Wood &

Coal Burning Boilers

OWNERS MANUAL

Jensen
Since 1922

MASTERCRAFT METAL
A DIVISION OF JENSEN METAL
7800 NORTHWESTERN AVENUE
RACINE WI 53406

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JENSEN BOILER INSTALLATION INSTRUCTIONS

ADDENDUM

Please see attached instructions that describe the installation procedures for independent or combined operations including complete electrical and piping diagrams. Note the following additions to the installation instructions as they appear in the Jensen Boiler Owners Manual.

Page 1
Do not burn garbage, gasoline, naphtha or gasoline.

Page 5
It is recommended that solid fuel be stored with the same rules that are defined in "Clearance to Combustibles" chart on Page 5 of your owners manual.

Page 5
If a factory-built chimney is to be used, It is a requirement that it be listed to UL 103 "HT".

Page 8
Your new Jensen Boiler must be installed without interfering with the normal delivery of heated water from the original boiler to the radiation system.

Page 9
All zone valves must be "NORMALLY OPEN" valves. If your Jensen Boiler is to installed in combination with an existing boiler all valves must be changed to "NORMALLY OPEN" valves.

Page 10
Your new Jensen boiler must installed so that the hot-water circulation loop will dissipate at least 10% of the estimated heat output of the solid fueled boiler in the event that circulation is reduced because of an electrical power failure.

Page 16
Your new Jensen Boiler must be installed without changing the function of the controls or rewiring of the original boiler. A wiring connection is permitted. The electrical system of both boilers shall be powered from a single branch without exception.

Page 20
Your new Jensen Boiler must be installed to operate as intended without effecting the operation of the electrical and mechanical safety controls of the original boiler.

Page 20
With the combustion fan "off", for whatever reason, do not fire the boiler with the doors open.

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Page 20
Where particulate fuel is used, exhaust fans must not create negative pressures in the room where the solid-fuel-burning boiler is located.

Note: Your new Jensen Boiler is designed to use anthracite coal.

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Welcome

Welcome to the world of solid fuel burning! Your new Jensen Boiler has been designed and built with a high grade of materials and the strictest regard to quality. This combined with our 60 years of experience in the fabrication of products for industrial and residential use, assures you of the right decision in choosing a Jensen unit.

Before you start installing your new boiler, take the time to read these installation and operating instructions. We have prepared them for your benefit to save time and provide some helpful knowledge on wood and coal burning.

Save these instructions for future use. It won't take long for you to realize the benefit of solid fuel heating, however, maintenance is the key to a long lasting relationship with your new Jensen. These instructions can help you now as well as in the future.

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General Rules

Rules for the Safe Installation and Operation of your Boiler

Check local codes, the installation must comply with them.

The boiler must be installed with strict conformance in regard to clearances. (See Page 4).

The boiler must be installed on a noncombustible base. (See Page 5).

Connect the boiler to tile lined inside masonry chimney or approved insulated all fuel prefabricated chimney only.

Keep smoke pipe connection as short as possible using a minimum 24 gauge pipe with a minimum ¼ " per foot rise from the flue collar to the chimney opening. (See Page 6).

Be sure there is a sufficient supply of combustion air to the area where the boiler is to be located. (See Page 7).

Do not over draft the boiler! It is designed to operate at .04 to .06 inches of water column and must be set with a draft gauge to maintain a steady draft.

Do not use flammable liquids for starting a fire.

Do not store fuel or combustibles near the boiler. Some areas of the boiler are hot and could cause an explosion and possible bodily or property damage.

Store all ashes in a metal container with a tight sealing lid, and allow ashes to cool before disposing of them. (See Page 20).

Familiarize yourself with the boiler's wood or coal burning characteristics before leaving unit unattended for long periods of time.

The loading door and ash door must be tightly closed during boiler operation to insure safety and efficiency.

The boiler has hot surfaces. Keep children away.

IN THE EVENT OF A CHIMNEY FIRE, CALL THE FIRE DEPARTMENT, THEN BE SURE THE BOILER DOORS ARE CLOSED TIGHTLY AND ELECTRICAL POWER TO THE UNIT IS TURNED OFF.

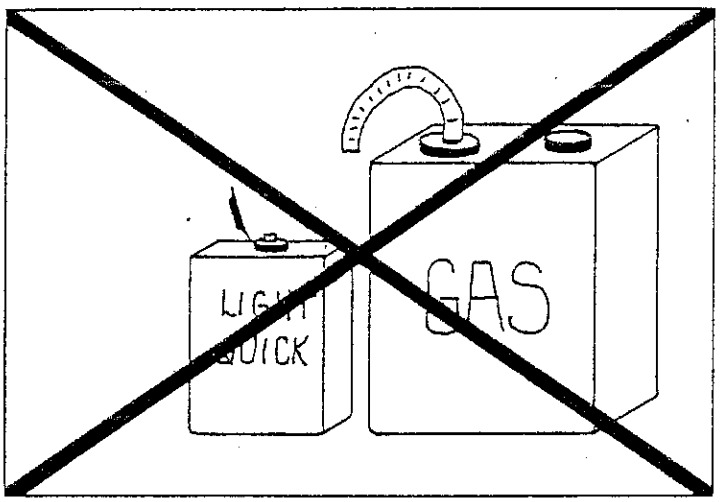
The boiler is designed to burn air dried wood and coal at a predetermined firing rate. Over firing could result in damage to the heat exchanger and cause dangerous operation.

Follow a regular service and maintenance schedule of the boiler and chimney for efficient and safe operation. (See Page 17).

Do not leave ash door open when the fire is burning.

Do not let ashes build up closer than 2" to the grate.

With new steel, there is a small amount of oil or dirt on the metal. You may smell an odor. This is normal during the first operation.



THIS BOILER MUST BE INSTALLED BY A QUALIFIED INSTALLER.

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How . . .

How Your New Jensen Boiler Works

Unlike conventional heating, (gas, oil, electric) wood or coal heating requires more user attention. Your Jensen boiler, with its automatic combustion air blower, alleviates the constant need for adjusting the burning rate common to other units on the market. The fire, however, must be started and subsequent fuel added by the user.

Conventional heating systems produce heat only when the thermostat calls for heat. This way of heating is inefficient and often leaves part of the home either too hot or too cold. Your Jensen Boiler is designed to deliver heat as long as there is a fire in it. The fire intensity is regulated by the room thermostat, high or low, the fire continues to produce heat. This heat is distributed throughout the home by a circulator pump. This constant supply of heat is uniform and prevents drafts.

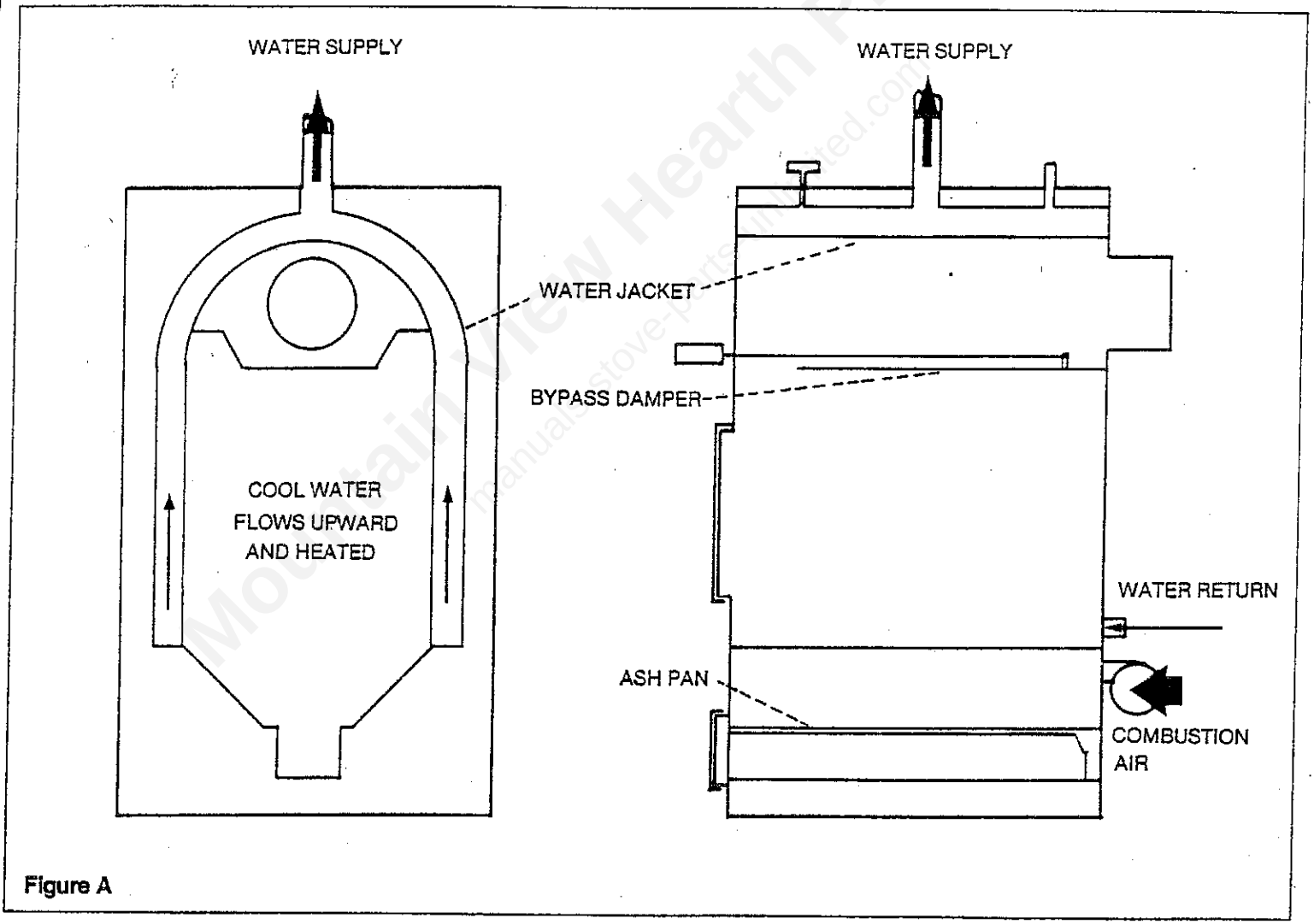

Figure A

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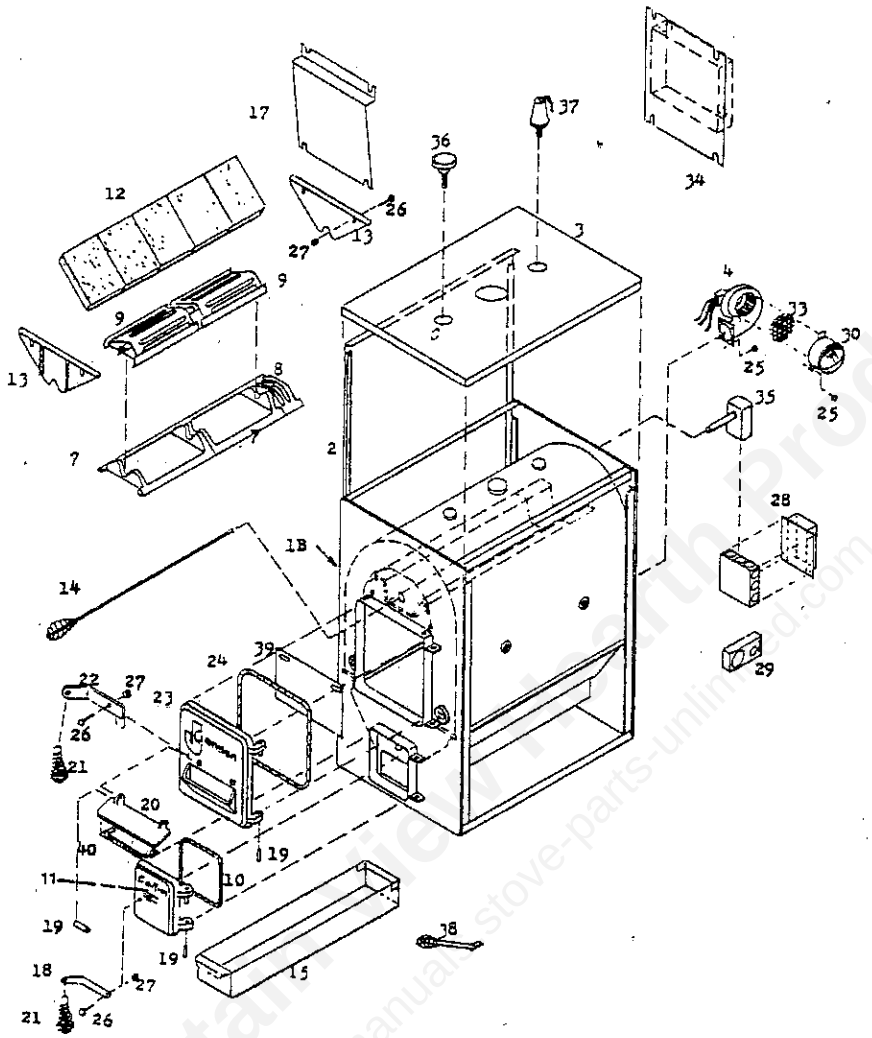
Parts



JMP PART #	DESCRIPTION	QT		JMP PART #	DESCRIPTION	QT
1000B	Boiler Weldment	1	20.	3002	Pressure Release Flap	1
1031/1032	Shroud Side	2	21.	3423	Spring Handle	2
1033/1034	Shroud Top	1	22.	2030	Feed Door Handle	1
3301	Draft Blower	1	23.	3001	Feed Door	1
3004	Grate Frame	2	24.	1083	Fiberglass Seal (Feed Door)	1
3006	Rear Grate (30" only)	1	25.	3405	#10-24 × 3/8 Self Tapping Screws	18
3055A	Shaker Grate	2	26.	3402	5/16-18 x 1-3/4 Hex Head Bolts	6
1084	Fiberglass Seal (Ash Door)	1	27.	3064	5/16-18 Hex Head Nuts	6
3007	Ash Door	1	28.	3322	Relay Control	1
3327 (5)	Firebrick — 30"	10	29.	3321	Thermostat	1
3327 (4)	Firebrick — 24"	8	* 30.	3330	Barometric Damper	1
3003	Lower Baffle	2	33.	1063	Draft Screen Protector	1
2011	Damper Rod	1	34.	2032	Domestic Hot Water Tank (optional)	1
2028/2029	Ash Drawer	1	35.	3024	Water Temperature Control	1
1052	Heat Plate	1	36.	3061	Temperature and Pressure Gauge	1
1043	Ash Door Handle	1	37.	3060	Pressure Relief Vaive	1
3408	Spring Pin 1/4 x 1-1/4"	6	38.	2062	Shaker Handle	1
			* 39.	1050	Smoke Flap	1
			40.	1161	Fiberglass Seal	1

* Discontinued items

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Installation

Boiler Location

Before You Start!

It is very important you check with your dealer, local fire department or building inspector. They will be able to inform you of any state or local codes pertaining to the location and installation of your boiler.

The ideal location for your Jensen is centrally located in the basement. This allows for an even heat distribution by having all the piping approximately the same length.

If your home does not have a basement, but a utility room, make sure there is enough space to maintain the required clearances as stated on the label on the boiler. Also, read about combustion air on Page 7 .

Chimney location is also critical. The boiler must be placed as close as possible to the chimney. You want the chimney connector (smoke pipe) to have two elbows or less. Also the chimney connector should be held to a minimum distance. Six (6) feet or less is ideal.

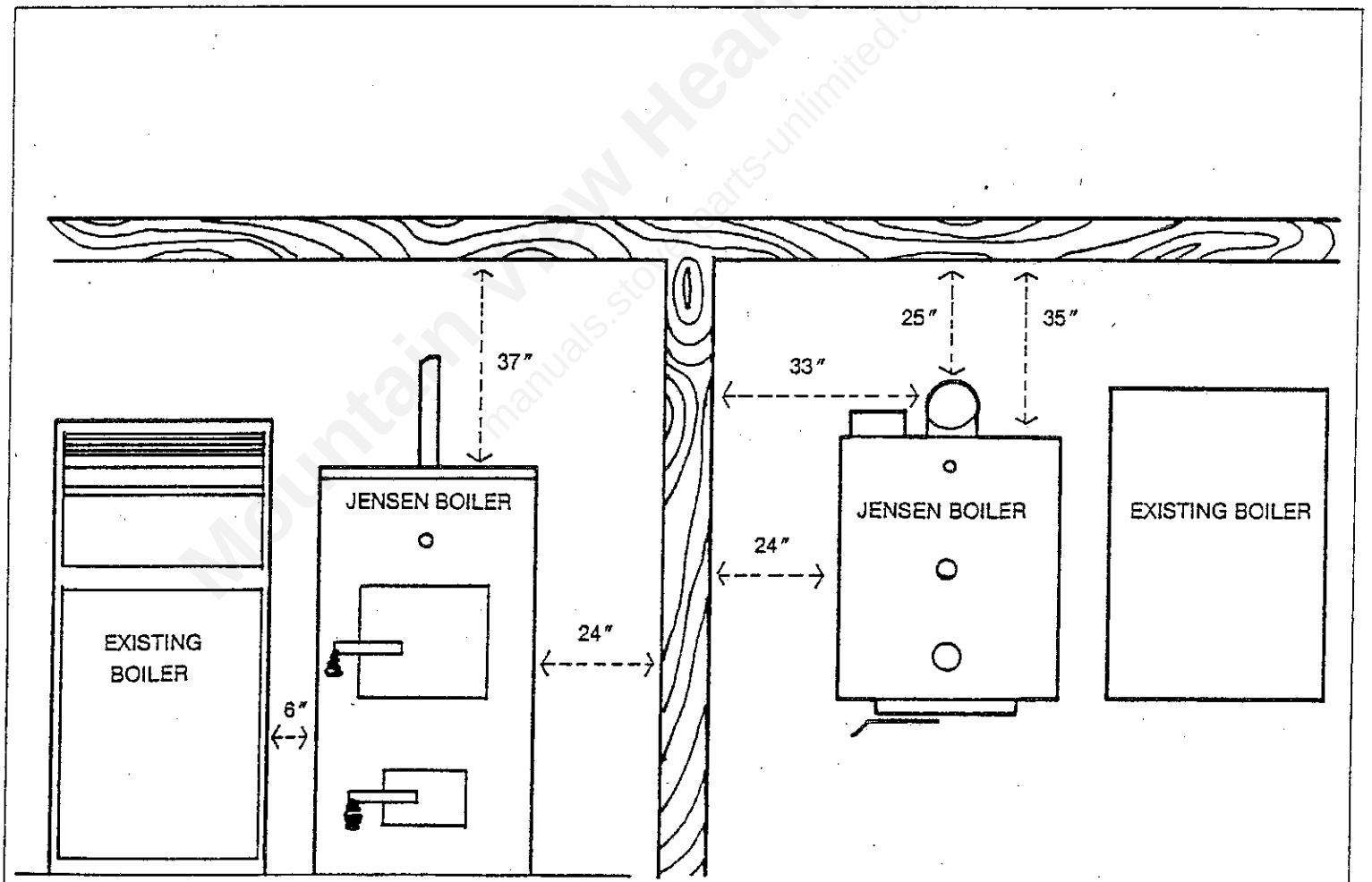

Figure B

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Clearances to Combustible Material

Your Jensen has been tested to determine the SAFE clearances to combustible material. The clearances are printed on the label located on the back of the boiler. The chart below also states these minimum clearances. Make sure you follow these when choosing your boiler location.

Clearance to Combustibles	
Boiler to back wall	35″
Boiler to side wall	24″
Pipe to back wall	25″
Pipe to side wall	33″
Boiler to ceiling	37″

Chimney Installation

With the chimney being the most important part to your installation, great care should be given to its design.

CAUTION
Only a "Class A", all-fuel chimney intended for use with solid fuel should be used.

"Class A" chimneys are those made from tile-lined masonry (brick or block) or an independent laboratory approved metal all-fuel factory built chimney.

Masonry Chimneys

If your intention is to use an existing masonry chimney, check first with your local building official to see if this is acceptable. Then have the chimney inspected by a qualified person to make sure it is suitable for your purpose.

An older chimney, in need of repair, is the GREATEST fire hazard in any installation.

Factory-Built or Metal Chimneys

If your home has an existing metal chimney, the same rules apply as with masonry chimneys. One thing to be especially aware of is that "Class B" chimneys are for gas appliances only, not solid fuel burners. If purchasing a new package, consult with the dealer. He will provide the necessary parts and instructions for installation.

Installing a New Chimney

When installing a new chimney, whether it be masonry or metal, if possible, it is recommended that it be placed within the house structure. These chimneys remain warmer and, in turn, radiate this warmth into the house. A chimney located outside the house is exposed to cold temperatures, which encourages creosote build-up and poor chimney draft.

What Size Chimney Should be Used?

The chimney size to use is either six (6) or seven (7) inch round or an 8 x 8 square. If you use a rectangular chimney, the minimum area it may be is 39 square inches.

Check Figure C for some additional chimney requirements.

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ove Pipe Installation

ie stove pipe you should use is six (6) inch 24 gauge heavier steel.

hen installing the stove pipe, make sure all joints e secured with at least three (3) sheet metal screws. iis includes the connection to the flue collar of the oiler. For added protection, use some high mperature furnace cement to seal each joint.

ie stove pipe should slope upward to the chimney at rate of 1/4 inch per foot. Any horizontal runs of stove pe should not exceed six (6) feet and it should be ipported every four (4) feet.

onnecting Stove Pipe to a Masonry Chimney

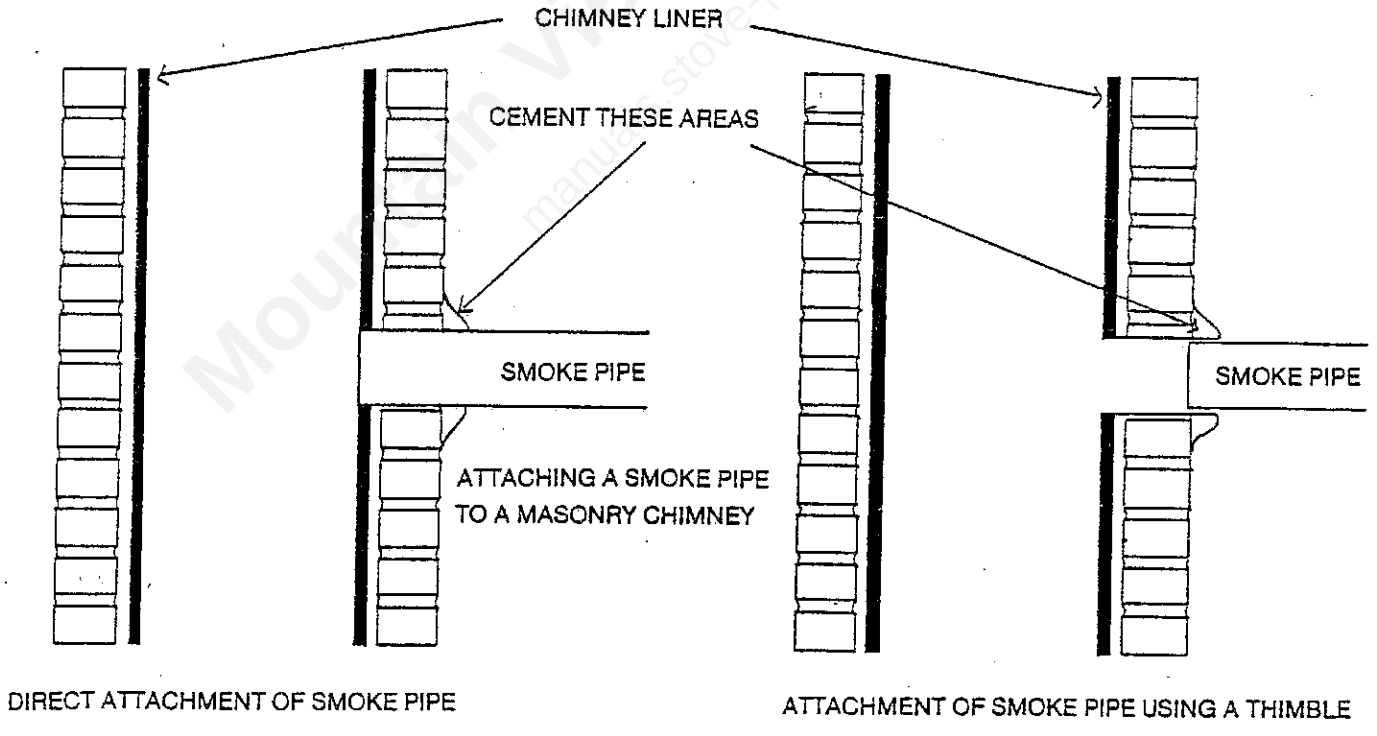
hen connecting stove pipe to a masonry chimney, ere are two ways to go:

1. The smoke pipe itself can be cemented into the chimney or,
2. a thimble can be used which is cemented into the chimney and the smoke pipe fits into the thimble.

In each case, care must be taken. The outer masonry (brick or block) must be chipped away and the inner liner must be pierced. The smoke pipe or thimble is then inserted flush to the inside face of the tile liner. NOT ANY FURTHER!

Use furnace cement or mortar to seal this connection. See Figure C . When connecting the stove pipe, make sure the attachment is secure enough so down drafts or "puffs" do not dislodge it.

Figure C



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Connecting Stove Pipe to a Metal Chimney

When using a metal chimney, part of the installation package should include a stove pipe connector. Follow the instructions provided with the chimney and its parts.

Chimney Draft Regulators

Barometric Dampers

These devices are used to help maintain adequate chimney draft automatically. They should be installed according to their instructions and set at .04 to .06 inches of water column. When burning coal, a barometric damper is a necessity, not an option.

Manual Dampers

These are used to control chimney draft manually and should be installed in a convenient place between boiler and chimney. In the event of a chimney fire, it should be closed reducing air to the chimney fire.

A combination of both barometric damper and manual damper may be used. If this is the case, install the manual damper between the barometric damper and chimney.

Ventilation For Your Boiler

There are many appliances which require "make up" air to operate.

However, with a combustion air draft fan, "make up" air is not necessary with the Jensen Boiler.

If your home is sealed exceptionally well, use a 3" or 4" diameter duct vented to the outside and terminating in the vicinity of the combustion air draft fan.

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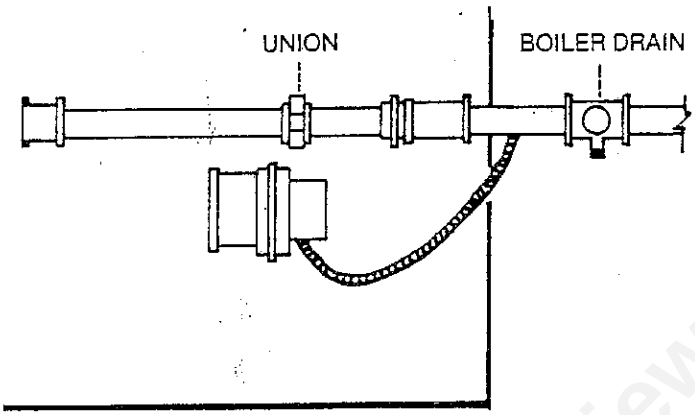
Piping Installation

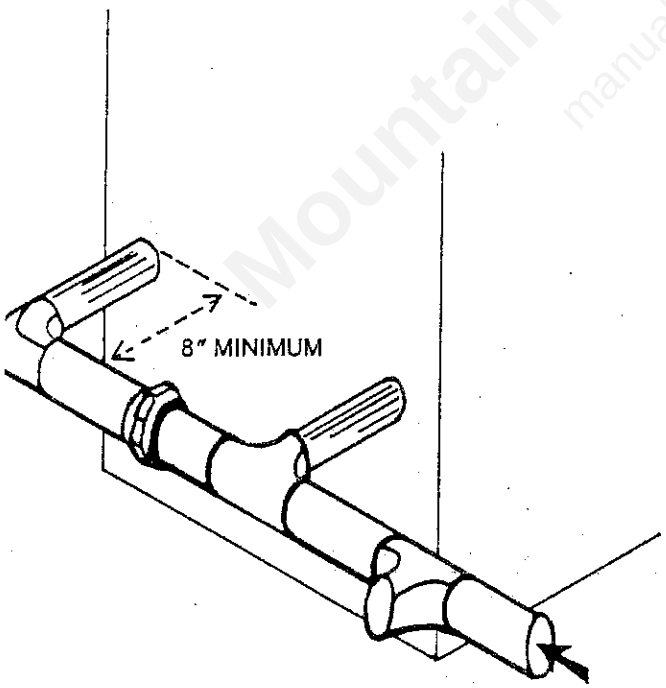
ɔing Installation

Important Connection Suggestions

ere are many alternative methods of connecting ur Jensen Boiler to your existing system. Consult ur professional installer to examine your present it and decide on the best type of safe installation · your needs.



BOILER RETURN PIPING



B. Return Piping

Refer to Return Piping Diagram on this page. When installing return piping, be sure to include boiler drain valve at lowest point in return piping.

It is important that the piping must be at least eight (8) inches from the back of the unit as shown before connecting pipe across back of boiler. This allows for the attachment of the optional water tank without modifying the piping.

C. Piping Systems

You are now ready to pipe your boiler into your existing heating system using one of the typical pipe schematics shown in this manual or your qualified installer's recommendations.

NOTE: Present air purger and expansion tank may not now be of adequate size because of the increased volume of the heating system. Check with your installing contractor.

a. Series System: See Figure D on Page 9 .

Series systems are the most economical to install because the circulating pump on the conventional oil or gas boiler is used for both units.

b. Parallel System: See Figure E on Page 9 .

Parallel systems have a higher installation cost because two (2) circulating pumps are required and additional check valves and flow regulating valves may be required. However, because of the isolation of the two systems, greater operating efficiencies result.

c. Independent System: See Figure F on Page 10.

Your Jensen Boiler may be used as a sole heating source. This system is economical, simple and provides more backup heat when your main unit is not being used. When installing the Jensen Boiler as an independent system, air purging and system expansion must be considered. Consult with your installing contractor.

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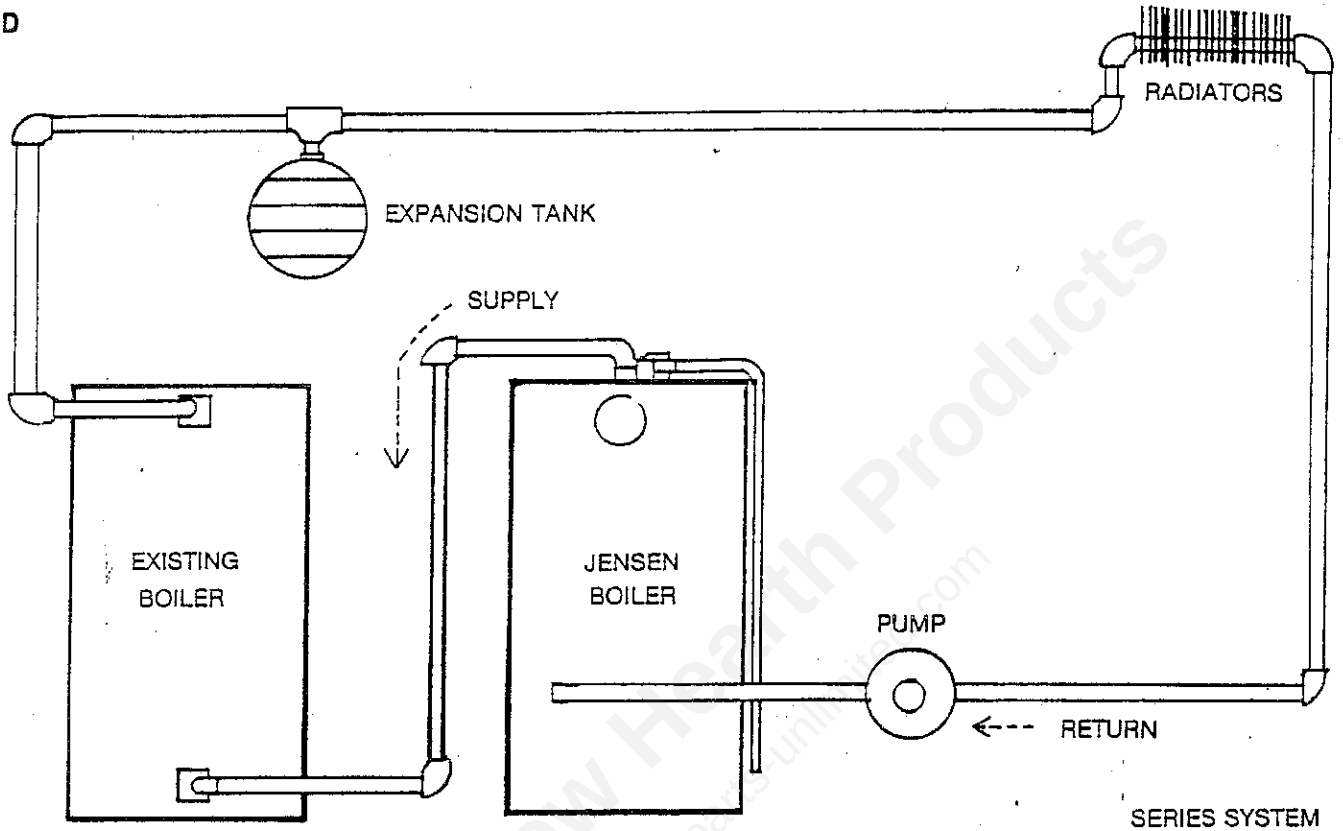
Figure D



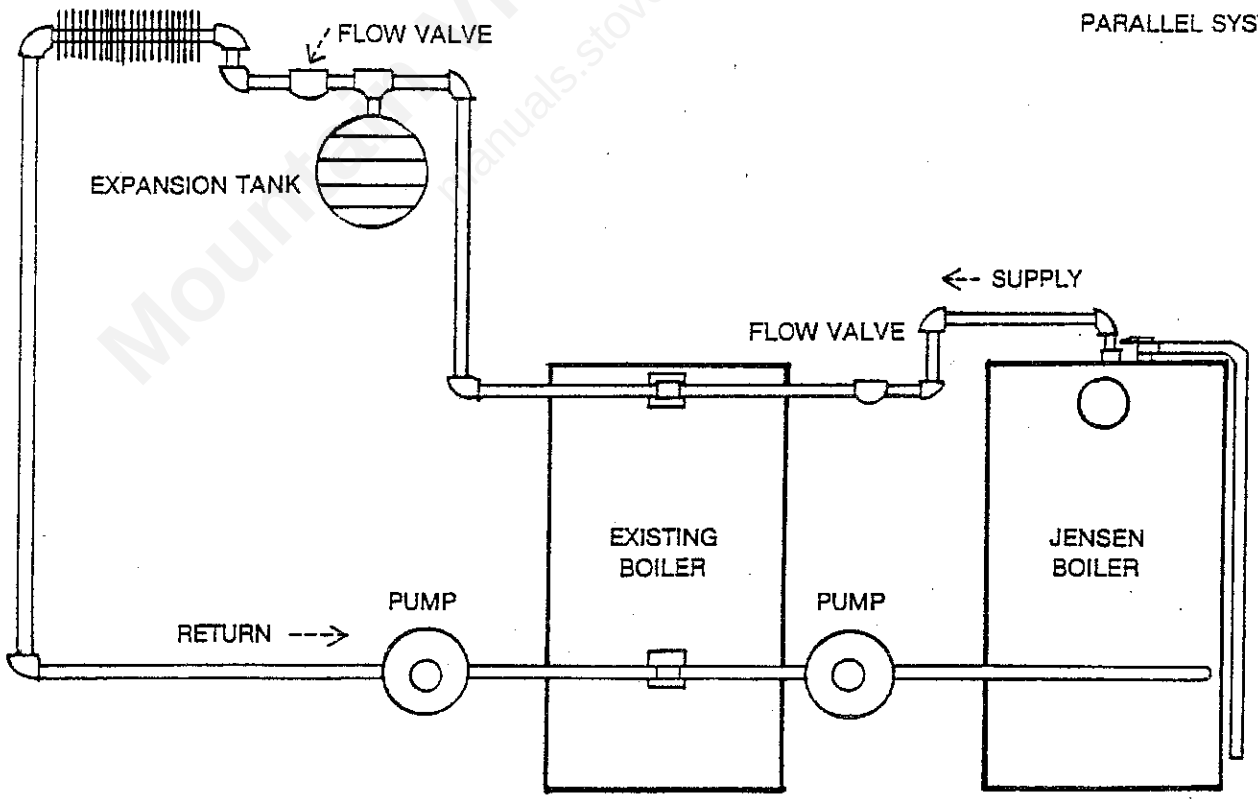


Figure E

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Assembly

Assembly

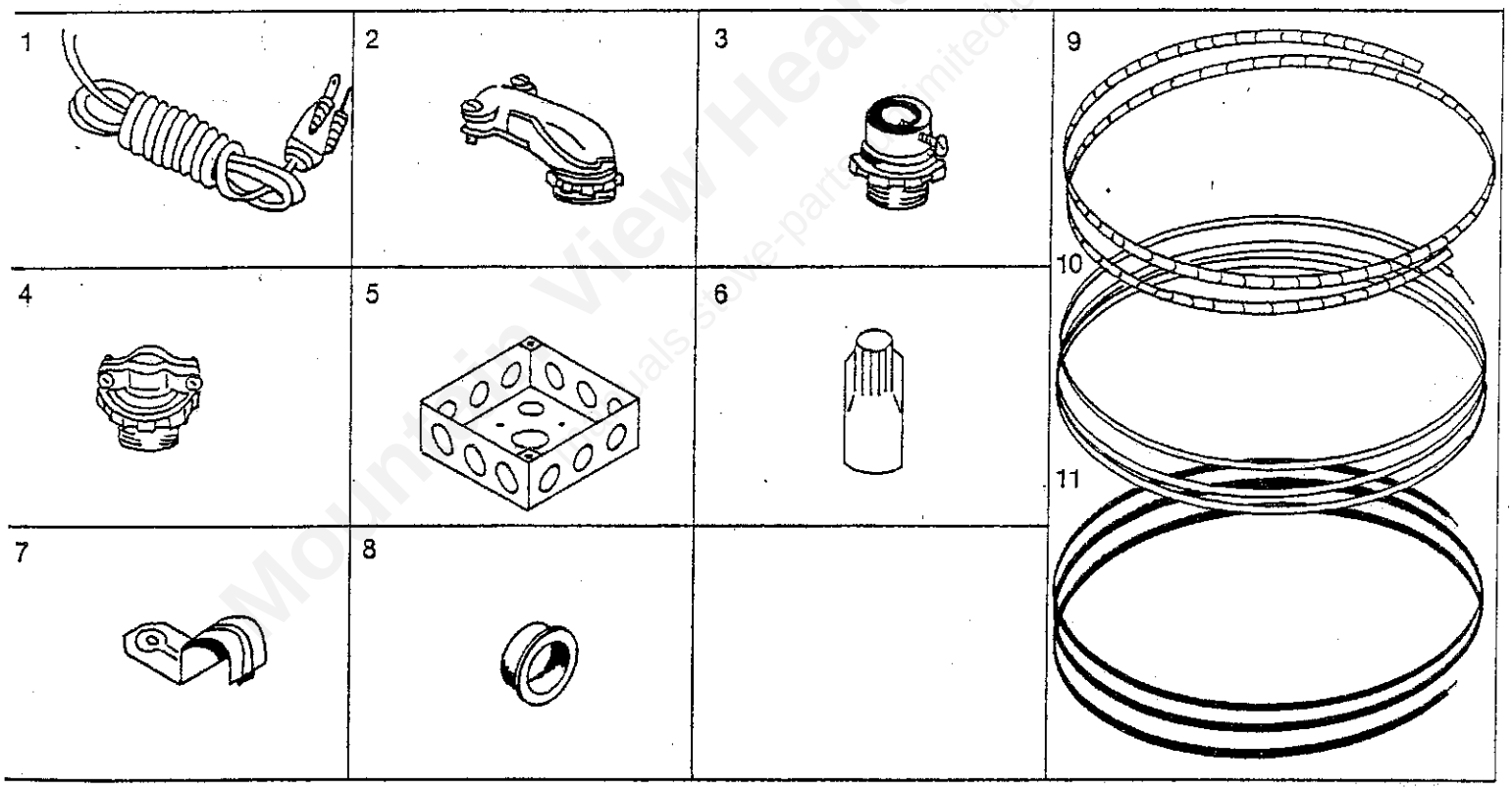
Your Jensen Boiler is shipped from the factory in two (2) packages. (1) The boiler with the smaller parts packaged inside, and, (2) the shrouding. Before assembling the boiler, check to make sure there is no shipping damage and that the necessary parts are included. Use the illustration and parts list on Page 3 as a guide.

If you find shipping damage or any of the parts missing, contact the dealer immediately. He will take the necessary steps to correct the problem.

To assemble the boiler, you will need to purchase the prewired components from your dealer.

THE PREWIRED COMPONENTS PACKAGE CONTAINS:

1	Power cord 14 gauge with ground prong	Varies
2	90° conduit connector	1
3	Straight conduit connector	1
4	Romex connector	1
5	4 x 4 electrical box	1
6	Wire nuts	7
7	Conduit hold down	1
8	Conduit bushing	2
9	3/8 flexible conduit	4 ft.
10	14 gauge solid copper wire (white)	4 ft.
11	14 gauge solid copper wire (black)	4 ft.



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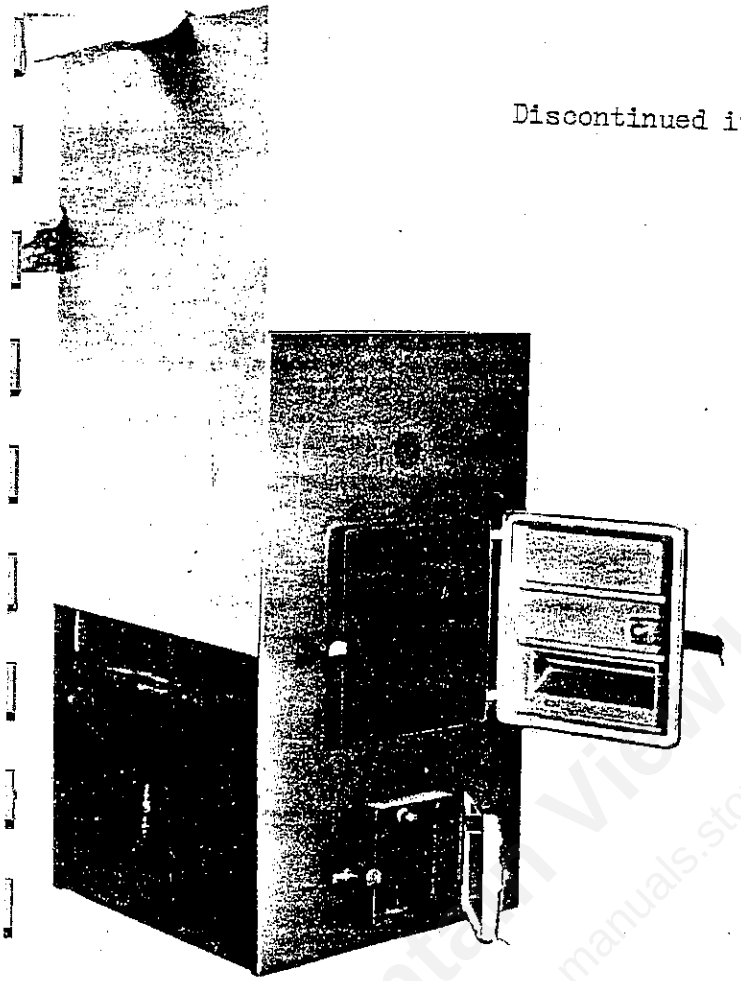

1. Slip the side shrouds into place from the top down. When properly installed, the electrical knockouts will be at the top of the unit.

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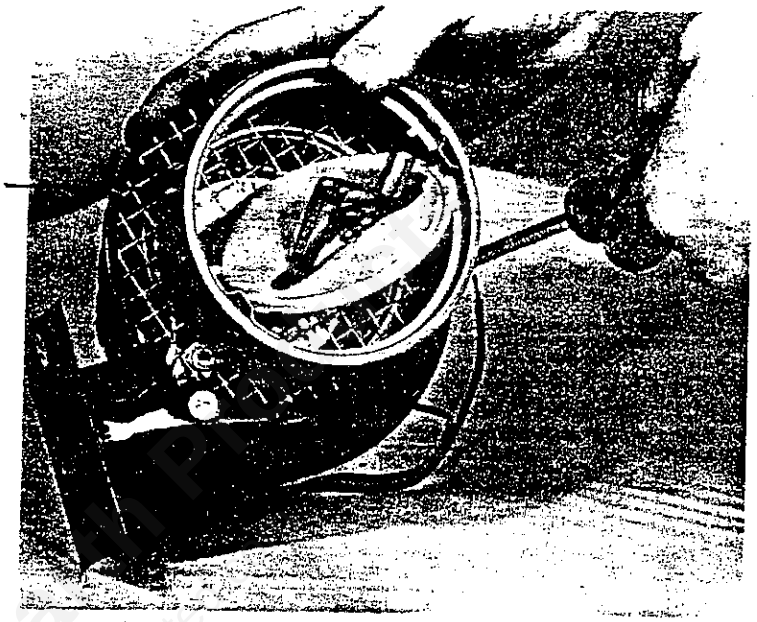
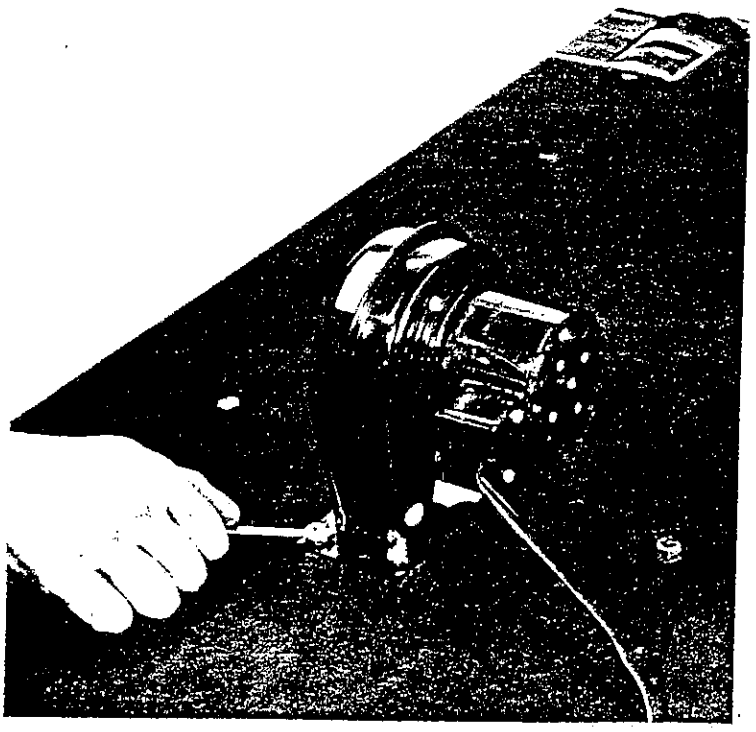


2. Assemble the draft blower as shown.

3. Attach the draft blower to the back of the boiler, making sure the electrical box on the blower is facing the bottom of the unit.



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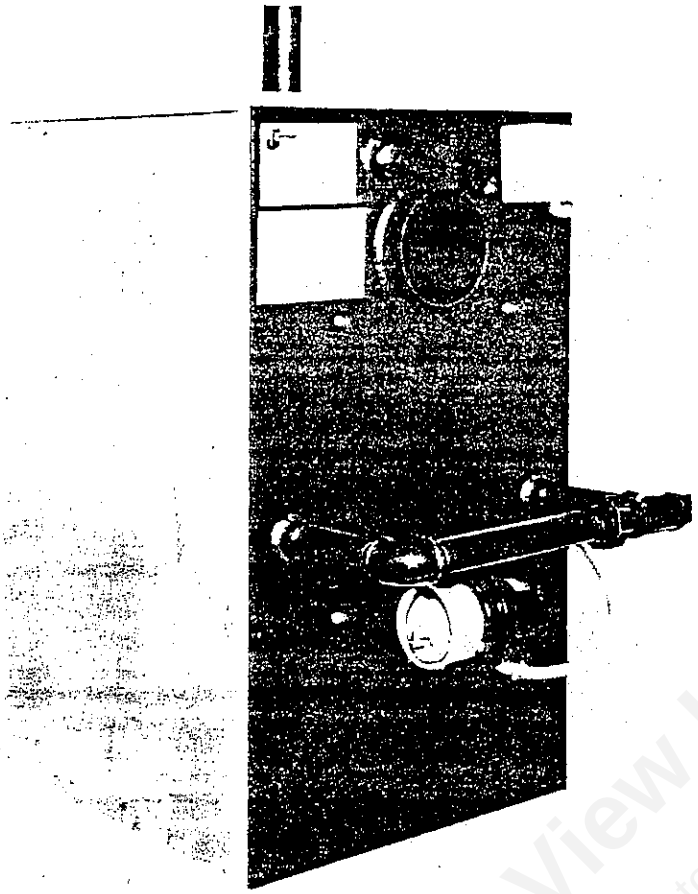
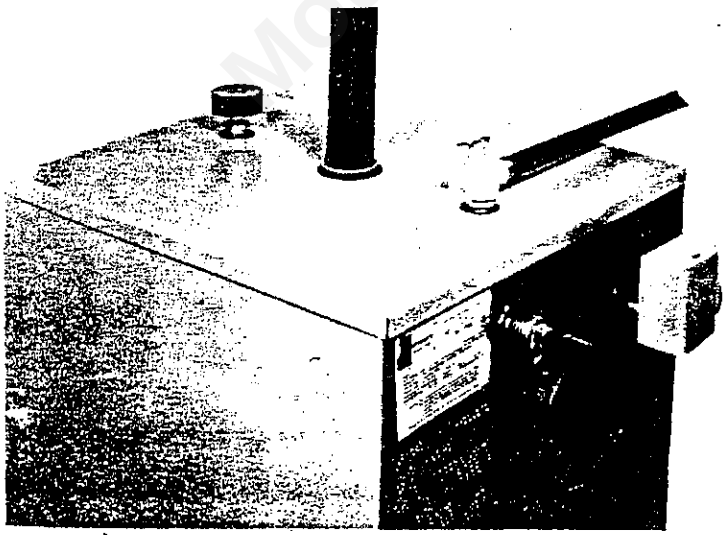
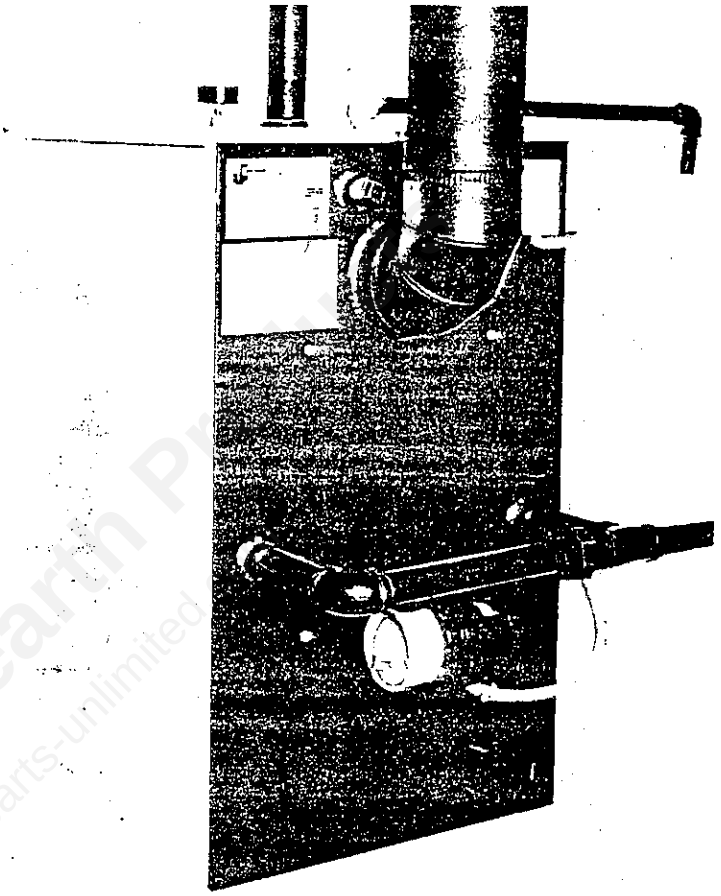


4. Install the water temperature control on the rear of the unit as shown.

5. The safety relief valve and temperature gauge must be installed in the top of the unit as shown.





6. Next, wire the boiler using the wiring diagram shown on Page 16 .

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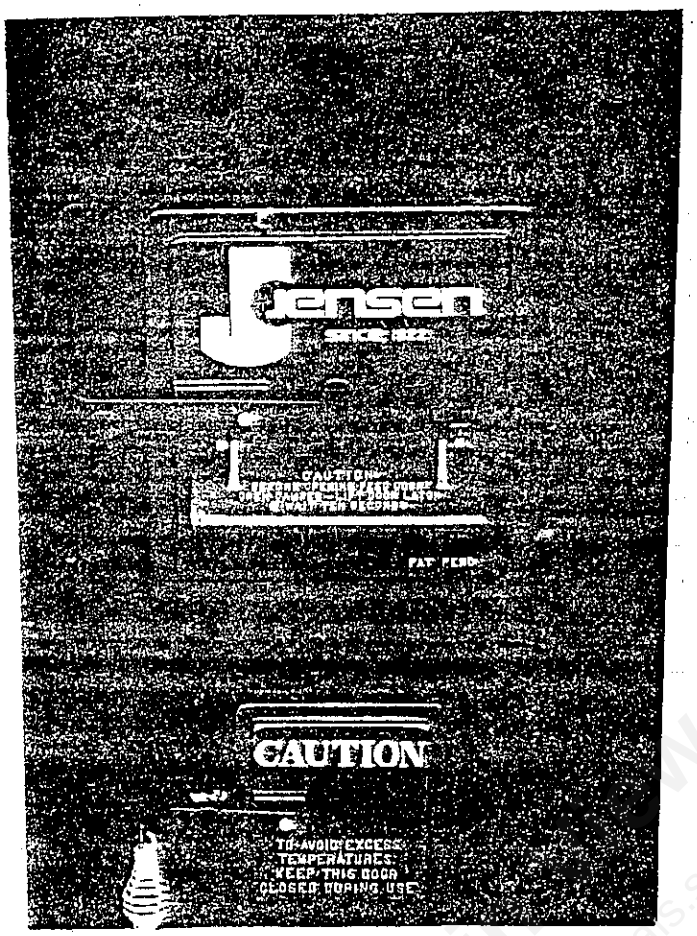
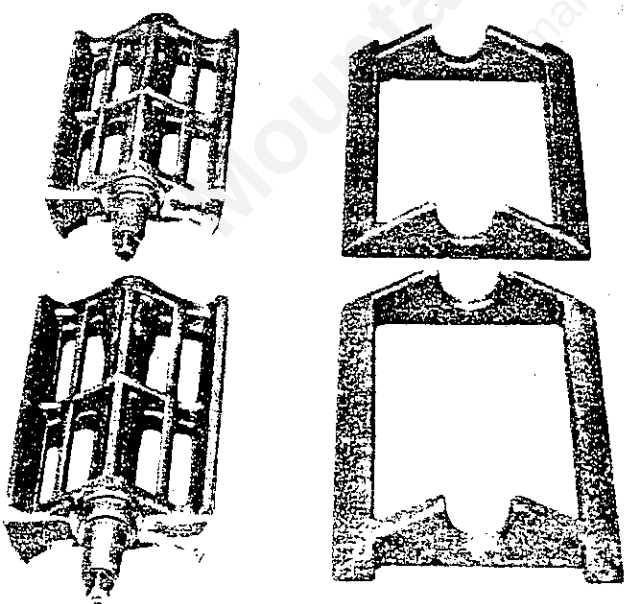
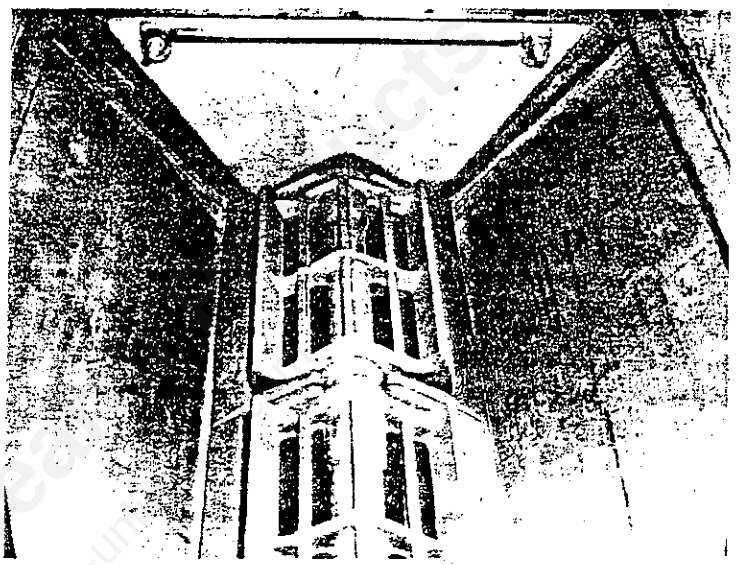


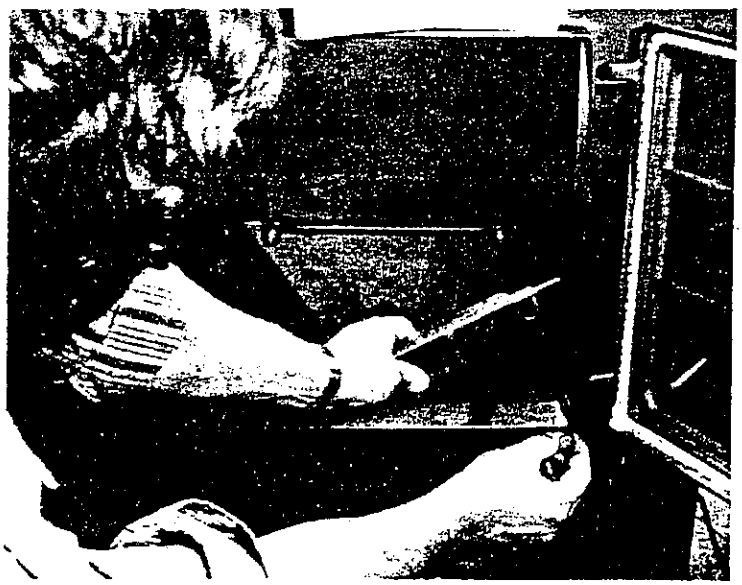


7. Place the grate frames and rear grate in the unit. When installing the front grate, push the lug through the shaker hole first, then rest it on the frame. (NOTE: shaker grates may already be assembled.)



8. Next, install the rear cast iron baffle and heat plate using four (4) 5/16" bolts, nuts and washers provided.

9. Install the front cast iron baffle below the fuel door.



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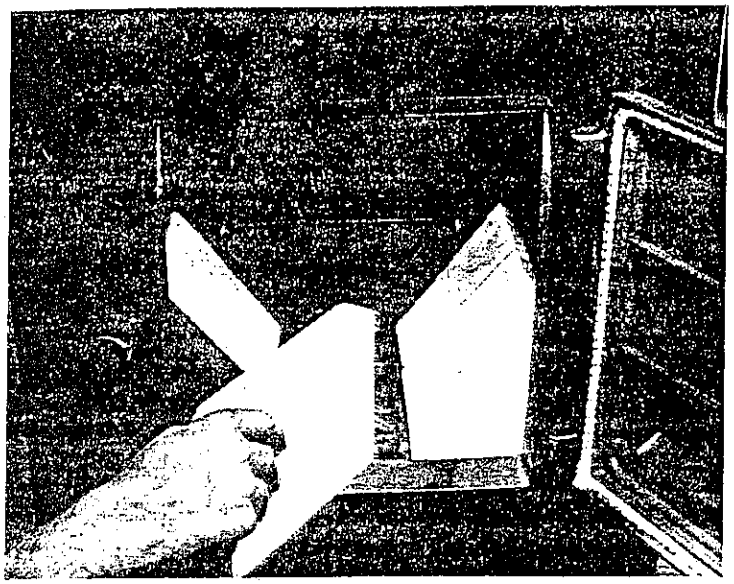
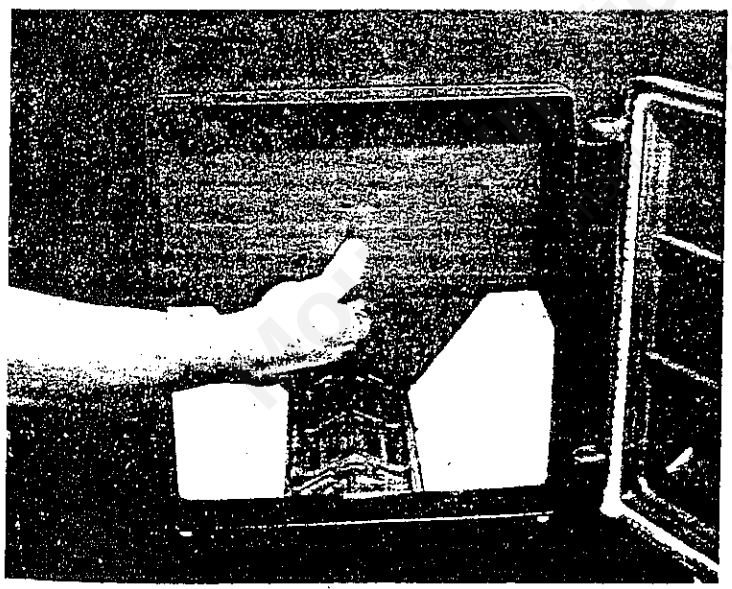


10. The firebrick must be inserted on each side, resting on the grate frames. Push the back and front firebrick tight against the unit so the center bricks fit in place.



11. The smoke flap "hangs" by two (2) hooks above the fire door.

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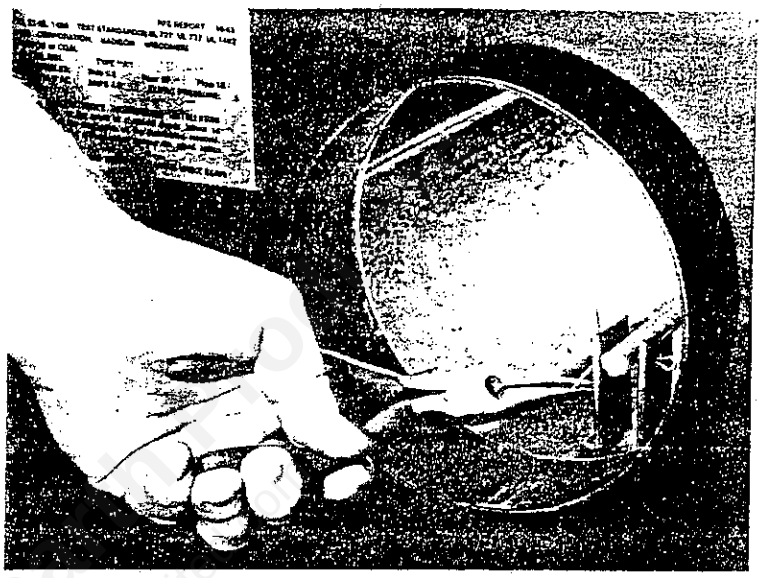
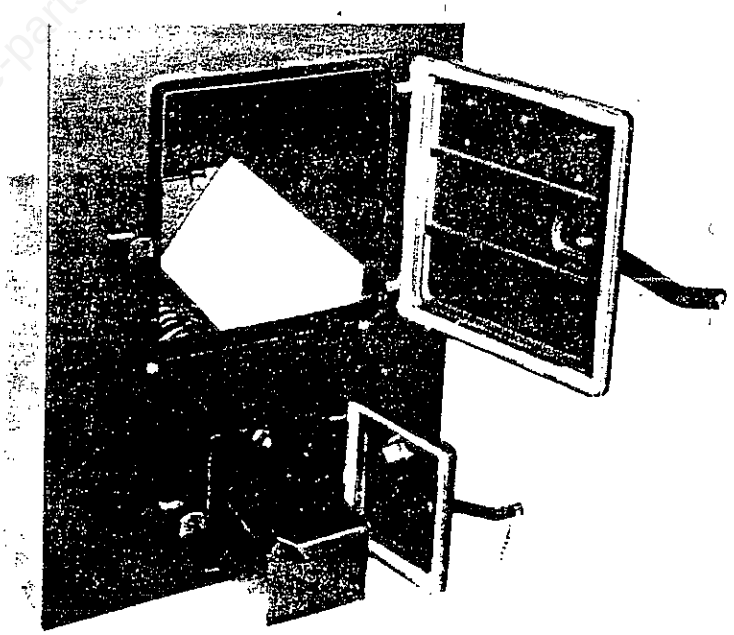


12. The damper rod must be pushed through the hole on the front of the unit and fastened with a cotter pin to the damper.



13. Slide in the ash pan and install both doors. NOTE: The fuel door handle is reversed to prevent shipping damage. Simply remove the bolt and reinstall it in the proper manner.

Your new Jensen Boiler is now completely assembled and ready to be installed. Make sure you follow the sections on installation in the front of this manual.

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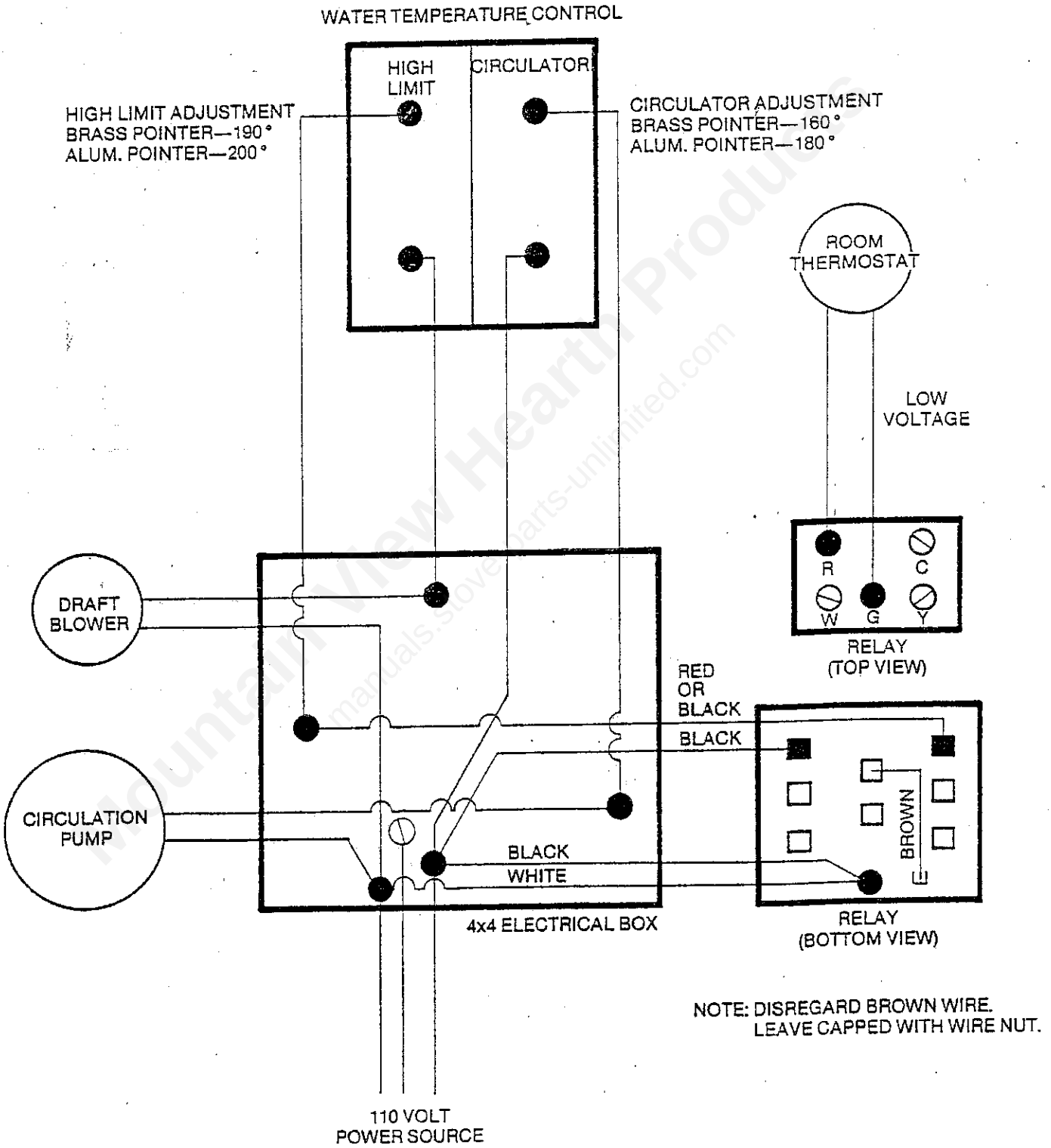
Wiring Diagram For Jensen Boilers



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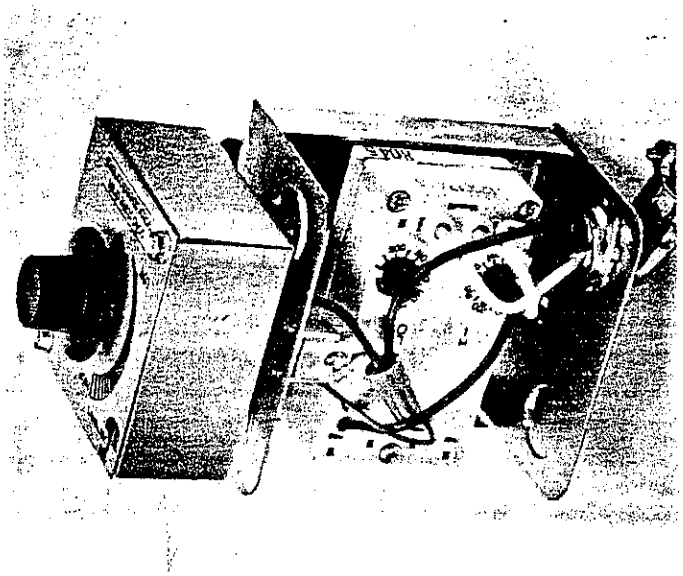

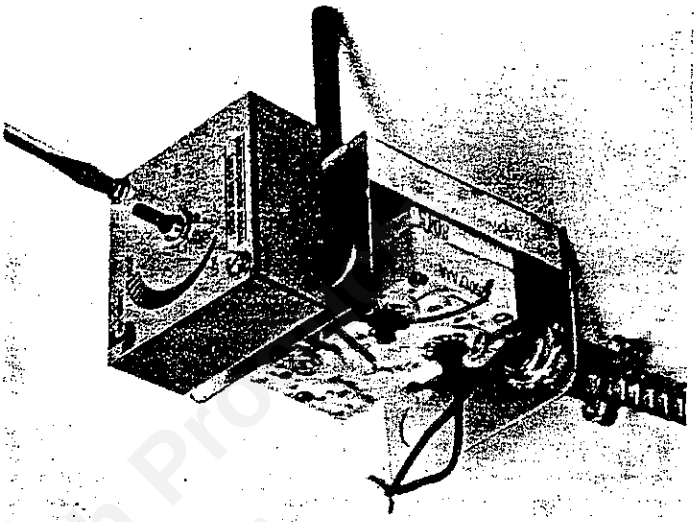

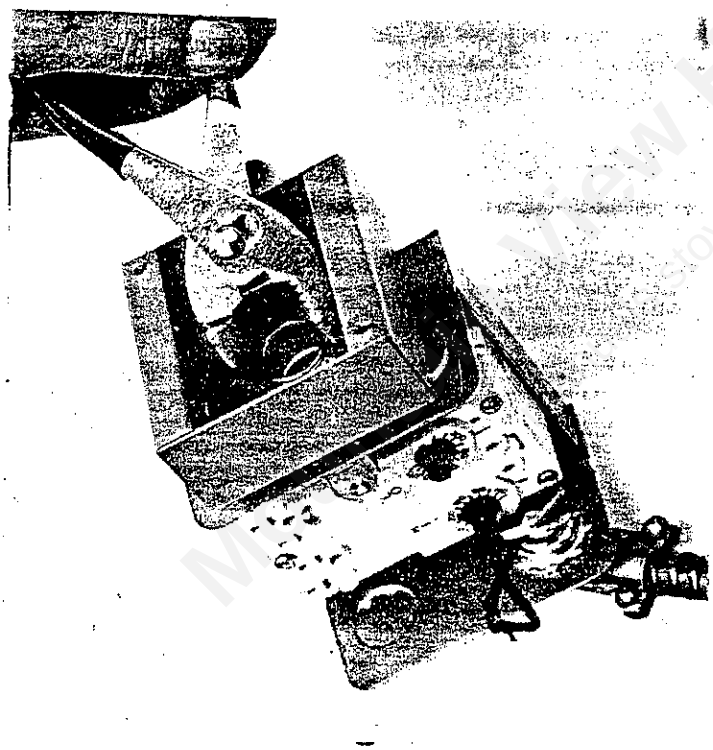

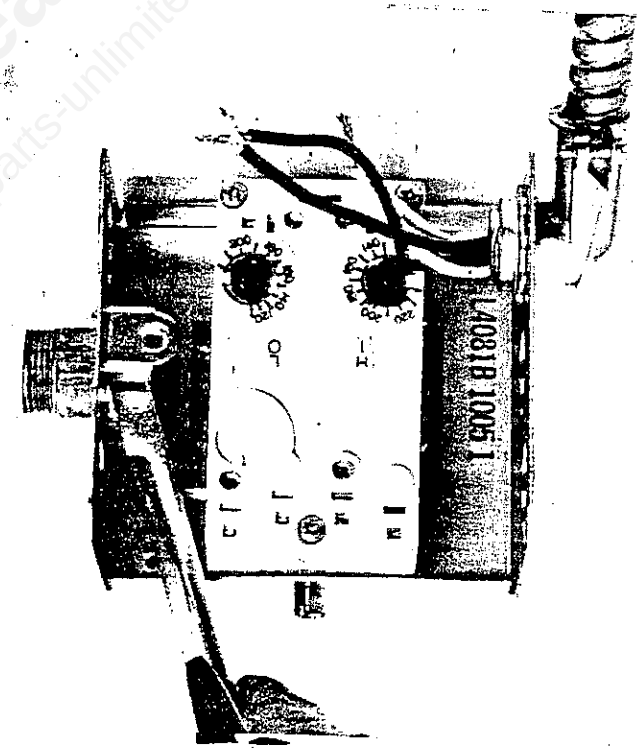

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Operating Rules

Operation of Your New Wood Burning Boiler

Check that your combustion air blower is in working order before lighting a fire. To do this, turn the room thermostat to a high temperature so that the combustion air blower turns on, then turn thermostat back to proper setting turning the combustion air blower off.

Now Proceed With Lighting a Fire

1. Pull by-pass damper out.

2. Make sure your smoke pipe damper is open. Place several pieces of crumpled paper in the center of your fire box. In a criss-cross pattern, place a couple handfuls of dry kindling wood then several small dry pieces of firewood.

> CAUTION
> Never use chemicals or fluids such as gasoline, charcoal lighter fluid, drain oil or kerosene to light a fire in your boiler. This would be like checking the level of gas in your gas can with a lighted match.

3. Ignite the paper and close the door. Do not attempt to open door immediately after igniting the fire.

4. It will take a few minutes for the fire to establish itself. Once you have some good red hot burning coals, add larger pieces of wood. All chimneys and hookups act differently. After a while, you will find out how your unit works best for starting.

5. Push in bypass damper after loading.

6. Your boiler is capable of providing a great deal of heat, so don't fully load your boiler until you have become familiar with the operation. Keep in mind, a full load will not always give you the best results for your needs. NOTE: With new steel, there is a small amount of oil or dirt on the metal. You may smell an odor. This is normal during the first operation.

7. When loading your boiler that has existing hot coals, pull bypass damper out and rake the red hot embers over grate evenly. Put a few smaller pieces of wood on coals first, then load-up.

USE CAUTION when opening loading door and avoid opening loading door rapidly. This could cause flame to flash out the door. This occurs when there is unburnt fuel and a large amount of gases on top of the fire box. When the door is opened, oxygen is combined with the gases and ignites.

Ash Removal

Every morning, when there is just a bed of hot embers, shake the grate making sure grate slots are clear of burnt fuel.

Once every week or two, depending on how much fuel you burn, ashes should be removed. (Daily with coal).

> CAUTION
> Never let ashes build up to grate level. This will reduce the life span of your grate.

To remove ash pan, simply open ash door and pull out your ash pan. But remember, the ash pan can get very hot. Dump ashes in a metal container with a lid that is placed on a noncombustible surface.

> CAUTION
> Never use anything but a metal container to put your ashes in. Every year fires are caused by emptying ashes into cardboard boxes or paper bags.

Maintenance

Keep chimney and smoke pipe clean by inspecting and cleaning at least twice monthly during a heating season.

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 build-up has occurred.

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

CAUTION

If you have a chimney fire, we recommend the following immediate actions:

1. Call the fire department.
2. Alert everyone in the house.
3. Shut any furnace doors, disconnect power to the unit, and close any dampers.

Keeping your chimney and stove pipe clean is the best insurance against chimney fires. NOTE: Smoke detectors and fire extinguishers should always be a part of your equipment.

If you clean your own chimney and stove pipe, we recommend purchasing the equipment professionals use. Wire brushes are available in enough sizes and shapes to be a snug fit inside any common flue.

Once a day let your boiler burn with ash door open for about 15 minutes while in attendance. This will help to minimize creosote build-up.

Burning Coal

Coal comes in many forms, the most commonly available being anthracite (hard coal) and bituminous (soft coal). Additional types include sub-bituminous and lignite, which have lower BTU (heat) content per pound than bituminous or anthracite. These are very soft and hard to handle and are difficult to burn. Cannel coal is a dense, lustrous coal normally sold in large pieces. It has a very high volatile content and burns easily with a yellow flame in open fireplaces. It is very dangerous to burn cannel coal in a furnace or boiler, as extreme heat and possible explosions can occur.

Anthracite coal is of far higher quality than bituminous, but there are wide variations in anthracites mined in different areas. As there generally is little variation in cost between different grades of anthracite, getting the best possible quality fuel is essential.

As a rule of thumb, one ton of high-quality anthracite coal contains the same amount of available energy as one and one-half to two cords of good, seasoned hardwood, 150 to 175 gallons of home heating oil, 20,000 cubic feet of natural gas or 4,200 kilowatt hours of electricity.

When coal shopping, search for a well-established supplier. A reputable dealer will have a certified chemical analysis of his coal available for inspection by a buyer. There are many items listed on an analysis. The points for the buyer to check are:

BTU content - The best anthracite has a BTU content per pound of over 13,500; any anthracite with less than 12,500 should be avoided.

Ash content - Less than eight (8) percent ash content is excellent; less than nine (9) percent is good; anything over ten (10) percent should be avoided.

Heat of fusion - The heat of fusion of coal determines how easily clinkers form. The higher the better. Above 2,700 degrees F is excellent.

Coal nuggets come in a variety of sizes. Those normally used domestically are:

	Diameter
Stove	1-5/8" to 2-7/16"
Nut	1-3/16" to 1-5/8"
Pea	9/16" to 1-3/16"
Buckwheat	5/16" to 9/16"
Rice	3/16" to 5/16"

Your boiler will accept stove or nut coal. These larger pieces of coal will not drop through the grate and allows for more air to circulate around the coal for better burning.

Coal is generally not as easy to burn as wood, but the ease of burning varies with different types of furnaces and boilers. Burning coal requires some patience and a specific and regular procedure. With improper tending, the coal fire can go out. (This may happen in a very short amount of time. Once the process of extinction has started, it is almost impossible to reverse).

After a coal fire goes out, all the coal first must be emptied from the unit and the complete starting pro-

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cess must be repeated. The learning process sometimes may be frustrating, but once the proper procedure is established and followed, coal burning becomes a reasonably simple process, with the benefits of long burn times and evenness of output over the entire length of burn.

Our coal-burning instructions are general in nature and apply to either bituminous or anthracite. Each type of furnace or boiler installation will have different operating characteristics, with many requiring less detail than listed. Trial and error will help in determining exactly how a particular installation should be operated.

Starting Up A New Fire

Use paper and dry wood kindling to start the fire.

Add small, compact pieces of hardwood when the kindling is burning hot. Keep the primary draft control blower on to establish a hot fire quickly. The ash door also may be opened during start-up to accelerate the initial burn. (Remember, your room thermostat controls the draft blower).

When a substantial bed of red coals is built up, start adding coal - small amounts at a time. Keep the draft control blower on.

Continue adding small amounts of coal until there is a solid bed of burning coal. Do not add too much at one time. Allow sufficient time between each small loading (at least five (5) to ten (10) minutes), so that each loading has time to ignite thoroughly before the next load is put in. When a substantial bed of burning coals has been established, fill the stove to the top of the firebrick. A deep bed of coal always will burn more satisfactorily than a shallow bed.

When most of the wood is burned and the coal is completely ignited (usually five (5) to ten (10) minutes or less after filling the boiler), the thermostat should be turned down to the proper operating level. (If the ash door has been opened, it must be closed to prevent overfiring which can severely damage the boiler.)

Loading

Coal never should be added unless there is a reasonably hot fire. The coal bed should be bright and vigorous.

If the fire is burning hot and there is a deep bed of coals, full loads of coal can be added at any time. However, if there is not a deep bed (three (3) to five (5) inches) of coals, it is best to add small amounts of coal at first.

Increasing Heat From A Low Fire

Every effort should be made not to let a coal fire burn too long so that the fire has started to die. This will cause the reloading process to be much longer, and there is a good possibility of losing the fire.

Do not shake or stir with a low fire.

Open the ash cleanout door to get the maximum draft.

Run the stove with the ash door fully open until the fire is reasonably hot (five (5) to ten (10) minutes).

Start adding small amounts of coal. Follow the same procedure as Paragraph 3 and 4 under "Starting Up A New Fire".

When the new coal is thoroughly ignited or there is a substantial bed of hot coals, the grate may be shaken thoroughly. Be sure to shake down all ashes (but do not overshake).

After shaking, if the ash door has been opened, be sure to shut it. (Serious damage can result if the boiler is run for extended periods with the ash door open).

Shaking

Shaking should be done only when there is a hot fire.

The frequency of shaking will depend on the degree of burning. Shaking should be done at least once a day and preferably twice a day.

Best results from shaking the rocker grates will occur if short, "choppy" strokes are used rather than long, even strokes.

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The amount of shaking is critical. Too little or too much of both can result in the extinguishing of a fire due to blocked air flow. The proper amount normally occurs when red coals first start to drop through onto the bed of ashes.

No furnace ever should be "poked" from the top. This can lead to clinker formation and compacting of the coal and ashes, which results in clogged air passages.

Ashes

Ashes never should be allowed to accumulate in the ash pit so that they, in any way, impede the flow of combustion air to the fire. Excess ash accumulation can cause the fire to go out and also can cause severe damage to the grates because of the absence of a cooling flow of air beneath them.

Ashes always should be emptied into a metal container. Coals can remain hot many hours after a fire is out. Coal ashes should not be put on gardens as they do not contain beneficial minerals like wood ashes, and may cause ground water pollution.

Coal produces considerably more ash than wood, so the intervals between emptying are much shorter. For equal heat output, coal will produce seven (7) to ten (10) times more ash than wood.

Clinkers

Clinkers can occur in any coal boiler during the process of burning. These are hard pieces of fused ash that form in the firebox. They can become hard and large in size and, therefore, cannot be shaken through the grates in a coal stove. When there is an appreciable accumulation, the fire will go out because insufficient air is allowed to pass through the clinkers to the burning coal.

Once large clinkers have formed, they can be removed only from the above grates. This usually means the fire must be allowed to go out before they can be removed.

Clinker formation can occur from a number of different causes or a combination of causes. Some of these are:

Poor quality coal - excess ash content and/or too low a heat of fusion.
Too hot a fire (too much draft).
Too shallow a bed of coals.
Too deep a bed of coals.
Excess shaking.
Poking the fire from the top.
Too little air (draft) after a long, hot fire (caused by rapid adjustment of draft from a very high setting to a low setting).

If clinkers do form, the coal quality should be checked first, and then all the above points should be reviewed and corrected.

Safety

Whenever a loading door is opened, the bypass damper should be opened first and the door should be cracked for ten (10) seconds to allow oxygen to enter and burn any combustible gases that are present before fully opening. Failure to do this could result in sudden ignition of the unburned gases when the door is opened.

With the exception of the start-up period, an ash pit door should never be left open. Serious damage to the boiler can occur from overheating; in extreme cases, this overheating could be the cause of an "unfriendly fire."

Coal boilers are subject to the same installation clearance standards as wood boilers. Never burn coal in any boiler that does not have an airtight, unified chimney system.

Coal boilers should not be installed in any chimney that has had a history of back-drafting or flow reversal. Also, coal boilers should not be installed in any chimney having an excessively large flue. These conditions can cause improper draft, resulting in carbon monoxide entering the house rather than being drawn up the chimney. Remember, coal gases are toxic.

Sulfur dioxide, sulfur trioxide and other ions released from coal burning may corrode stainless and masonry chimneys, and even terra cotta chimney liners and brick in nearby buildings. Coal with high sulfur content will destroy chimneys especially fast if soot sits in the flue for extended lengths of time. It is important to clean chimneys regularly.

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WARNING

In the event of a power failure precautions must be taken to assure safe operation.

The following steps should be taken.

1. Open *all* zone heating valves fully.
   NOTE: Many heating systems are equipped with "normally open" zone valves. These valves open automatically in the event of power failure. Check your system. If you have "normally closed" zone valves and no manual opening provision **DO NOT OPERATE** your boiler without power.
2. Keep the fire small and check the boiler temperature and pressure often.

Refueling should be kept to no more than 1/2 way up the firebrick during power out conditions.

3. Your Jensen Boiler should not be expected to keep your house as warm during power outages as it does when power is on. However, gravity or convection flow should provide sufficient comfort until the power is restored. This of course depends on the individual installation.

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Trouble-Shooting

PROBLEM	POSSIBLE CAUSE	SOLUTION
1. Main circulating pump won't turn on.	• Improper wiring. • Bad Aquastat.	• Go over wiring diagram again. • Replace Aquastat.
2. Pressure relief valve continually popping off.	• Water flow restricted.	• Check all plumbing and consult your local plumber.
3. Smell an odor from the first fire in the home.	• New steel, small amounts of residue on the steel. • Bad weld, if smell continues for two weeks of burning.	• This will disappear in a matter of hours. • Contact dealer immediately.
4. Excessive creosote build-up. A small reminder, whatever kind of fuel you burn, there is some kind of residue build-up on the boiler & chimney. Same with wood no matter how good the conditions.	• The use of wet, frozen, or unseasoned wood. • The use of soft wood, particularly those of high resin content such as plywood or blandex with glue. • Poor natural draft or an obstruction in the stove pipe or chimney flue. • Too long of burning times. • Inadequate amount of oxygen supplied to the combustion chamber. • Low fire or flue gas temperatures. • Uninsulated stove pipe or chimney flues, especially if construction is exterior to the house. • Air leaks in the stove pipe or chimney.	• If you have to use wet wood, make loads smaller & burn them hotter. • Avoid using if possible. • Measure draft with gauge. Should have a minimum of .04-.06 water columns of draft. • Smaller & hotter fires. • Adjust draft for hotter fires or in some homes, it has been determined there was not enough oxygen in the basement, due to such an airtight home. We recommend a 4" round hole to the outside with a screen on it to keep varmints out. • Smaller loads of wood & hotter fires. Stack temperatures should maintain minimum of 200° to 300°. • Never use uninsulated pipe for chimneys. If installed on the outside of the house, INSULATE! • Check chimney from top to bottom. NOTE: Creosote is a tarry liquid or solid coming from distillation of wood during the combustion process. The heavier the build-ups, the greater chance of a chimney fire. NOTE: No matter how seasoned the wood, no matter how good the draft, you always will get a small amount of soot build-up. Chimney should be cleaned out before winter firing and during the mid-winter firing.

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PROBLEM	POSSIBLE CAUSE	SOLUTION
5. Not getting heat in the home.	• Improper insulation in home allowing heat to escape. • Improper hook up to boiler. • Aquastat control set too low.	• Reinsulate! • Check installation drawings or consult your local heating man. • Check settings on your old system.
6. Flames coming out the door when loading.	• Excessive amount of gases on top of fire-box & igniting when given oxygen from open door. CAUTION: Always open by-pass damper & smoke pipe damper when loading.	• Open draft on ash door and allow gases to burn before opening loading door. • Try to load when fire is at its lowest point, but have enough embers left for a good start again. NOTE: Only you will know this time after some experience with your unit and installation.
7. Excessive amounts of smoke coming out loading door when loading.	• Improper draft. • Chimney cap too close to top of chimney. • Too long a run of smoke pipe from Jensen to chimney.	• Measure with draft gauge—should have .04 to .06 water column. • Relocate. CAUTION: Always open by-pass damper & smoke damper when loading. • Relocate unit closer to chimney.
8. Puffings of smoke through draft control.	• Improper draft. • Down draft on chimney. • Plugged chimney.	• Check draft with gauge. Should be .04 to .06 water column. • Check for cold spots on chimney or obstruction outside of chimney. Trees or other buildings. • Check with mirror in clean-out door or send cleaning brush down chimney. Plus check stove pipe connections.
9. Improper seal around door.	• Door rope not sealing on door frame. • Loose door from shipment.	• Adjust door rope so that all parts of door frame are sealed, especially the corners. • Open door, put handle in closed position and try to close door firmly. This will tighten door. NOTE: Door will not be damaged.

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THE JENSEN LIMITED FIVE-YEAR WARRANTY

Jensen Metal Products, Inc. hereafter referred to as Jensen, (warrants to the original purchaser) this product against defects in workmanship on a five (5) year pro-rate exchange basis from the date of purchase when used in accordance with the recommendations in the installation and operating instructions for the product. This warranty does not apply on the sheet metal shrouds, castings, firebrick, or on metal stressed by misuse or neglect. A one year warranty applies to all castings. Electrical and plumbing components are limited to the warranties offered by those respective manufacturers.

Jensen does not warrant fitness for a particular purpose or merchantability. Jensen neither assumes nor authorizes any party to assume for it any other obligation or liability in connection with its products. Jensen shall be held free and harmless from liability from damage to property related to the operation, proper or improper, of the product. There are no other warranties expressed or implied which extend beyond the description of the face hereof.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

All claims made by the purchaser under this warranty should be directed through the dealer from whom the product was purchased.

Warranty Note

If you think you have a defective component part, please follow these steps:

STEP #1: First check your Instruction Manual to assure you have the item installed correctly.

STEP #2: If the part is installed according to your Owner's Manual directions and still does not function correctly, call your dealer and make an arrangement for your warranty replacement part.

STEP #3: Remove the defective component part and package it in its original container if possible and return it to your dealer.

CAUTION: Warranty claims will not be honored on component parts damaged due to misuse or improper handling.

Fill out this section and keep for your records.

Serial Number _____

Model Name _____

Invoice No. _____

Dealers Name _____

Address _____

Phone No. _____

Date of Purchase _____

Date filed with my Home Owners Ins. Co. _____

Chimney Cleaning & Servicing Phone No. _____

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