



DS Power Boilers

High Efficiency Boilers

Models: #DS5000 #DS6000 #DS7000

OWNER'S MANUAL



MADE IN USA
By
D.S. MACHINE SHOP

Before you install or operate a DS Power Boiler, you must:

- Read all instructions carefully
- Install smoke and carbon monoxide detectors.

ALL BOILERS MUST BE INSTALLED BY A NFI CERTIFIED SPECIALIST AND PLUMBED BY A QUALIFIED LICENSED PLUMBER OR D.S. IS NOT RESPONSIBLE FOR WARRANTY

Safety Instructions

1. Read all instructions before installing or operating any DS boiler
2. Never fire boiler without water in the system. Doing so could ruin boiler.
3. You must install smoke and carbon monoxide detectors before you install or operate any furnace or boiler. **Check your local codes, this installation must meet their rulings.**
4. Do not open bottom ash door to increase draft. It is designed only to empty ash pan.
5. Never leave boiler doors open when boiler is unattended.
6. Install barometric or manual damper when burning coal.
7. Do not use a manual, barometric or automatic damper when burning wood.
8. Do not hook up a wood or coal boiler to an aluminum Type B gas vent. Use a code approved Class A chimney. A minimum of 20' high.
9. On all new installs connecting to an existing chimney, a level 2 chimney inspection must be done by a certified chimney sweep.
10. Clean chimney before installing boiler. If there is creosote attached to the liner you could create a serious chimney fire.
11. Never leave children unsupervised when they are in same room as boiler. Provide a sturdy barrier to keep children and pets a safe distance from the boiler, or they could get burned.
12. Keep boiler area clear from all combustible materials, gasoline, other flammable vapors and liquids.
13. Use the required floor protection as shown on page 6.
14. Check the clearance to combustible walls and floors on page 6.
15. Do not allow anyone who is unfamiliar with the boiler to operate it.
16. Spend some time with your boiler to become well acquainted with the different settings and how each setting will affect its burning patterns. It is impossible to state how each setting will affect your boiler.
17. Be extremely careful when removing the boiler ash pan. It may be very hot!
18. Make sure your single wall chimney connectors have at least 3 screws per joint.
19. When starting a fire, circulating pump must be running continuously.
20. If circulating pump is installed you must install a high limit aquastat set at 190 degrees Fahrenheit.
21. Always install a mixing valve when installing a domestic coil.

Operational Work Practice Standards

1. When burning wood, burn only seasoned, dry cord-wood that has been dried; then warmed before firing. (Warming cord-wood means placing in a heated building for 1 day before burning)
2. Keep wood under cover: in a wood shed, or a tarp.
3. Right after delivery: stack cord-wood under cover
4. Split cord wood before drying.
5. Do not burn green wood, it needs to have no more than 20% moisture.
6. All firewood must be seasoned at least 1 year.
7. Check cord-wood with moisture meter. Check wood moisture at least once a week!
8. Keep a 2" to 3" ash layer on top of your grates when burning wood. Note: Do not cover louvers.
9. The boiler is designed to burn air dried wood and coal at a predetermined firing rate. Over firing occurs when the ash door is left open during operation or a highly volatile fuel, i.e. large amounts of small kindling is used. Do not exceed 200 degrees water temperature.
10. When tending the firebox always open load door slowly to minimize smoke out the fire door or a "flash back".
11. Check the fit on the load door. It must fit tightly. If it does not, check for deterioration or wear of the ceramic rope seal. Replace defective seals.
12. Inspect and clean your chimney and single wall chimney connectors regularly.
13. In the event of a chimney fire, shut off all draft controls and blowers. Call your fire department immediately. Alert everyone in the house. If flue is still burning vigorously, throw baking soda into firebox or discharge a fire extinguisher into fire box. After the chimney fire is over, have a certified chimney sweep complete a level 2 inspection of your chimney.
14. Equip your building with fire extinguishers, carbon monoxide and smoke detectors.

15. Do not burn garage, gasoline or any other flammable liquids in this boiler.
16. This is a wood and anthracite coal burning boiler and should not be altered in any way.
17. Do not burn boiler over 200 degrees water temperature or warranty will be void!
18. When used in a large greenhouse and they are forecasting a cold night it is advisable to load and fire your boiler at 3 to 4 o'clock in the afternoon so that you do not fall behind. If you wait till the sun sets to fire your boiler you may be playing catch up all night. In the morning when it is cold with a sunny day in the forecast you may want to consider shutting the boiler down at 5 o'clock in the morning so that when the sun comes out and it warms up so that there's not too much heat in your green house till the boiler fire dies down.

Note: When burning coal, shake ashes every 12 hours if possible. You must keep your ashes cleaned out from under grating. This may require emptying your ash pan daily. If there is no air space under the grates, the grates will warp and become inoperable.

Starting A Coal Fire

Fully open Samson Draft Regulator. Place crumpled paper and kindling wood on grate and ignite with match or lighter. Use a good amount of kindling to get the fire started. Add larger pieces of wood to get a hot fire. Once you have a hot fire, add 2" of coal over the entire grate area. As the coal starts burning and glowing red add another 2" layer of coal. Keep adding coal until you have an 8" body of fire, but don't add too much at a time or you could smolder the fire. You can now add up to 50 lbs. of coal at a time, adjust draft on Samson Draft Regulator to meet your desired water temperature. NOTE: You can also use charcoal briquettes for a fire starter. 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. You may want to assemble the boiler out of doors and build a small fire in it to "BURN OFF" this dirt and oil before installing unit.

Starting A Wood Fire

Fully open Samson Draft Regulator. Place crumpled paper and kindling wood on grate and ignite with match or lighter. Use a good amount of kindling to get the fire started. Add larger pieces of wood to get a hot fire. Once you have a hot fire add wood as needed, adjust draft on Samson Draft Regulator to meet your desired water temperature. Allow ash to build up on top of grates, this will not choke fire until it covers louvers. For most efficient burning keep approximately 2" to 3" of ash on grates at all times.

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. You may want to assemble the boiler out of doors and build a small fire in it to "BURN OFF" this dirt and oil before installing unit.

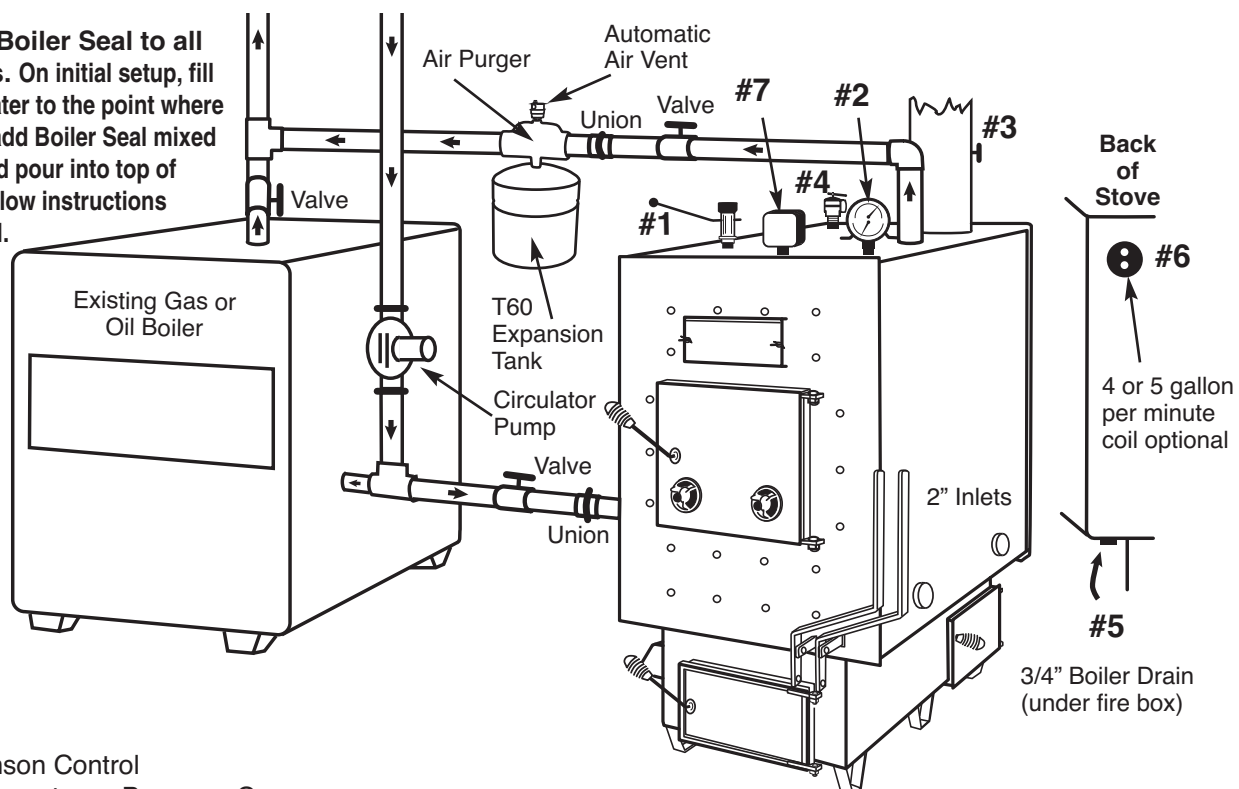
Creosote – Formation and Need for Removal

When wood is burned slowly, it can produce tar or other organic vapors, which combined with expelled moisture will 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. If creosote has accumulated, it should be removed to reduce the risk of a chimney fire.

NOTE: Firewood must be seasoned for one year. That means cut, split and stacked under shelter with sides open so the wind can dry it. Wood needs to have no more than 20% moisture. Stack indoors 1 day prior to burning.

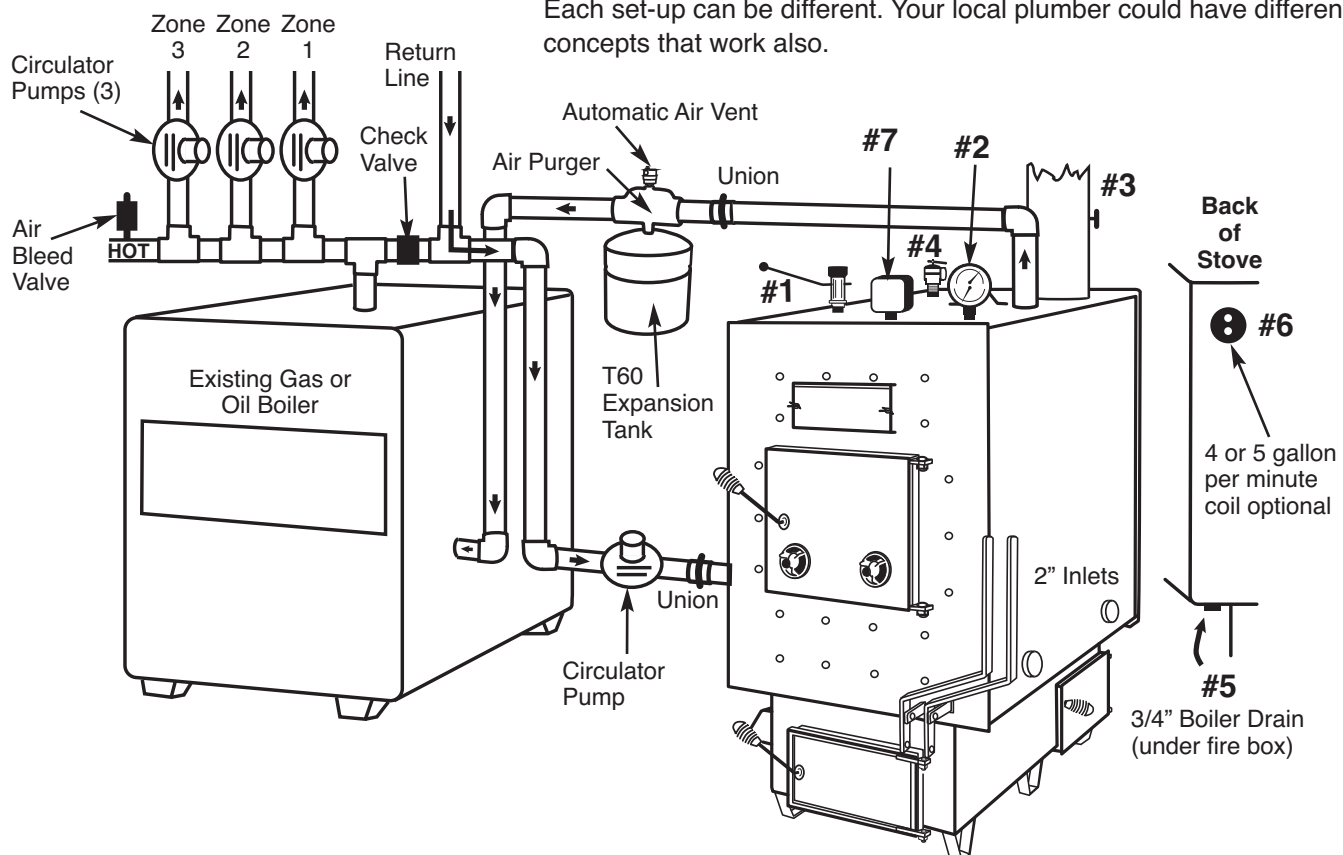
Boiler Installation

NOTE: Add Boiler Seal to all new boilers. On initial setup, fill boiler with water to the point where you can still add Boiler Seal mixed with water and pour into top of boiler. OR, follow instructions on Boiler Seal.



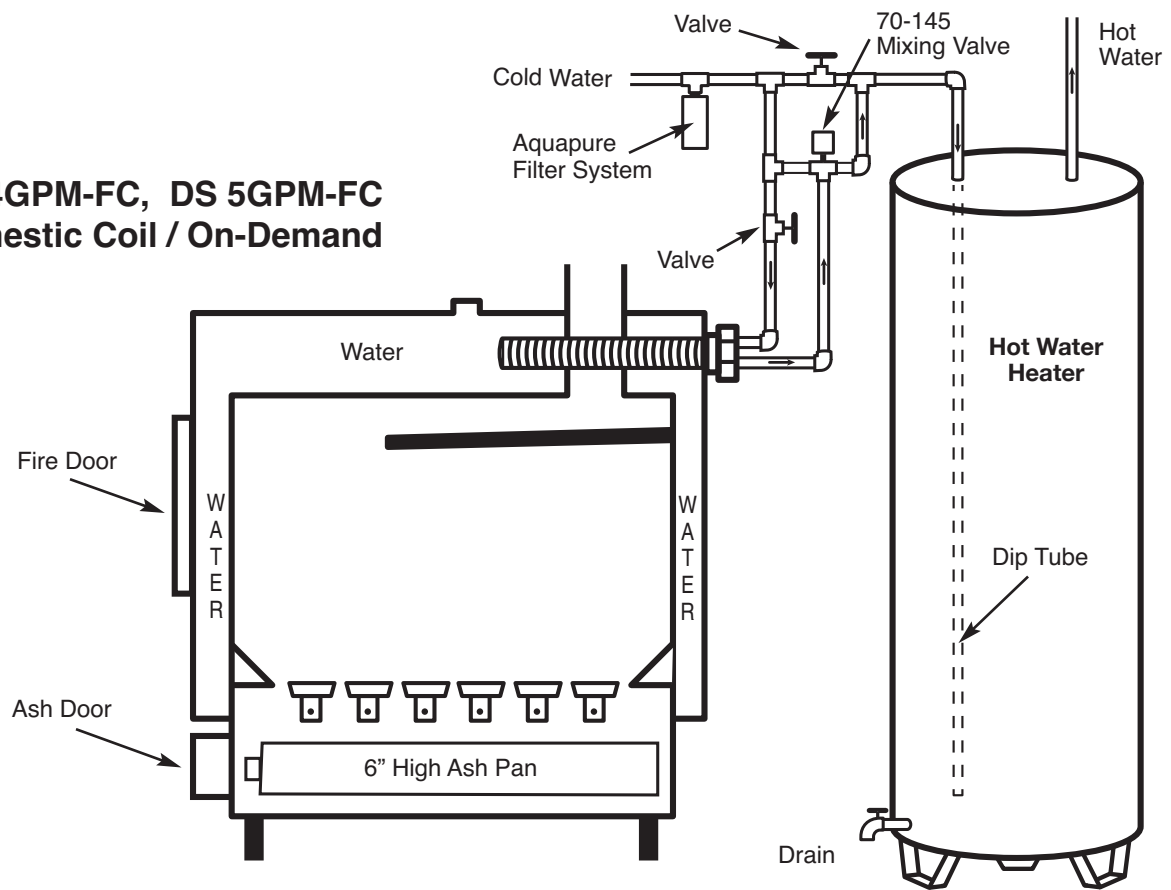
- #1 Samson Control
- #2 Temperature - Pressure Gauge
- #3 Damper
- #4 30# Safety Valve
- #5 3/4" Boiler Coil
- #6 4 or 5 Gallon Coil
- #7 Aquastat

- **All D.S. Boilers must be plumbed by a Qualified Licensed Plumber or D.S. is not responsible for warranty.**
- Failure to follow installation and basic operation will void the warranty
- All Boilers are tested to 100psi.
- Recommended working pressure - 12psi.
- **NOTE:** This Boiler set-up is only a D.S. Machine Design. Each set-up can be different. Your local plumber could have different concepts that work also.



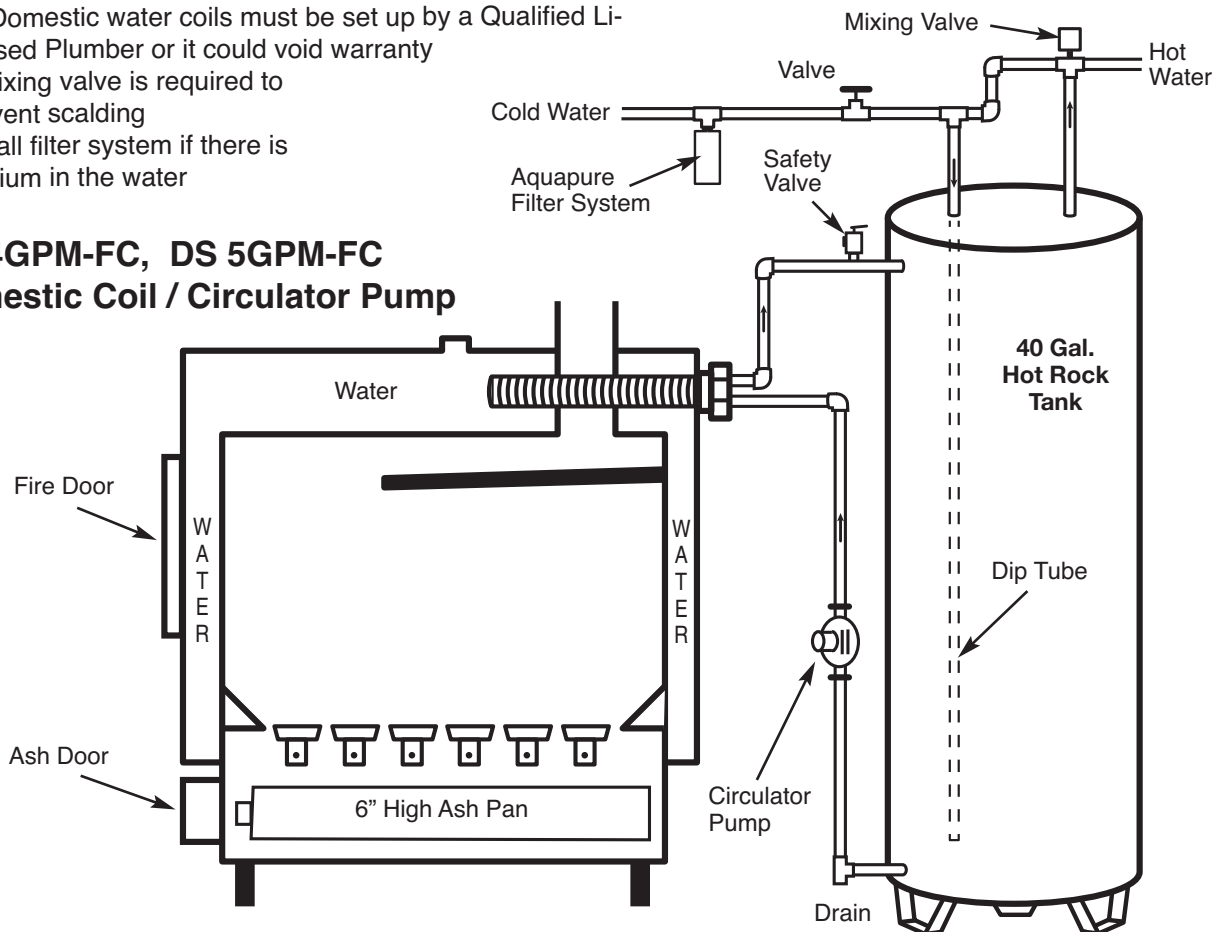
Boiler Installation

DS 4GPM-FC, DS 5GPM-FC Domestic Coil / On-Demand



- This Domestic Coil has a 1 year Limited Warranty
- All Domestic water coils must be set up by a Qualified Licensed Plumber or it could void warranty
- A mixing valve is required to prevent scalding
- Install filter system if there is calcium in the water

DS 4GPM-FC, DS 5GPM-FC Domestic Coil / Circulator Pump



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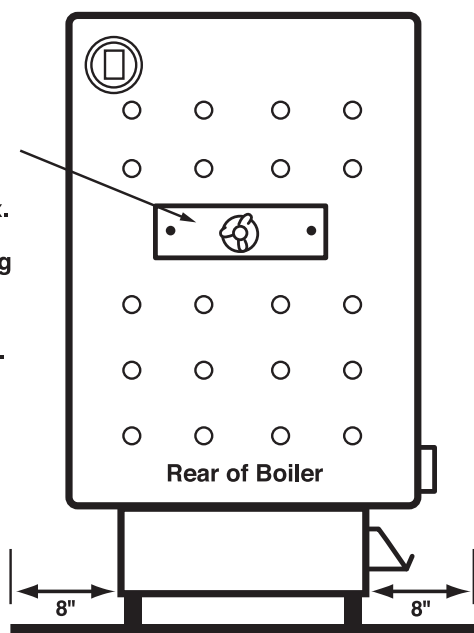
Locating Boiler

- 1 - The boiler must be placed on a solid none combustible floor. If you have a combustible floor it is required to use a code approved none combustible floor board (Type 1 Board)
- 2 - It is recommended that the boiler be centrally located.
- 3 - The most important consideration in installing your boiler is adequate clearance between the boiler and any combustible surface. A boiler that is placed too close to a wall or to furniture can cause a fire. See chart at right for clearances to combustibles.
- 4 - The non-combustible base must extend at least 16" beyond the front and 8" of the back, and sides of fuel opening, and must extend under and 2" beyond either side of the single wall chimney connectors if it's elbowed towards a wall.
- 5 - The boiler or furnace must have its own flue. Do not connect this unit to a chimney flue serving other appliances.
- 6 - Connection of the boiler to the chimney should be made as directly as possible (6 feet maximum horizontal) and not more than two bends. No reduction in flue pipe below the exhaust diameter should be used.

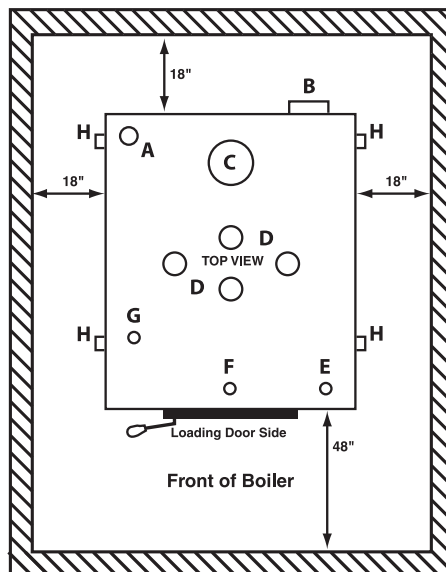
CAUTION:
Keep furnishings and other combustible materials away from the boiler.

The pipe connecting the stove to the chimney should be at least 24 gauge. Thicker gauges are available and will resist corrosion longer and need fewer replacements. Slope the flue pipe back towards the heater, 1/4" per foot of horizontal run. That way if any condensation forms in the pipe it will be carried back into the heater. The connector pipe should be installed so that the upper pipe section fits inside the

All models have one secondary air intake. Open approx. 1/16" to 1/8" when burning wood. Close when burning coal.



Class 1 Floor Protection
8" on back and two sides - 16" on front



Clearance to Combustibles

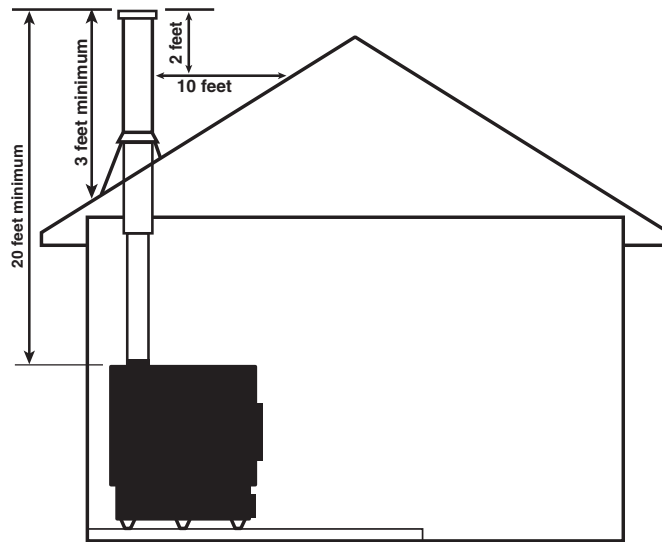
- A - 30# Safety Valve
- B - Domestic Coil
- C - Exhaust
- D - 2" Hot Water Out
- E - Temp. Pressure Gauge
- F - High Limit Aquastat
- G - Samson Regulator
- H - 2" Water Return on side

lower section. This way any condensation building up inside the pipe will stay inside the pipe as it flows down the inside surface. Horizontal pipe runs should have the pipe seams turned up. Particular attention should be paid to the point where the flue passes through a wall or ceiling. This penetration should always be made with a thimble, insulated pipe, and then proper accessories following manufacturers instructions. Chimney connectors must not pass through the ceiling, concealed spaces, or enter the chimney in the attic, unless proper clearance or insulated pipe is used following manufacturers instructions.

REMEMBER single wall chimney connector adapter. Where the pipe connects to a masonry chimney. The flu to the chimney should be larger than the single wall chimney connector so you can insert the pipe out to the inside edge of the chimney, but not past. Then seal as tight as possible and cover with a single wall chimney connector collar.

Chimney Requirements

The minimum height of a chimney system for the D.S. Boiler is 20 feet. The chimney must exceed the roof of a building at a minimum of 3 feet at any point of exit. In a pitched roof installation the chimney must be 2 feet higher than anything within a 10 foot radius of the chimney. It is important to have a chimney draft of 0.06 water column. It is required to abide by the manufacturer's instructions on Class A chimneys as well as local building codes. It is not recommended to build a chimney on an addition that is lower than the main part of your building. Do Not extend the stovepipe past the inside of a masonry chimney liner. Never connect this unit to a chimney serving another appliance. Should you have a problem with inadequate draft you should see page 11.



Boiler Controls

1 Samson Regulator

The Samson Reg. is designed to regulate the draft going into the draft intake. There is no electricity needed to operate the Samson reg.

Set Up - thread Samson Reg. into 3/4" fitting at top left (see page 6) when installing chain from Samson Reg. to draft intake. Turn knob clockwise and connect chain so lid is shut and chain is tight. Then turn knob counter-clockwise to increase draft.

2 Temperature Pressure Gauge

The Temperature Pressure Gauge has two features:

A - Needle shows temperature of water

B - Needle shows water pressure

Note: Normal pressure for closed systems are 12-15 lbs.

Warning: Do not exceed 200 degree water temperature.

Thread temperature pressure gauge into 1/2 inch fitting at top right corner (see page 6)

3 30# Safety Valve

This is a pop-off valve. At 30 PSI hot water will dump out of the 30# safety valve.

Installation Instruction: You must run some sort of high temperature pipe down to the floor from the safety valve. Install a drain in the floor if possible.

Thread 30# safety valve into 3/4 fitting at top left back (see page 6)

4 Automatic Fill Valve / Pressure Reducing Valve

The Automatic Fill Valve needs to be hooked up to the water supply line connected to your system.

The Automatic Fill Valve will reduce pressure to 12 lbs. and keep water supplied.

A water line with an automatic fill valve can be hooked up anywhere in your system.

5 Expansion Tank

An Expansion Tank is designed to maintain the boiler pressure at 12-15 lbs.

Every degree the temperature rises the boiler will gain 1 lb. of pressure. The expansion tank will absorb the pressure and keep it at 12-15 lbs. in normal temperature ranges. This normally gets hooked up to the hot water horizontal line close to the boiler.

6 Circulator Pump

A Circulator Pump is designed to circulate water through your heating system. This normally runs off 110 volts, 12 volts, or air. The thermostat controls the circulator.

We recommend the circulator pump be set up in the return line close to the boiler, pushing water into the boiler.

7 Aquastat (High Limit)

The Aquastat is a safety feature. It will override the thermostat. If the thermostat is not calling for heat the circulator will not run. If water is not circulating through your system the water temperature will rise slowly. The Aquastat wires get hooked up to the thermostat wires. Set the High Limit Aquastat to 190 degrees. If the water temperature rises to 190 degrees, the circulator will run.

8 Domestic Water Coil

The Domestic Water Coil will heat 4 gallons per minute when the water temperature is set at 160 - 180 degrees. The coil has a bolt on flange with a gasket that holds coil into the back of the boiler.

NOTE: Always hook up a mixing valve when using a domestic water coil, or someone could get burnt.

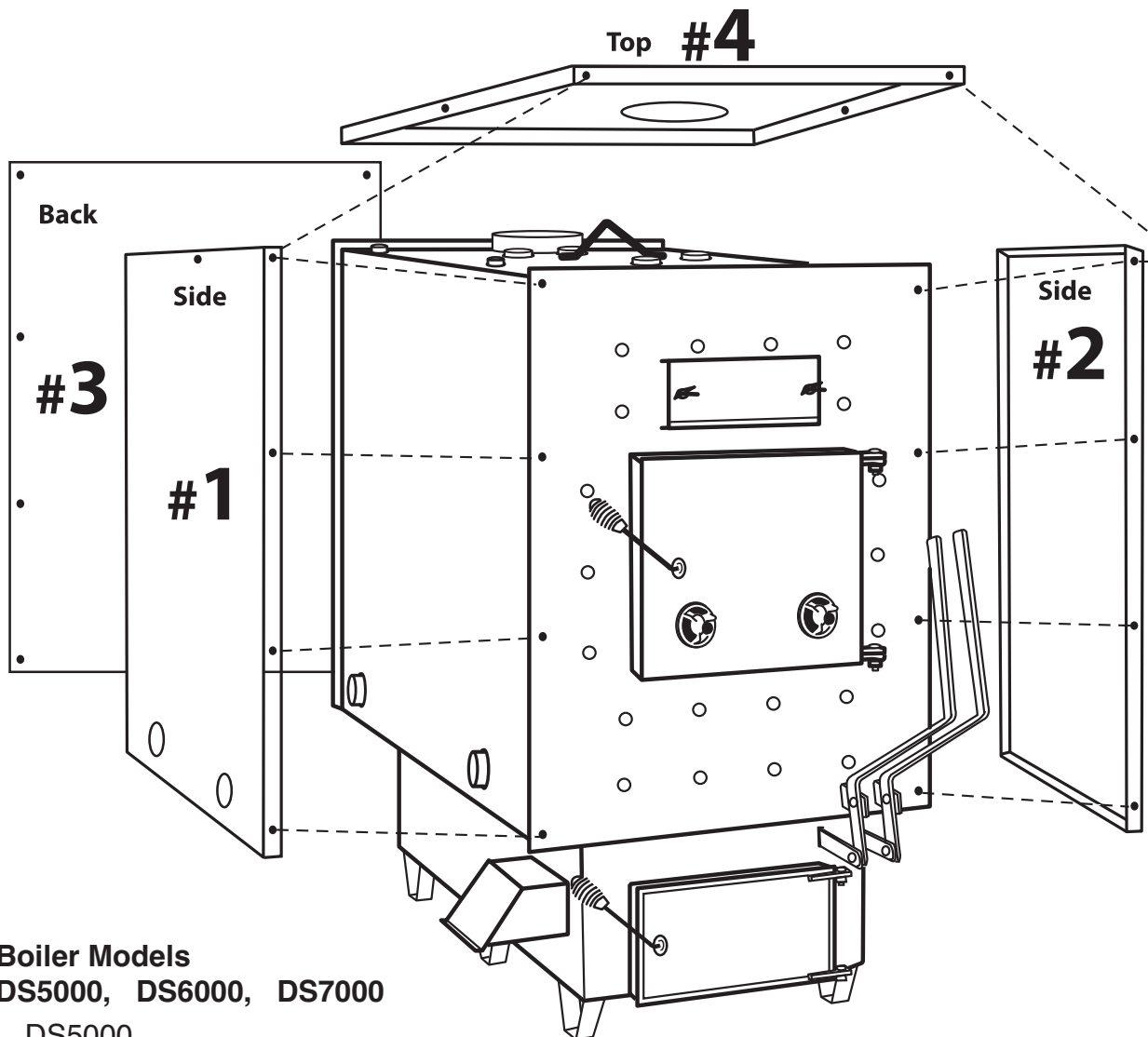
9 Air Purger

The Air Purger can also be called an Air Scoup. It is designed to do three things:

- Capture air pockets, which is then released by the air vent.
- Mounts the automatic airvent
- Mounts an expansion tank

Boiler Sheet Metal Installation

Install in order as numbered - 1,2,3,4



Boiler Models DS5000, DS6000, DS7000

DS5000
20 - #14x3/4 screws

DS6000
22 - #14x3/4 screws

DS7000
24 - #14x3/4 screws

- Install side and back panels first.
- Back panel goes inside of side panels.
- Top panel goes outside of all panels.



Trouble Shooting

Problem 1 - Inadequate heat being delivered to your building,

Solution:

- Is boiler the recommended BTU size for your building?
- Check building insulation – is it adequate?
- Is water temperature at boiler hot enough? It should not exceed 180 degree.
- Is water circulating properly through your system? If not your system could be air locked. If your system is air locked install an auto air bleed valve at the highest point of that zone.
- Do you have a circulator pump? If not install one if needed.
- Do you have a good draft of 0.06 water column? If not, check and clean chimney and single wall chimney connectors
- Do you have the appropriate amount of floor heat or radiators?
- When burning coal your coal bed needs to be at least 8" deep throughout firebox.

Problem 2 - Boiler burns too hot

Solution:

- Is boiler the recommended BTU size for your building?
- Turn Samson Regulator to low.
- Check gasket on all Ash Doors (replace if needed). All doors must be sealed.
Do you have a manuel draft damper? If so, close it.
- A windy day will create more draft. If you do not have a barometric damper or manuel damper when burning coal, you must install one now. Read instructions on barometric damper before installing. At least a 0.06 water column on all D.S. Coal Boilers.
- Manuel dampers work good but you need to be cautious because a manuel damper can restrict draft so much that it can create carbon monoxide.

Problem 3 - Poor Draft

Solution:

- Check and clean chimney and single wall chimney connectors
- Check chimney draft – there should be at least a 0.06 inch of water column. This service is provided by a certified chimney sweep or a professional installer.
- Open manuel damper if you have one
- If you have barometric damper? Is it installed properly? Read the instructions.
- Check ash pit. If it is too full - empty it.
- There might be a cracked flue liner. If so you need to reline chimney before further use of the boiler.
- Make sure no other fuel burning devices are connected to the chimney impairing the draft.
- Make sure all of chimney mortar connections are airtight.
- Check chimney for possible down draft caused by taller surrounding trees or objects.
- Make sure clean-out door in the chimney is closed tight if you have one.
- When start up, the chimney is cold so you will have less draft.

Problem 4 - Odor from first fire

Solution:

- Uncured paints and oils will create an odor that can last a few hours. Odors can continue to develop if you make hot fires until the paint cures.

Limited Warranty



LIMITED WARRANTY DS Power Boilers

Please read this warranty carefully!

D.S. Stoves warrants this DS Power Boiler against premature failure of any component due to workmanship, quality or materials. So long as it is owned by the original purchaser, subject to terms, limitations and conditions herein set out. **Soft coal is prohibited in any DS Furnace or Boiler. This warranty is void if anything other than hard coal or dry cord wood is burned in this unit.**

	Time Period
1 - Firebox	Five Years
2 - All doors - (fire and ash door)	Five Years
3 - Cast Iron Components (grates, grate rails, bypass baffle and firebox retainer)	Five Years
4 - All Electrical Components	One Year

D.S. Stoves will replace, at no charge to the owner, any defective part which D.S. Stoves determines affects the operation of the stove.

The owner is responsible for labor and costs to complete the repair. The owner may at his option and with D.S. Stoves approval, have the stove shipped to the factory for repair. All labor and material costs for repair at the factory will be borne by D.S. Stoves.

The owner is responsible for all shipping costs.

D.S. Stoves gaskets, paint or enameled parts, firebrick, and furnace cement are not covered by this Limited Warranty.

Failure to follow installation and basic operation recommendations written in this negligence abuse modifications to the boiler or over firing 200 degrees water temperature, as determined by D.S. Stoves or its authorized dealers.

This Limited Warranty is in lieu of all other warranties either expressed or implied.

D.S. Stoves is not responsible for accidents due to improper installation or failure to follow instructions.

– D.S. Stoves
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