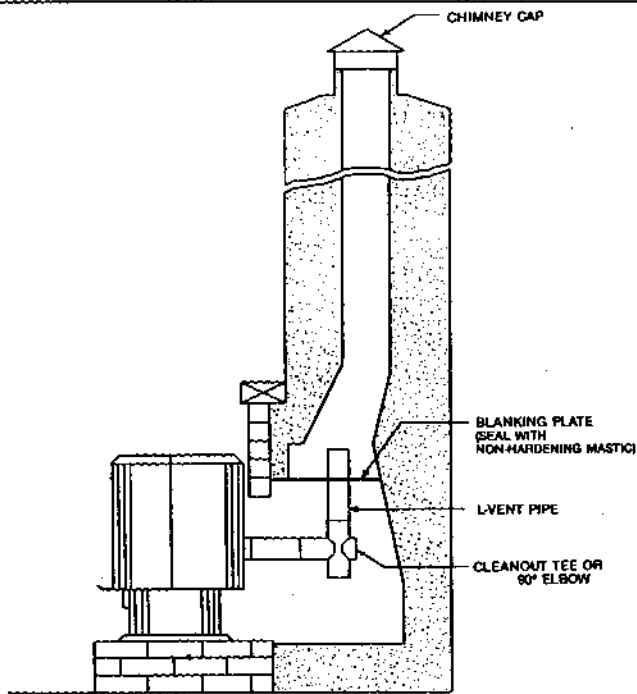


FIGURE 6

2.4 Electrical Installation

This stove is provided with an 8-foot grounded electrical cord extending from the rear of the stove. This should be connected to a standard 110 volt, 60 hz electrical outlet. The approximate power requirements are 150 watts.

2.5 Special Mobile Home Requirements

Mobile Home installations made prior to the initial sale of the mobile home are governed by US Department of Housing and Urban Development (HUD) standards. They include the following: A. Do not install in a sleeping room. B. Stove should be grounded, with #8 copper wire and terminated with NED approved grounding device. C. Stove should be attached to mobile home during shipment.

3.0 OPERATION

3.1 Proper Fuel

THIS STOVE IS APPROVED FOR BURNING PELLETIZED WOOD FUEL ONLY! Factory-approved pellets are those $\frac{1}{4}$ " or $\frac{5}{16}$ " in diameter and not over 1" long. Longer or thicker pellets sometimes bridge the auger flight which prevents proper pellet feed. The burning of wood in forms other than pellets is not permitted. It will violate the building codes for which the stove has been approved and may void all warranties. The design incorporates automatic feed of the pellet fuel into the fire at a carefully prescribed rate. Any additional fuel introduced by hand will not increase heat output, but may seriously impair the stove's performance by generating considerable smoke. Do not burn wet pellets. The stove's performance depends heavily on the quality of your pellet fuel. Avoid pellet brands which display these characteristics:

- Excess Fines — "fines" is a term describing crushed pellets or loose material that looks like dust or sand. Pellets can be screened before being placed in hopper to remove most fines.
- Ash content greater than 1%.
- Binders — Some pellets are produced with petroleum distillates or other materials to hold them together, or bind them.

Poor quality pellets will often create smoke and dirty glass. They will create a need for more frequent maintenance. You will have to empty the burn pot and ash pan DAILY plus vacuum the entire system more often. Poor quality pellets could damage the auger. National Steelcrafters of Oregon cannot accept responsibility for damage due to poor quality pellets.

3.2 Pre-Startup Check

Clean firebox of all residue ash by scraping ash into ash pan (see sections 4.1 and 4.2). Lift off burn pot and dump ash into ash pan. Remove ash pan (see section 4.1) and dump ash into metal container with lid. Replace ash pan and burn pot. Clean door glass if necessary (a dry cloth is usually sufficient). Check fuel in hopper and refill if necessary. **NOTE:** Hopper capacity is approximately 50 lbs.

3.3 Building a Fire

NOTE: During the first few fires, your stove will emit an odor as the high temperature paint cures or becomes seasoned to the metal. Maintaining smaller fires will minimize this. Avoid placing items on stove top during this period as paint could be affected.

- Check to make sure power cord from stove is plugged in.
- Fill burn pot by hand to level just below top air holes. Add approved fire starter, light and close door.
- Push damper control rod (located on right side of stove) all the way in.
- Push on/off switch to "on" position. Set fuel control knob to "1".
- When fire is burning well in burn pot, push "auger" button and pull damper rod out about $\frac{1}{4}$ -inch. When forced air flow becomes warm and auger starts feeding pellets, usually in about 10 minutes, set pellet feed knob to desired setting. Readjust damper (see section 3.6) **NOTE:** Auger will not start feeding pellets until firebox temperature reaches preset level.

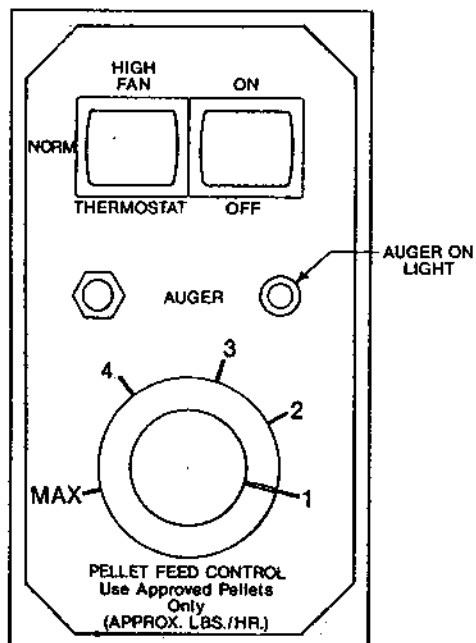


FIGURE 7

3.4 Panel Controls

The blowers and automatic fuel supply (auger) are controlled from a panel on the right side of the stove. The on-off switch turns the blowers on. The "norm/thermostat" switch should remain in the "norm" mode unless an optional remote wall thermostat is installed (see section 3.5). The "auger" button activates the automatic feed system. When the green light is on, there is power to the auger. The auger will not begin feeding pellets until the firebox has warmed up to a preset temperature. In case of a power outage lasting more than several seconds, this button must be pushed to re-engage the auger.

The feed rate settings are shown in approximate lbs. per hour to help you plan your refueling schedule. Please note these rates are only approximate. The "Max" setting feeds approximately 4½ lbs./hour. The convection blower speed varies directly with feed rate. The "High Fan" switch overrides this variable speed function. It will set the convection blower speed to high at any feed rate setting.

3.5 Optional Thermostat

A remote thermostat will help you maintain a more constant house temperature automatically. A low voltage, normally closed thermostat is recommended. When engaged, the stove will automatically switch between two settings. When warm enough, it will switch to "1", which also slows the convection blower. If the house then cools below your thermostat setting it will switch to a feed rate 60% of your knob setting. For example, if stove is set at 4 lbs./hour when you engage the "thermostat" switch (remember — do not engage unless you have a thermostat attached), the stove will burn at 60% of 4 lbs./hour, or 2.4 lbs./hour when the thermostat

calls for more heat. Thermostat should be installed by an Authorized Breckwell dealer.

NOTE: When using the thermostat, it is important to set your damper control rod at approximately ½" out.

3.6 Damper Control

The damper control rod on the stove's right side adjusts the combustion air. This control is necessary due to the varied burn characteristics of individual installations, different pellet brands and pellet feed rates. It allows you to improve the efficiency of your stove. Also, it will reduce the frequency of cleaning your glass door and prevent the rapid buildup of creosote inside your stove and chimney.

You should adjust the rod based on the fire's appearance. A low, reddish, dirty fire can be improved by pulling the damper out slightly. A "blow torch" fire can be improved by pushing the damper in a bit.

As a general rule, on a low feed rate setting, the damper will be in. On higher feed rates, the damper should be more open. Through trial and error, you will find the best settings. Consult your dealer if you need help. **NOTE:** On "1" damper should be out a minimum of ¼".

3.7 Refueling

You can calculate your refueling needs based roughly on the pellet feed rate setting. For example, at the "2" setting, a full hopper will last approximately 25 hours (50 lbs./2 lbs./hour). We recommend, however, that you not let the hopper drop below ¼ full.

3.8 Shut Down Procedure

Turning the Breckwell off is a matter of pressing the control panel switch to off. The blowers will continue to operate until internal firebox temperatures have fallen to a preset level.

3.9 Safety Features

- If there is a power outage longer than one or two seconds, the auger will not operate once power is restored. This prevents pellets being fed to a non-burning burn pot. Pressing the auger button on the control panel will reactivate auger. The blowers will come on when power is restored to evacuate the combustion chamber of gases.
- In case of a malfunctioning convection air blower, a high temperature thermodisk will shut down the auger, preventing the stove from overheating. After stove cools down, pressing auger button will restart auger. **NOTE:** If high temperature thermodisk activates, there is an electrical component failure and it should be checked out immediately.

3.91 Operating Safety Precautions

- DO NOT STORE OR USE FLAMMABLE LIQUIDS,** especially gasoline, in the vicinity of your Breckwell Pellet Stove. Never use gasoline,

gasoline-type lantern fuel, kerosene, charcoal lighter fluid or similar fluids to start or "freshen up" a fire in this heater.

- b. **WARNING: DO NOT OVERFIRE THIS STOVE.** This may cause serious damage to your stove and void your warranty. It also may create a fire hazard in your home. **IF ANY EXTERNAL PART OF THE UNIT BEGINS TO GLOW, YOU ARE OVERFIRING.** Immediately press "off" switch on control panel.
- c. Keep all household combustibles, such as furniture, drapes, toys, etc. three feet, or a considerable distance from the burning stove.
- d. Maintain proper ventilation. It is important that adequate oxygen be supplied to the fire for the combustion process. Modern houses are often so well insulated, it may become necessary to open a window or install an outside air vent to provide sufficient combustion air.
- e. Since heating with a solid fuel fire is potentially hazardous, even with a well made and thoroughly tested stove, it would be wise to install strategically placed smoke detectors and have a fire extinguisher in a convenient location.
- f. Do not open stove door when operating, unless necessary. This will create a dirty, inefficient burn and could allow sparks to escape.
- g. Do not permit operation by young children or those unfamiliar with stove's operation.
- h. Do not add more fuel than the automatic fuel system provides, as this could cause an overfiring condition.
- i. Do not service this appliance without disconnecting power cord.
- j. **If during start up or operation you notice a smoldering fire (burn pot full but no visible flame) AND a heavy smoke build up in firebox, pull plug on unit. Do not open door or tamper with any controls on stove. Wait 15 minutes or until firebox clears, open door, plug unit back in and restart fire. (See section 3.3).**

4.0 MAINTENANCE

4.1 Ash Disposal — (see figure 10)

Remove ashes periodically as they fill the pan. To remove drawer:

- a. Put fire out or set feed rate to "1". **NOTE:** Do not leave fire unattended while ash pan is out.
- b. Use standard (flat blade) screwdriver. Turn screw (under hearth extension) counter clockwise to loosen latch.
- c. Pull out pan. **CAUTION:** It may be hot!
- d. Empty pan. Reverse procedure to replace. Make sure pan seals snugly.

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

4.2 Burn Pot Cleaning

The burn pot must be kept clean for proper operation. Clinkers and excessive ash must be removed when they block the air holes. If the fire's appearance changes or the door becomes dirty, you may need to clean the burn pot.

Stirring the pot will often be sufficient. Other times it will be necessary to lift the pot up off its base and empty it in the ash pan. Scrape it clean and make sure holes are not blocked when emptying burn pot. **NOTE:** The outside holes should face front when replacing pot on its base.

4.3 Firebox Cleaning

Periodically, fly ash must be removed from the exhaust manifold and combustion air chamber. Cleaning frequency depends on usage and fuel quality. Inspect the system monthly until you are familiar with ash and creosote accumulation with your operating patterns.

- a. Extinguish fire and let stove cool.
- b. Use $\frac{3}{8}$ " wrench. Remove bolts A & B (figure 8). Pull out manifold.
- c. Vacuum fly ash from all surfaces. Remove ash pan and burn pot too. Vacuum inside of pipe on which burn pot sets (open slide damper).
- d. Reverse procedure to replace manifold. Do not overtighten bolts.

Gasket around door and door glass should be inspected and repaired or replaced when necessary (see section 6.0).

4.4 Blowers

- a. **Cleaning —** Over a period of time, ashes or dust may collect on the blades of both the combustion blower and convection blower. Periodically the blowers should be vacuumed clean as these ashes can impede performance. Creosote can also accumulate in the combustion blower. Both blowers should be removed once per year and brushed clean. The combustion blower is accessed through the service access door on the stove's left side. While convection blower is out, it can be oiled. The convection (forced air) blower is accessed from the pedestal rear. **NOTE:** Be

careful when cleaning not to dislodge balancing clip on convection blower, or bend fan blades. Some stove owners lightly spray an anti-creosote chemical on the fire to help reduce creosote formation within the stove.

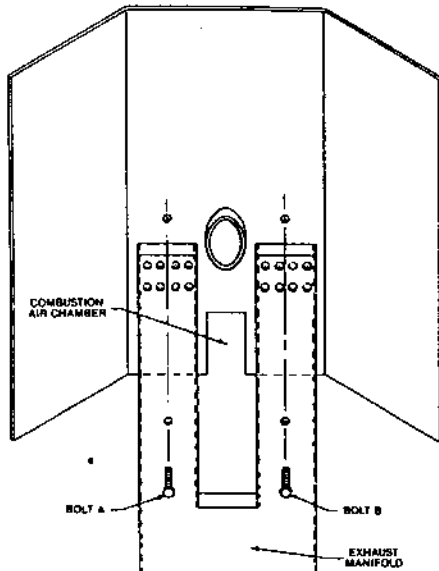


FIGURE 8

b. **Oiling** — Blower manufacturers suggest oiling annually. See figure 9 for lubrication points. Use SAE 20W oil. **NOTE:** The convection (forced air) blower should *not* be oiled.

4.5 Chimney Cleaning

a. **Creosote Formation** — 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 newly started fire or from a slowly burning fire.

As a result, creosote residue accumulates on the flue lining. When ignited this creosote makes an extremely hot fire which may damage the chimney or even destroy the house.

Despite their high efficiency, pellet stoves often accumulate creosote under normal conditions.

b. **Fly Ash** — This accumulates in the horizontal portion of an exhaust run. Though non-combustible, it may impede the normal exhaust function. It should therefore be periodically removed.

c. **Inspection and Removal** — The chimney connector and chimney should be inspected at least monthly during the heating season to determine if a creosote or fly ash buildup has occurred.

If creosote has accumulated, it should be removed to reduce the risk of a chimney fire. Inspect the system at the cleanout tee or stove connection, and at the chimney top. Cooler surfaces tend to build creosote deposits quicker, so it is important to check the chimney from the top as well as from the bottom.

The creosote should be removed with a brush specifically designed for the type of chimney in use. A chimney sweep can perform this service. It is also recommended that before each heating season the entire system be professionally inspected, cleaned, and repaired if necessary.

5.0 TROUBLE-SHOOTING GUIDE

When your stove acts out of the ordinary, the first reaction is to call for help. This guide may save time and money by enabling you to solve simple problems yourself. Problems can be due to only four factors: 1) poor fuel; 2) poor operation or maintenance; 3) poor installation; 4) component failure. You can usually solve those related to 1 and 2. Your dealer can solve those in 3 and 4. Refer to figures 9, 10 and 11 to help locate indicated parts. **REMINDER: Pull plug before servicing, unless otherwise instructed.**

5.1 Fuel Will Not Feed

1. Check hopper. Stir pellets. Unlike liquids, pellets do not drain evenly into the auger. Bridging can occur or pellets can hang up on a hopper slope. If stove runs out of fuel, pellets will not feed once hopper is reloaded until auger fills with pellets. This takes several full turns of the auger.
2. Push "auger" button.
3. Check for auger jam. You can hear auger motor work at least every 15 seconds. If motor is working and auger is not, contact your dealer.
4. If auger motor is not working, and there is power

to the system (green light is on) high temp or auger thermodisk may be stuck in wrong position. Check for electrical continuity and tap thermodisk lightly. If problem persists, call dealer.

5. High Temperature Safety Shutdown. When too hot, a switch in the stove turns off the auger. Allow stove to cool. Green light should automatically relight.

5.2 Fire Goes Out

(assuming auger is feeding and there is ample fuel in hopper and burnpot)

1. Check for blockage in combustion air inlet, burnpot and exhaust.
2. Restart fire, adjust feed rate upwards. Large pellets, near or above the recommended size, feed more slowly. A fire sometimes CANNOT be maintained on "1" or thermostat setting. When the fire goes out, a thermodisk shuts off the auger when the unit cools. If this problem recurs, either change to ¼" pellet fuel or use only manual setting and do not set feed rate below 1½ lbs./hr.
3. Check to see if combustion blower is operating.

5.3 Smokey Fire

(reddish flame, soot deposits on door glass)

1. Check door, ash pan door and door glass gasket. Door should be tightly sealed. Replace gasket if necessary.
2. Check that burnpot is installed properly and holes are not plugged.
3. Check for blockage in combustion air inlet and exhaust.
4. Check quality of fuel (see section 3.1).
5. Adjust slide damper (see section 3.6).

5.4 Pellet Feed Rate Varies From Setting

1. Check "thermostat" setting. On "thermostat" stove will operate at 60% of selected burn rate.
2. Feed rate settings are approximate. You can expect minor variations.
3. Different size pellets feed at different rates amplifying variation.
4. Potentiometer (feed rate knob) problem. Contact dealer.

5.5 No Power

1. Check power supply to stove.

5.6 Blower Will Not Operate Properly

1. Check power supply to stove.

2. High Temp Shutdown (convection blower only). When blower overheats, either due to internal or external conditions, a switch shuts it off. Allow it to cool. Blower should start again automatically.
3. Clean and/or oil blowers
4. When "on" switch is pushed at start-up, convection fan turns on low. Pushing "auger" button sets this blower at proper speed.
5. Faulty blower thermodisk. Check for electrical continuity and tap lightly. If problem persists, contact dealer.
6. Faulty "on/off" switch. Check for electrical continuity. Contact dealer.

5.7 Noisy Operation

1. Identify source of noise (i.e. which motor).
2. Check tension of blower mounting screws if vibrating noise.
3. Check for dirty or unbalanced impeller wheel on blowers if clanging noise.
4. Oil blowers with SAE 20W oil.
5. Readjust convection blower speed (pellet feed control knob) if harmonic vibration.

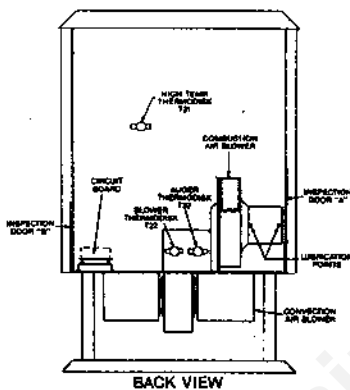


FIGURE 9

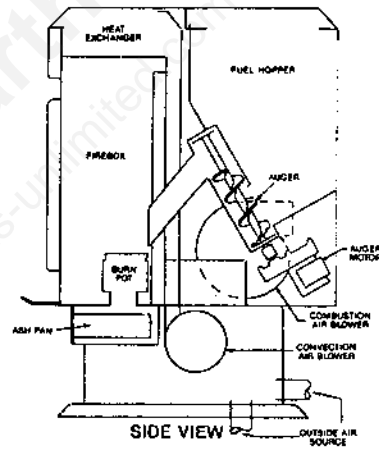


FIGURE 10

6.0 REPLACEMENT PARTS

- Damper Handle
- Door Handle
- Door Glass
- Window Clips
- Door Gasket (four feet)
- Window Gasket (four feet)
- Circuit Board & Speed Control
- Burn Pot
- Furnace Cement (2-oz.)
- Auger Gear Motor
- High Temp Thermodisk (T21)
- Auger/Blower Thermodisk (T22)
- Convection Blower (for circulating room air)
- Combustion Blower (air to the burnpot)
- Remote Thermostat (optional)

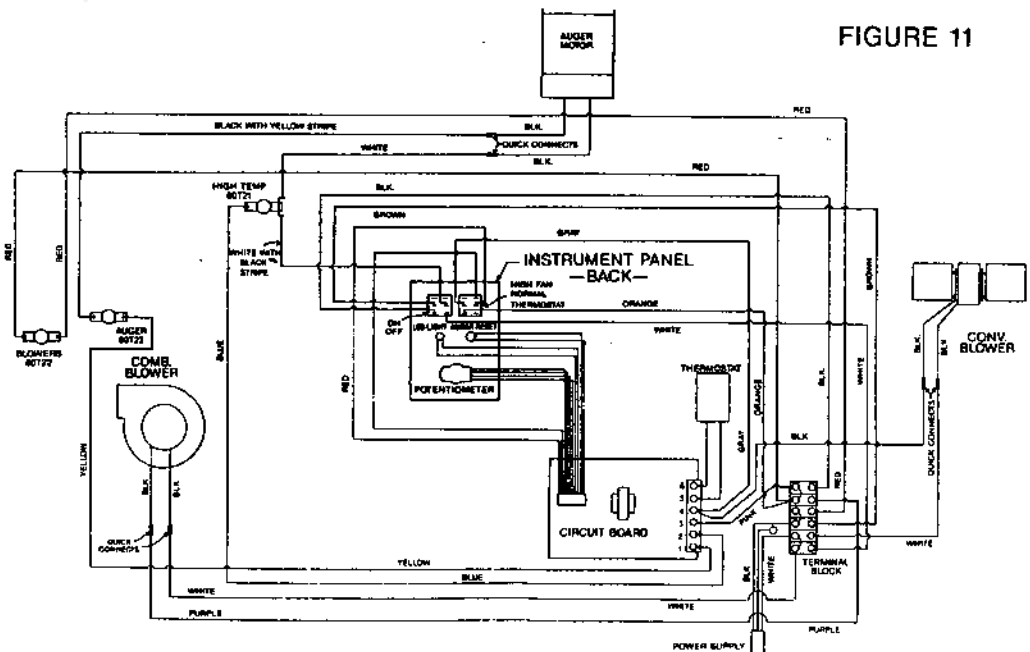


FIGURE 11