



DS Stoker Boiler

High Efficiency Auger Fed Rice Coal Stoker Boiler

Model SB200

OWNER'S MANUAL



This Boiler meets
U.S. Test Standard UL 391
CAN/CSA B - 366.1



MADE IN USA
By
D.S. MACHINE SHOP

Before you install or operate a DS Stoker 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

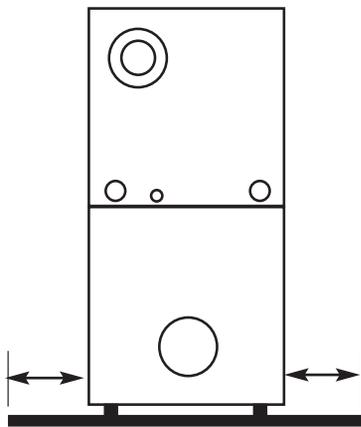
- 1 - Read all instructions carefully before installing or operating any D.S. boiler.
- 2 - **You must install smoke and carbon monoxide detectors before you install or operate any boiler. Check your local codes, this installation must comply with their rulings.**
- 3 - Never leave boiler doors open when unattended
- 4 - Install a barometric damper in your chimney system.
- 5 - Do not hook up a coal boiler to an aluminum type B gas vent. Use a code approved Class A chimney that is equal or greater than the exhaust on the boiler, and a minimum of 20' high.
- 6 - On all new installs connecting to an existing chimney, a level 2 chimney inspection must be done by a certified chimney sweep.
- 7 - Clean chimney before installing boiler. If there is creosote attached to the liner you could create a serious chimney fire.
- 8 - 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 severely burned.
- 9 - Keep boiler area clear from all combustible materials, gasoline, and other flammable vapors and liquids.
- 10 - Do not burn garbage, gasoline, drain oil or other flammable liquids.
- 11 - Do not operate boiler with fire or ash removal door open.
- 12 - Use the required floor protection as shown on (page 3).
- 13 - Check the clearance to combustible walls and floors. (see page 3)
- 14 - Do not allow anyone who is unfamiliar with the boiler to operate it.
- 15 - Spend some time with your boiler to become well acquainted with the different settings and how each will affect its burning patterns. It is impossible to state just how each setting will affect your boiler because of variations in each installation, and chimney drafts.
- 16 - Be extremely careful when removing the boiler ash pan. It can get very hot!
- 17 - Make sure your single wall chimney connectors have at least 3 screws per joint.
- 18 - You must install a 30# safety valve.
- 19 - Always use a mixing valve when hooking up a domestic coil.
- 20 - The area in which the boiler is located must have an adequate amount of air for combustion. Open basements without storm windows or tight doors generally provide adequate air infiltration. If the boiler is located in a separate room with a tight door ventilation must be provided to an open area within the building or to the outside. If the building is of tight construction with exhaust fans, an outside air supply that is ducted into the boiler room may be required.
- 21 - Keep all covers and shields in place while stoker is in operation.
- 22 - Turn off and disconnect power before disassembling pot, performing any maintenance or repairs.
- 23 - Use #641 Seal-It-Right caulking to seal all joints between base and boiler, auger pipe and any connections to eliminate any carbon monoxide escaping boiler pot area. Carbon Monoxide can cause sickness or death.
- 24 - Do not operate boiler with a fuel draft exceeding 0.06 In. Water Column / 14.93 PA.

Locating Boiler

- 1 - The boiler must be placed on a solid non-combustible floor. If you have a combustible floor it is required to use a floor protector per UL 1618.
- 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 UL plate on boiler for clearances.
- 4 - The type 1 floorboard must extend at least 16" beyond the front and 8" of the back, and sides, and must extend under and 2" beyond either side of the single wall chimney connector 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. The pipe connecting the boiler to the chimney should be at least 24 gauge. Thicker gauges are available and will resist corrosion longer and need fewer replacements. Slope

Locating Boiler - continued

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 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



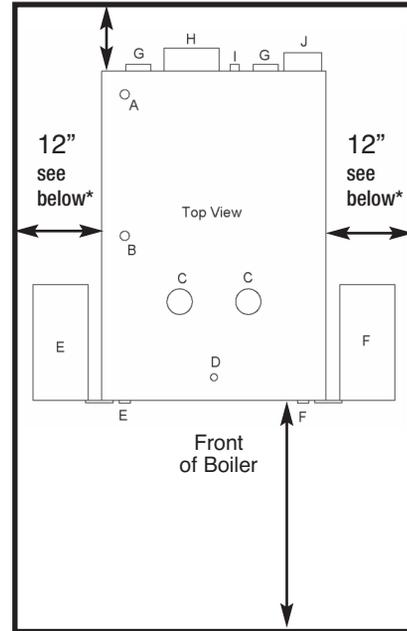
Floor Protection
8" on back & 2 sides, 16" on front

- A - 30# Safety Valve
- B - Extra 3/4" Outlet for Additional Aquastat
- C - 2" Hot Water Out
- D - Temp. Pressure Gauge
- E - Aquastat Location when Control Panel is on Left
- F - Aquastat Location when Control Panel is on Right
- G - 2" Water Return on Back
- H - 8" Exhaust on Back
- I - 3/4" Boiler Drain
- J - Optional Domestic Coil

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 that all single wall chimney connector sections should be connected with at least 3 sheet metal screws per joint. A fire in the stack may cause vibration and poorly fastened piping may come apart causing an extreme fire and smoke hazard. Do not extend single wall chimney connector past the inside edge of the flue liner. If you have a manufactured Stainless Steel chimney, attach single wall chimney connector to single wall chimney connector adapter. Where the pipe connects to a masonry chimney, the flue 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 trim collar.

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



Minimum Clearance to Combustibles

Control side to combustibles	21"
Auger side to combustibles	12"
Back to combustibles	30"
Top to combustibles	18"
Front to combustibles	36"
Single wall stove pipe to combustibles	18"
Double wall stove pipe to combustibles	6"

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 house 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 house. Do Not extend the single wall chimney connector 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 15.

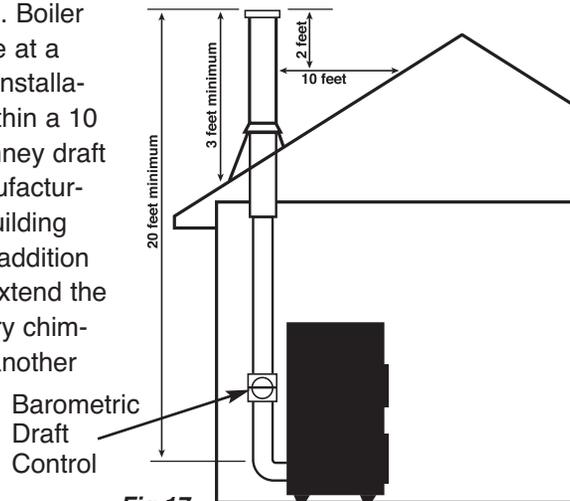


Fig. 17

Installation Instructions

- 1 - Set on noncombustible level hard surface prepared for 1100 lbs
- 2 - See Label or page 3 for clearance to combustibles.
- 3 - When installing screws, nuts, bolts and pipes, it is always important to use an anti-seize compound to aid in future removal.
- 4 - Assemble side ash slides (2 pcs part #SB200-RLAS) to inside control side mounting plates (part #'s SB200-ASMP & SB200-CSMP) using 4-1/4" x 3/4" (F) Black hex bolts and 4-1/4" (J) Zinc nuts. Assemble back ash slide (part # SB200-BKAS) to the back baffle of stoker base. Using 2-1/4 x 3/4 (F) Black hex bolts and 2- 1/4" (J) Zinc nuts. Assemble front ash slide (part #SB200-FTAS) to front panel of stoker base. Using 2- 1/4 x 3/4 (F) Black hex bolt and 2- 1/4" (J) Zinc nuts. See Fig. 1.

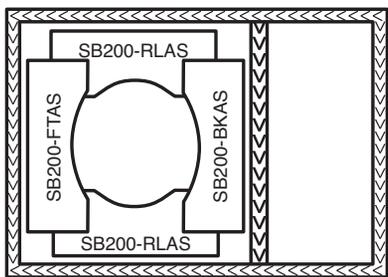


Fig. 1

- 5 - Determine which side of boiler your coal hopper or coal bin will be. Else right or left side. The coal hopper side is called the auger side of boiler in this manual. The side opposite the coal hopper is called the control side of boiler
- 6 - Install (part #SB200-ASMP) to auger side of boiler. Using 8 - 5/16x3/4 (D) SS hex bolts and 8-5/16" (I) SS nuts. See Fig. 4.
- 7 - Assemble pot assembly (part #SB200 pot-assem) to inside of control side mounting plate (part #SB200-CSMP) using 4-5/16x3/4 (D) SS hex bolts and 4-5/16 (I) SS nuts. See Fig. 4.

Chart 1

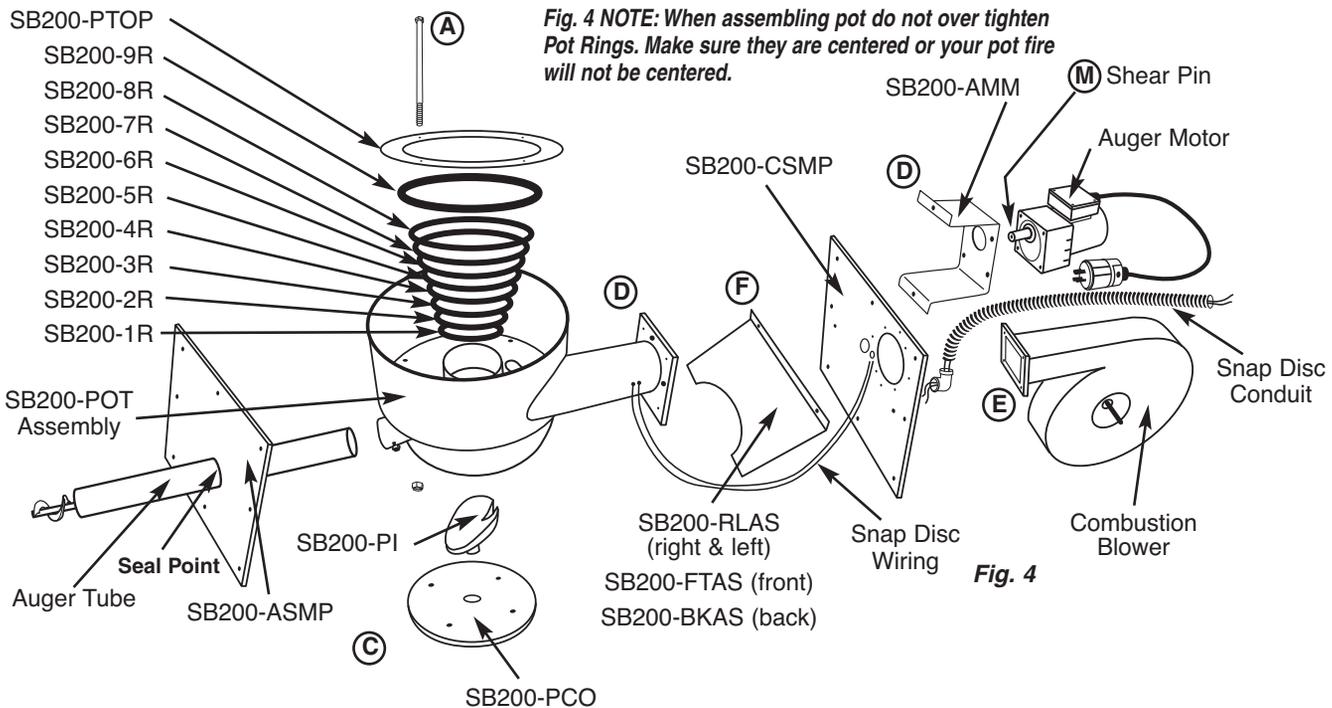
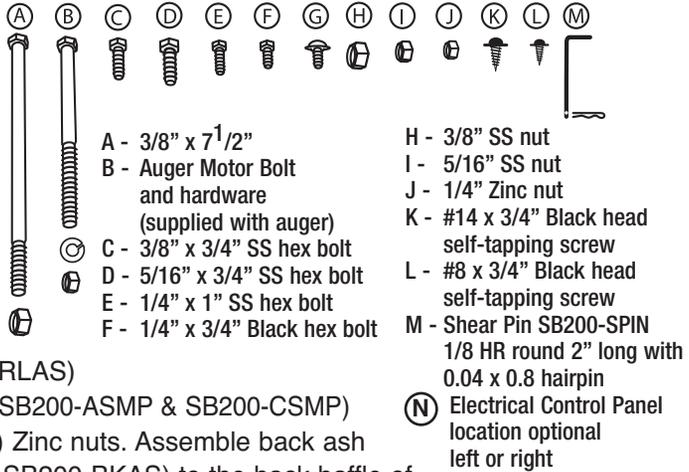


Fig. 4 NOTE: When assembling pot do not over tighten Pot Rings. Make sure they are centered or your pot fire will not be centered.

Fig. 4

- 8 - Assemble combustion blower to outside of (part #SB200-CSMP) using 4- 1/4 x 1 (E) SS hex bolts. See Fig. 4.
- 9 - Attach snap disc conduit with 90° connector #SP200-CSMP and insert snap disc wiring through snap disc conduit. See Fig. 4.
- 10 - Assemble auger motor to auger motor mounting bracket (part #SB200-AMM) using 4-bolts & nuts

Installation Instructions

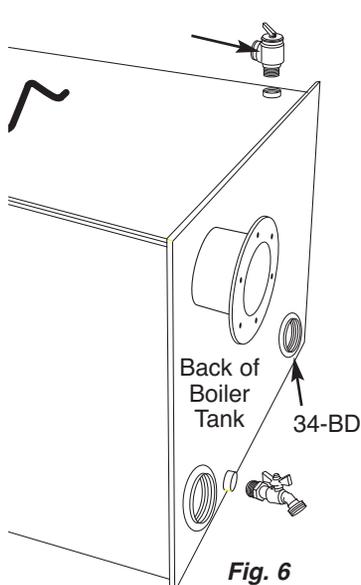
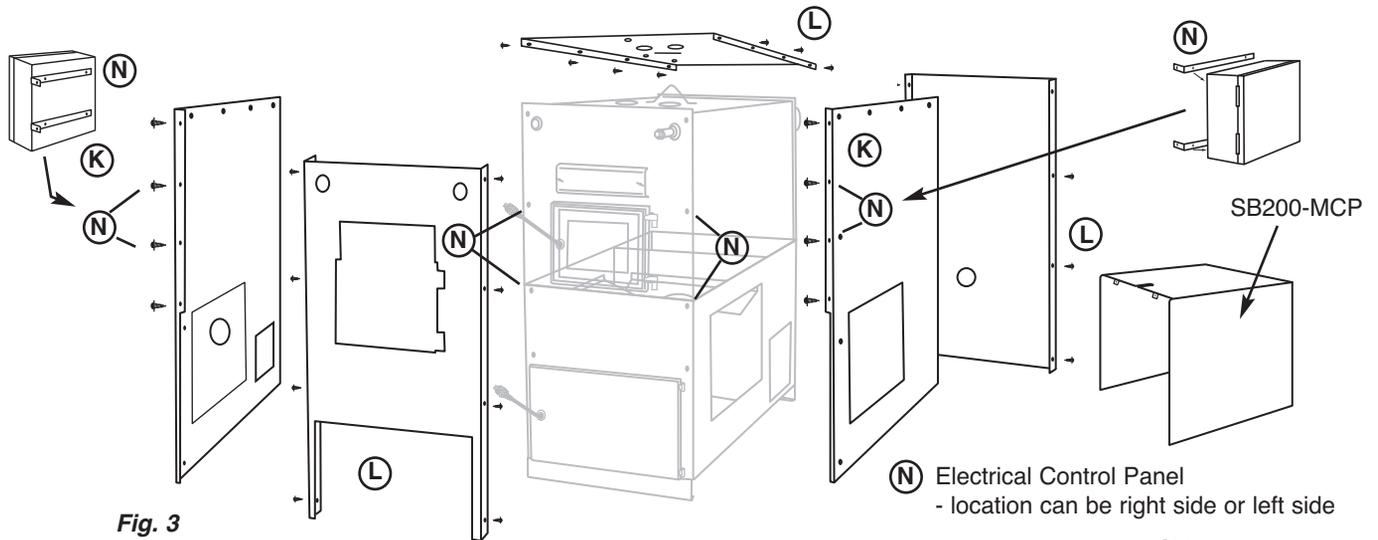
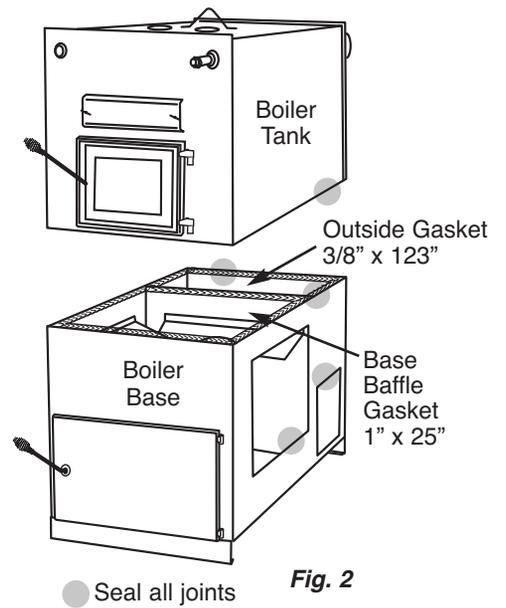
provided with auger motor. Install part #SB200-AMM to outside of part #SB200-CSMP using 2-5/16x3/4 (D) SS hex bolts and 2-5/16" (I) SS nut. See Fig. 4.

11 - Insert standard auger pipe (part #SB200-1AP) into stoker pot inlet and tighten 2-5/16 x 3/4 (D) SS bolts. See Fig. 4.

12 - Disassemble Pot Ring #SB200-PTOP from pot assembly. Install part #SB200-CSMP on control side of boiler using 8-5/16 x 3/4 (D) SS Hex bolts and 8-5/16" (I) SS nuts. Insert short auger pipe through inside of stoker boiler and out the 2-7/16" hole of part #SB200-ASMP. See Fig. 4. Reassemble Pot Ring #SB200-PTOP to pot assembly. See Fig. 4 Note.

13 - Place boiler tank onto boiler base. Make sure that rope gaskets around the outside of base are intact. The 1" x 25" rope gasket for between base baffle and boiler may need to be installed after boiler is placed on base. This can be accomplished through the fire door. Just push gasket in between base baffle and boiler.

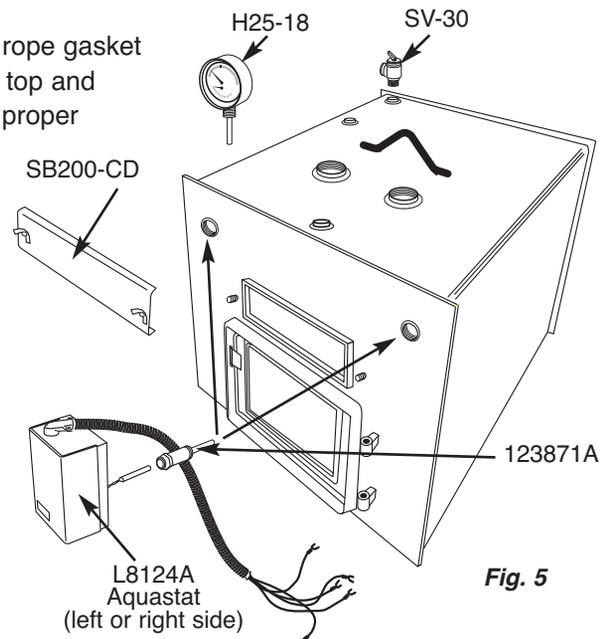
Seal all outside seams between base and boiler with 641 Seal-It-Right caulk shipped with boiler. See Fig 2.



14 - Make sure that the 1" x 25" rope gasket got installed between boiler top and base baffle, and that it is in proper position. See Fig.2.

15 - If you are getting the sheet metal kit option, you will want to install your sheet metal kit next. See Fig 3.

16 - **(If no insulation jacket)** Install electrical control box on the control side of boiler using 2-#14 x 3/4 (K) self tapping screws. See Fig. 3. (N)





BOILERS MUST BE WIRED BY A QUALIFIED LICENSED ELECTRICIAN OR D.S. IS NOT RESPONSIBLE FOR WARRANTY

Installation Instructions

- 16 - Before installing main auger you must first remove the pot insert from bottom of pot. Insert main auger through short auger pipe on auger side of boiler and attach to auger motor on control side of boiler using shear pin(M). See page 4, Fig.4. Reinstall pot insert once auger is installed.
- 17 - Seal all joints where auger pipe exits boiler, and where pipe coupler is used for 5' and 8' auger extension option, seal both ends of pipe coupler as well as where you enter your hopper or bin. Use #641 Seal-It-Right caulk. Provided with boiler. See Figs. 4, 14, 15, 16.
- 18 - Install aquastat in 3/4" outlet on front of boiler on the same side of boiler as control panel. Do not use vise grip or pipe wrench to install aquastat as this will void your warranty. Use 1-5/16 wrench or an adjustable wrench. Do not over tighten. See page 5, Fig. 5.
- 19 - Install a barometric damper in your chimney system. With boiler operating at normal temperature adjust barometric damper so that you have about a negative .05 or negative .06 inches of water column in your single wall chimney connector approx. 12" below barometric damper. See page 3, Fig. 17.
- 20 - Have a licensed electrician connect all your wiring. Make sure all power is disconnected from boiler before opening control box. Connect aquastat and snap disc wiring to control box as shown in wiring diagram. See Fig. 8.
- 21 - When hooking up a thermostat and circulator. See Fig. 7.
 - Thermostat wire goes to T and T.
 - Circulator gets wired to C1 and C2.
 - When using multiple zones use a switching relay and follow directions on your switching relay on how switching relay gets wired into aquastat.

L8124A Aquastat

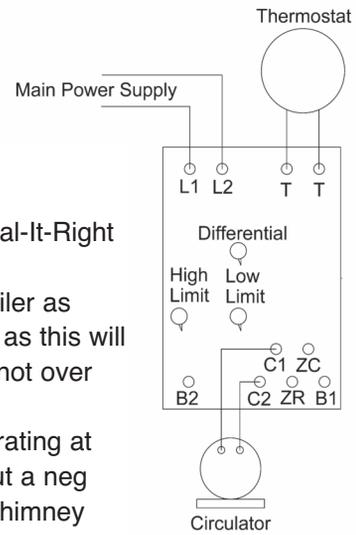


Fig. 7

Wiring Diagram for Aquastat and Pot Snap Disc to Main Control Panel for Initial Hook Up

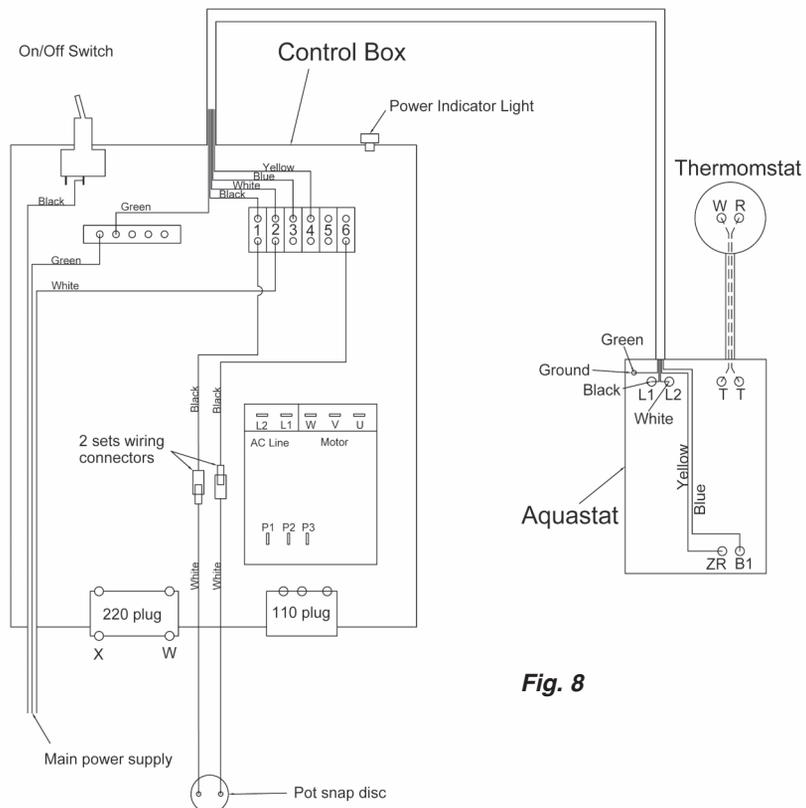


Fig. 8



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Full Electrical Diagram

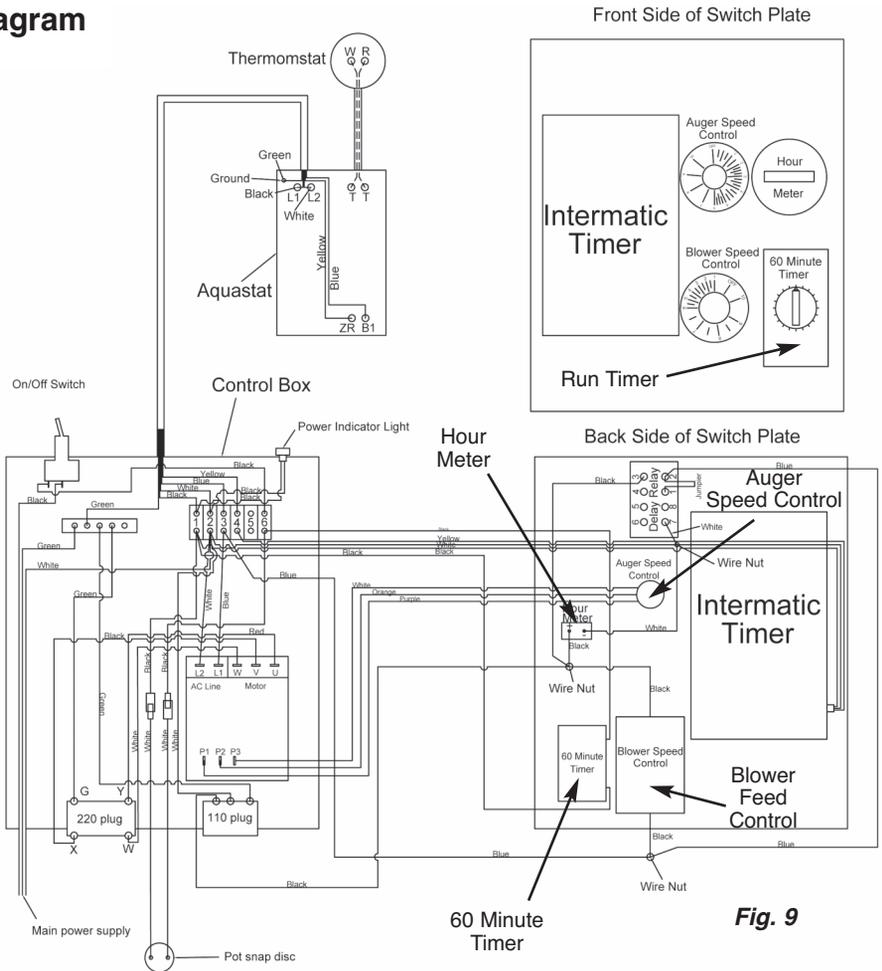


Fig. 9

DS 4GPM-FC and DS 5GPM-FC - Domestic Coil / On-Demand - See Fig. 10

DS 4GPM-FC and DS 5GPM-FC - Domestic Coil / Circulator Pump - See Fig. 11

- This Domestic Coil has a 1 year Limited Warranty
- All Domestic water heaters 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

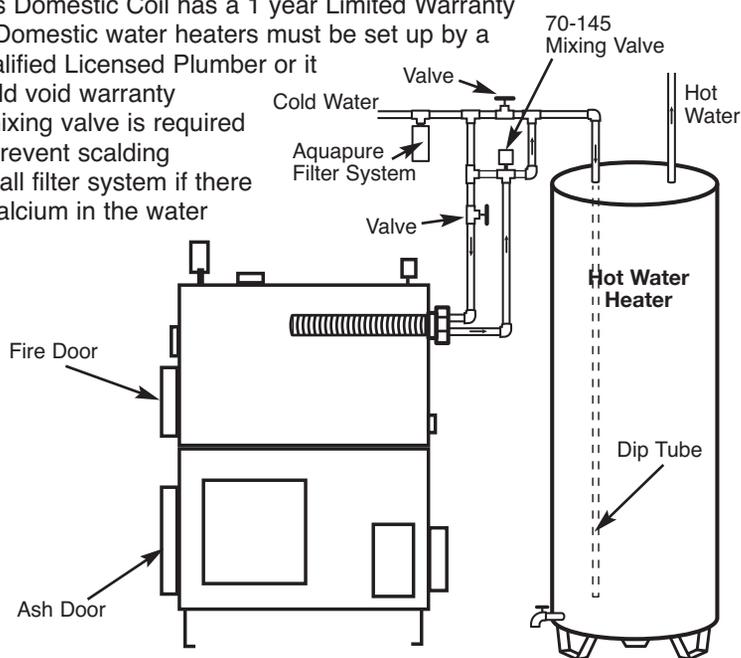


Fig. 10

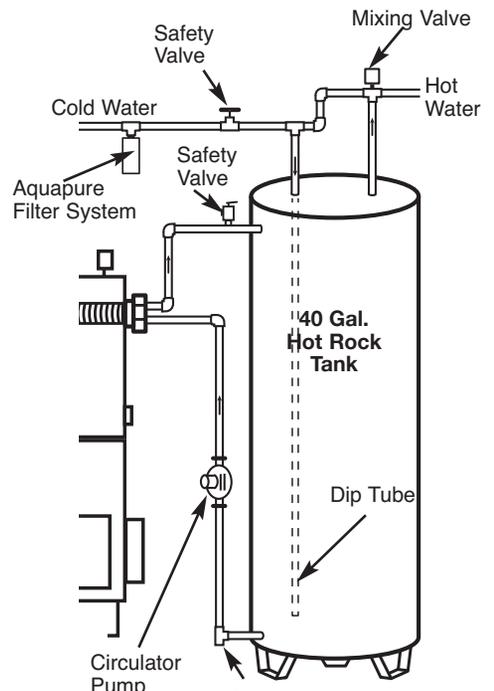


Fig. 11

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.

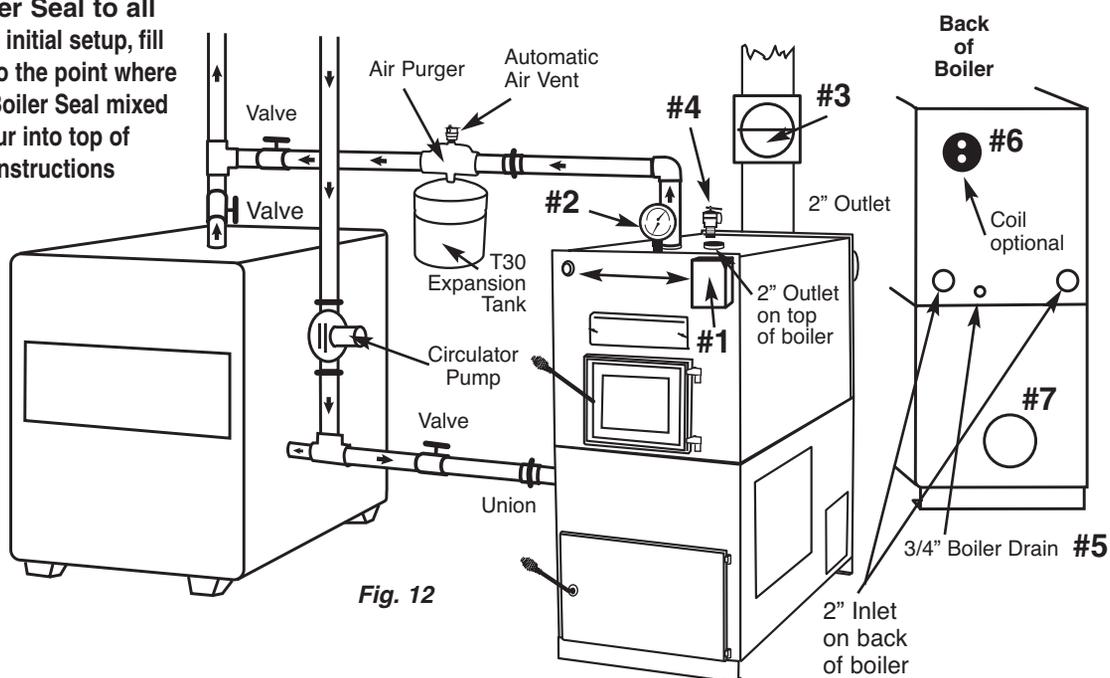


Fig. 12

- #1 Aquastat
- #2 Temperature - Pressure Gauge
- #3 Barometric Damper
- #4 30# Safety Valve
- #5 3/4" Boiler Drain
- #6 4 or 5 Gallon Coil (optional)
- #7 8" Exhaust

- **All D.S. Boilers must be plumbed up 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.

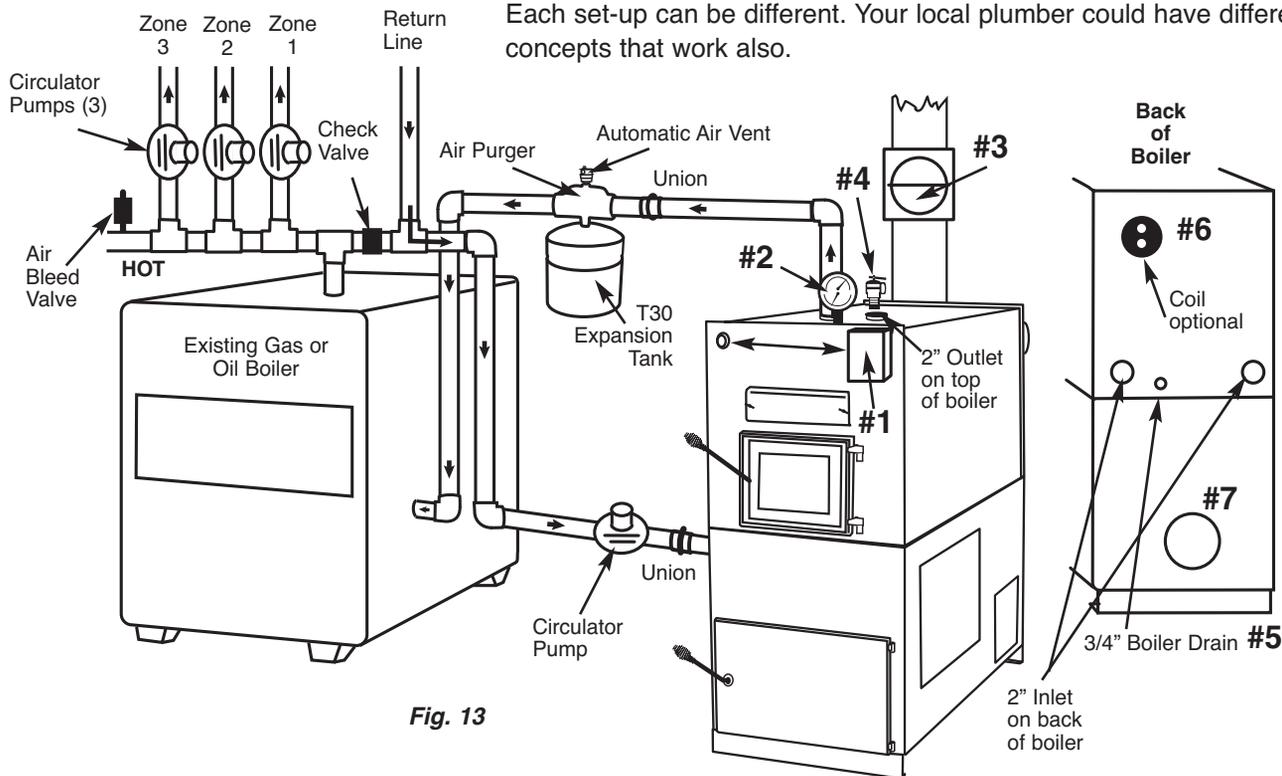


Fig. 13



Operating Instructions

Starting a fire

- 1 - Turn switch on top of control box to on.
- 2 - Turn run timer to one hour. See page 7, Fig. 9 for run timer location.
- 3 - Turn on auger. Set auger speed to high setting and fill stoker pot to top ring. Turn off auger.
- 4 - Bury stoker starter package in center of pot with just the fuse exposed. Or wrap shavings or saw dust in news paper and partially bury in coal.
- 5 - Use torch or lighter to ignite stoker starter or newspaper.
- 6 - Turn combustion blower:
 - on high when using stoker starter
 - on low when using newspaper and shavings
- 7 - Wait till well started then add more coal to top of shavings and newspaper package.
- 8 - When you have blue flames coming off of stoker pot, turn on auger and set combustion blower and auger speed setting to desired heat setting. See Chart 2 below.
- 9 - Must empty ash pan before it overflows. Empty ash pan regularly.

Adjusting The Coal Feed Rate

- 1 - The coal feed rate determines the output of the boiler. See chart below.
- 2 - The coal feed rate is adjusted by changing the RPM's of the auger. This is done by adjusting the auger speed control up or down.
- 3 - You may need two feed rate settings. One for summer time and one for winter time. During the heating season, the feed rate will have to be raised to provide sufficient heat for load conditions. This feed rate may cause outfire conditions during the time you are only maintaining water temperature for domestic water use. See outfire section. It is recommended to record both summer and winter air and coal settings for easy reference.

Adjusting The Air Supply

- 1 - Whenever the coal feed rate is adjusted, the air supply setting needs to be adjusted as well. See chart below. These are approximate settings and may vary according to draft conditions and coal quality. The numbers on the auger speed control are not intended to coincide with the numbers on the blower speed control.
- 2 - It may be necessary to adjust the air supply a few times to find the desired setting. With a proper adjusted fire there will be approximately a 2" wide ash ring around outside of burner ring with a small dark circle in the center of the pot. This is the fresh coal entering into the bottom center of the pot. With too much air, the fire bed will tend to develop cracks. The dark spot in the center of the pot will disappear. With too little air, the ash ring will be very small, hot and dark, falling off the burner ring into the ash pit and the dark spot at the center ring will be large.
- 3 - Some unburned coal in the ash is normal and indicates a well adjusted fire for maximum efficiency. This amount must be small. Excess unburned coal indicates poor air/feed adjustment or a poor grade of coal. In some cases, what appears as unburned coal may be slate or other foreign material.

Output per hour				Approx. Sq Ft Heating Area	Approx. Sq Ft Greenhouse Heating Area
Auger speed	Blower Speed	Pounds of coal per Hr.	Approx. Input BTU		
1.5	2	7	91'700	1800	900
2	2.5	9.5	124'450	2400	1200
2.5	3.5	12	157'200	3000	1500
3	6	14	183'400	3500	1750
3.5	10	15.5	203'050	4000	2000
4	10	19	248'900	4800	2400

This is only a recommended blower speed setting with each auger speed setting. You may need to adjust your blower speed for your chimney draft and coal quality.

Chart 2



Summer Month Operation

Maintaining boiler temperature for domestic use during summer month. Set intermatic timer so that it runs approximately 2 minutes every hour. The best way is to split run time to about 30 seconds every 15 minutes. Which is about two trippers every 15 mins in the intermatic timer box. One tripper will run about 20 seconds, each additional tripper will add 15 seconds run time. This is just a suggested starting point. You will need to adjust to your setup. Chimney draft and coal quality play a role in the required run time of your stoker. If your run time is too high and your boiler water temperature rises to the high limit setting your high limit setting will not allow your stoker to run therefore causing an outfire. To prevent this remove trippers from intermatic timer until you do not get a water temperature rise from stoker running on timer only. We recommend an auger setting of 2 and a fan setting of 2.5 for your summer setting. This is only a recommendation and may vary due to conditions. We find that it works better to not use the lowest settings for summer month.

Winter Month Operation

During the heating season, the feed rate will need to be adjusted to provide sufficient heat for load conditions. See chart for output settings. Intermatic timer settings should be about 35 seconds every 30 minutes. Which is about 2 trippers every half hour. This will vary according to draft and coal conditions.

Out-Fire Situation

- 1 - Is power indicator light ON? If light is ON this indicates that the boiler still has power and is trying to function. If light is OFF this indicates that boiler has shut down due to pot out-fire situation.
- 2 - Check shear pin. If sheared, replace shear pin (part #SB200-SPIN) (M) see page 4 Chart 1.
- 3 - A stoker fired boiler must run periodically to maintain a pot fire even though there is no call for heat by the thermostat or operating aquastat. This is accomplished by the intermatic timer. A normal run time is approximately 35 seconds every half hour. This is a suggested start and times may have to be adjusted to meet conditions and time of year. Due to the wide range in the quality of coal, a timer setting of 2 minutes per hour may produce an acceptable burn. Its an experimental process of timer run times, air and feed settings, with the two main objectives being a proper ash ring (2 inches) and a fire that does not burn deeply into the pot. You may need a summer setting and a winter setting. It is recommended to record your settings for future references.
- 4 - An outfire in the stoker is a more prevalent condition during the summer months. It can happen even though you find nothing wrong with the stoker mechanically.

The following conditions can cause an out-fire.

- **Feed Rate To High For Summer Operation:** In this situation, where the stoker is maintaining boiler water temperature for domestic hot water and there is little domestic water draw, the boiler water temperature can reach the high limit setting. The high limit control overrides the timer, not allowing the stoker to run and results in an outfire. This can be corrected by dropping the feed rate, raising the high limit setting, lowering the operating setting on the aquastat to create more of a temperature spread between the operating and high limit settings on the aquastat, and decreasing the differential on the operating control.

Removing insulation jacket and installing a water circulation pipe on back of unit, will help keep water circulating in boiler.

Note on aquastat settings: The L8124A aquastat has three settings

- 1- The High Limit Setting: This shuts the stoker off when the water reaches the temperature setting. It overrides all other controls.
- 2- The Low Limit Setting: This setting maintains the boiler water temperature and shuts off the stoker when the water temperature reaches the setting, but not if there is a call for heat.
- 3- The Differential Setting: This setting determines when the stoker shuts down on a call for water temperature rise in boiler when the thermostat is not calling for heat. For example: If low limit is set at 160 degrees (water temperature), with a 10 degree differential, the stoker will fire at 150 degrees (water temperature) and shutoff at 160 degrees (water temperature). If low limit is set at 160 degrees (water temperature), with a 25 degree differential, the stoker will fire at 150 degrees (water temperature) and shutoff at 175 degrees (water temperature). The thermostat or timer can override this setting, but can not override the high limit.

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- **Loss of Draft:** This can occur during hot, humid summer weather, with low fire in burner. Changing the number of minutes of run time per half hour, increasing slightly the coal feed and air settings may help. Thoroughly clean the boiler flue pipe and chimney. Remove fly ash buildup in boiler by removing clean out plates and removing fly ash from boiler. Check to make sure all openings that could infiltrate air from boiler base are sealed either by gaskets or seal it right caulk.
- **Too much Draft:** This is most likely to happen during cold, windy weather where there is no barometric damper installed in chimney pipe. In this situation the fire continues to burn, even though the stoker is not on. Adding a barometric damper and or properly adjusting barometric damper can help. Adjust barometric damper so that you have about a negative .05 or negative .06 inches of water column in your single wall chimney connector between your barometric damper and where single wall chimney connector enters the boiler. Exhaust fans can also cause this problem by drawing air down the chimney, through the burner and out of the housing inlet. This can be corrected by providing adequate outside air openings for both the stoker and the exhaust fan or discontinuing the use of exhaust fan.

Cleaning and Maintenance

- **Turn off all power supply or disconnect power cord before attempting any maintenance.**
- We recommend that you run this unit year round. Use to heat domestic hot water during summer month. If not this unit will need to be completely cleaned out immediately after unit cooled down. Take auger out of auger pipe and completely clean out left over coal, this will help reduce corrosion. Spray full inside with vegetable oil. If boiler is located in a damp atmosphere it is recommended to put heat lamp inside boiler to reduce corrosion while boiler is not running.
- Clean out fly-ash every 1,000 hours or at least once annually. You can expect fly-ash buildup behind baffle in the base of unit and under pot rings. (remove pot rings once annually to remove fly ash.) Remove all clean out plates from boiler, (including pot insert clean out on bottom of pot assembly) and remove fly-ash with ash-vac or by just cleaning out manually. Also remove single wall chimney connector from boiler and remove fly-ash. There may be some fly-ash buildup in the single wall chimney connector elbow.
- Check all gaskets and sealer joints for cracks or leaks annually. Replace gaskets or seals as needed.

Coal

- 1 - Use rice sized coal in your stoker boiler. With not more than 10% oversize and not more than 15% under size. Not following these guide lines will result in poor combustion.
- 2 - **Avoid using wet coal, this will retard combustion and increase carbon monoxide output.**

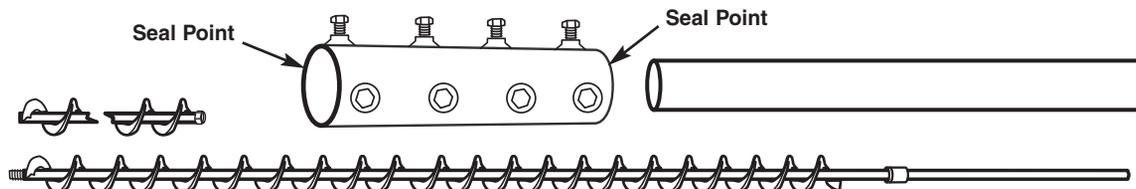


Fig. 14

Example of 5' or 8' Auger Options

Coal Storage

- 1 - Provide an adequate amount of coal storage for your boiler. Preferably indoors in the form of an optional manufactured coal hopper or coal bin within the same room as your boiler. Ideally your coal bin will be located so that your coal supplier can access your coal bin from the exterior of your building. We recommend that you contact your local coal supplier for recommendations on this matter.
- 2 - If you purchased the optional 500 lb coal hopper that is available with this stoker boiler it gets attached to the end of the short auger coming out of boiler. This can be located on either the right or left side of boiler. Make sure you put sealant around auger pipe where it enters hopper. Because of carbon monoxide keep hopper lid closed when not loading coal. **(very important)**
- 3 - Never hook 55 gallon barrel or coal bin to short hopper that gets shipped with boiler, because of carbon monoxide you must add either 5' or 8' auger option. For coal bin option we recommend you build a coal bin feed trap see drawing at right. If using a 55 gallon barrel for coal hopper, it must have a sealed lid.

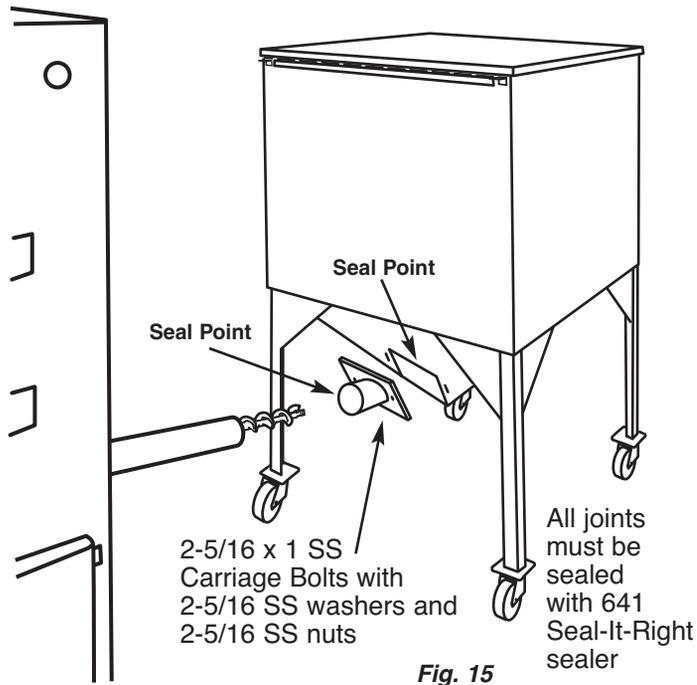


Fig. 15

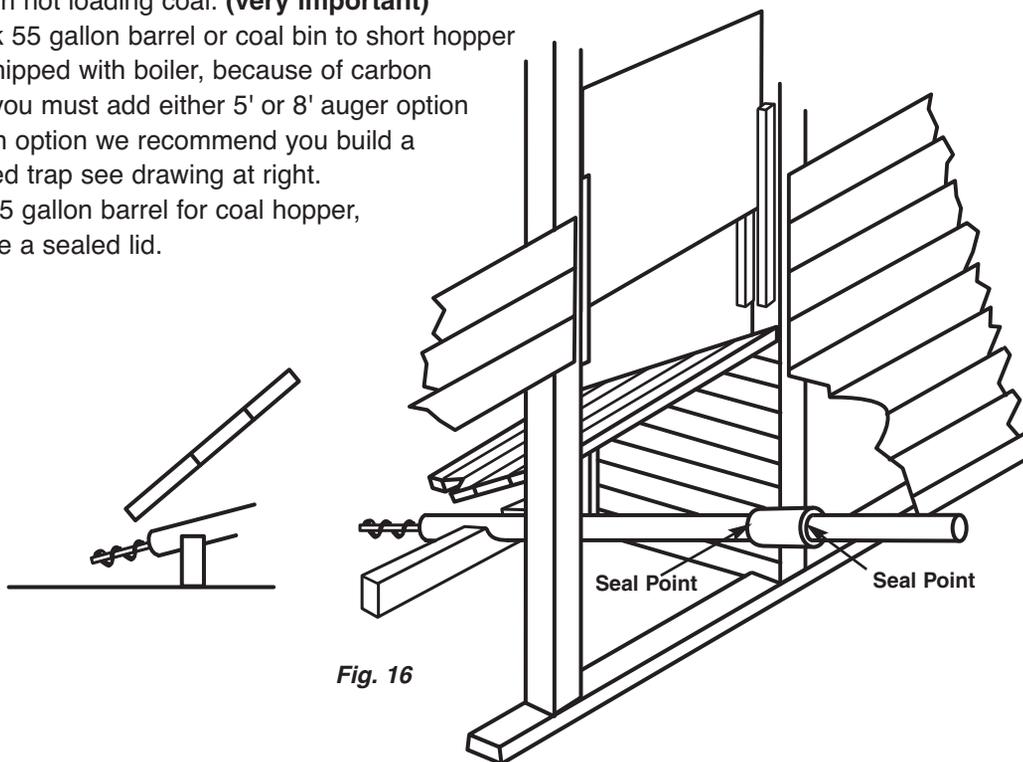


Fig. 16



Boiler Controls

Aquastat: The L8124A aquastat has three settings

- The High Limit Setting: This shuts the stoker off when the water reaches the temperature setting. It overrides all other controls.
- The Low Limit Setting: This setting maintains the boiler water temperature and shuts off the stoker when the water temperature reaches the setting, but not if there is a call for heat.
- The Differential Setting: This setting determines when the stoker shuts down on a call for water temperature rise in boiler when the thermostat is not calling for heat. For example: If low limit is set at 160 degrees (water temperature), with a 10 degree differential, the stoker will fire at 150 degrees (water temperature) and shutoff at 160 degrees (water temperature). If low limit is set at 160 degrees (water temperature), with a 25 degree differential, the stoker will fire at 135 degrees (water temperature) and shutoff at 160 degrees (water temperature). The thermostat or timer can override this setting, but can not override the high limit.

Temperature Pressure Gauge

- 1 - The Temperature Pressure Gauge has two features: A - Needle shows temperature of water.
B - Needle shows water pressure.
- 2 - Note: Normal pressure for closed systems are 12-15 lbs.
- 3 - Warning: Do not exceed 200 degrees water temperature.
- 4 - Thread temperature pressure gauge into 1/2 inch fitting at top front center. See page 8, Fig. 13.

30# Safety Valve

- 1 - This is a pop-off valve. At 30 PSI hot water will dump out of the 30# safety valve.
- 2 - Thread 30# safety valve into 3/4 fitting at top left back corner. See page 8, Fig. 13.
- 3 - 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.

Automatic Fill Valve / Pressure Reducing Valve

- 1 - The Automatic Fill Valve need to be hooked up to the water supply line connected to your system.
- 2 - 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.

Expansion Tank

- 1 - An Expansion Tank is designed to maintain the boiler pressure at 12-15 lbs.
- 2 - 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. If you are putting an air purger in your system it has a port already provided to mount expansion tank.

Circulator Pump

- 1 - 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.
- 2 - The circulator pump is recommended be set up in the return line close to the boiler, pushing water into the boiler.

Domestic Water Coil

- 1 - The Domestic Water Coil will heat 4 or 5 gallons per minute when the water temperature is set at 160 - 180 degrees. NOTE: Always hook up a mixing valve when using a domestic water coil, or someone could get burned.

Air Purger

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

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



Parts List

DS Stoker Boiler

1	Cover box	SB200-MCP	Boiler Controls and Electrical		
1	Ash door	SB200-AD	1	Aquastat	L8124A
2	Exhaust cleanout	SB200-EXCO	1	Intermatic Timer	SB200-EIT
1	Auger side mount	SB200-ASMP	1	Snap Disc (pot)	SB200-ESD
1	Control side mount	SB200-CSMP	1	Auger Motor	SB200-EAM
1	Ash pan	SB200-ASHP	1	Auger Speed Control	SB200-EASC
1	r/h l/h ash slide	SB200-RLAS	1	Blower Motor	SB200-EBM
1	Back ash slide	SB200-BKAS	1	Blower Speed Control	SB200-EBSC
1	Front ash slide	SB200-FTAS	1	Hour Meter	SB200-EHM
1	Base baffle	SB200-BBAF	1	On/off Toggle Switch	SB200-ETS
1	Ash door handle	SB200-ASDH	1	60 minute timer	SB200-ET
1	ash door latch	SB200-ADL	1	Red Power Light	SB200-ERPL
1	Auger motor mount	SB200-AMM	1	110/240V Electrical Convertor	SB200-EC
2	Exhaust cleanout	SB200-EXCO	1	Complete Blower	SB200-CB
1	Cleanout door	SB200-CD	1	30 lbs relief valve	SV-30
1	Energy max door	EM-FD	1	Boiler Drain	34-BD
1	Door glass	EM-GL	1	Temperature pressure gauge	H25-18
	Pot Assembly	SB200-POT	Gaskets		
1	Pot Ring (bottom ring)	SB200-1R	1	Front Clean Out Door Gasket	
1	Pot Ring	SB200-2R		7/8 x 30" window gasket - 30"	78-WG
1	Pot Ring	SB200-3R	1	Fire Door Gasket	
1	Pot Ring	SB200-4R		3/4 x 56" rope gasket	3448-Kit
1	Pot Ring	SB200-5R	1	Fire Door Glass Gasket	
1	Pot Ring	SB200-6R		7/8 x 46" window gasket - 46"	78-WG
1	Pot Ring	SB200-7R	1	Ash Door Gasket	
1	Pot Ring	SB200-8R		3/4 x 77" rope gasket	3475-Kit
1	Pot Ring	SB200-9R	1	Base to Boiler Gasket	
1	Pot Ring (cast iron)	SB200-PTOP		3/8 x 123" rope gasket	38125-Kit
1	Pot Insert (cast iron)	SB200-PI	1	Base Baffle to Boiler	
1	Pot Bottom Clean Out	SB200-PCO		1 x 25" rope gasket - 25"	25" of 726
1	Standard Auger	SB200-3A	2	Auger and Control side panel gaskets	
1	5' Auger	SB200-5A		7/8 x 57" window gasket - 57"	78-WG
1	8' Auger	SB200-8A	2	Side Clean Out Panel Gaskets	
1	Standard Auger Pipe	SB200-1AP		7/8 x 37" window gasket - 37"	78-WG
1	5' Auger Pipe	SB200-SAP	Optional Domestic Coils		
1	8' Auger Pipe	SB200-LAP	1	4 gallon per minute coil	4GPM-FC
1	Auger Motor Bushing	SB200-AB	1	5 gallon per minute coil	5GPM-FC
1	Auger Shaft Shear Bolt	SB200-ASSB	1	4 & 5 gal per minute domestic coil gasket	45GPMC-Gasket
	Optional insulation jacket				
1	Top Sheet Metal	SB200-TSM			
1	Front Sheet Metal	SB200-FSM			
1	Left Sheet Metal	SB200-LSSM			
1	Right Sheet Metal	SB200-RSSM			
1	Back Sheet Metal	SB200-BSM			
1	Side Auger cover plate	SB200SPAC			
1	Side Clean out cover plate	SB200-SEAC			



Trouble Shooting

Problem 1 - Inadequate heat being delivered to your home,

Solution:

- Is boiler the recommended BTU size for your home?
- Check home 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 air auto 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 connector
- Do you have the appropriate amount of floor heat or radiators?

Problem 2 - Poor Draft

- Check and clean fly ash from boiler, 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.
- 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.
- Check and clean chimney and single wall chimney connectors

Problem 3 - Odor from first fire

- 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.

Problem 4 - Out-Fire (see Out-Fire section page 10)

- Is power indicator light: On
- Is shear pin sheared
- Timer operates too infrequently.
- Timer “ON” operation too short. Add trippers to intermatic timer.
- Excessive draft
- Too little draft
- Too much combustion air
- Not feeding coal
- Stoker will not run
- Exhaust fan in building
- Control failure
- Too little coal feed

Problem 5 - Carbon Monoxide

- Burning wet coal
- Poor draft due to partially choked chimney flue (see poor draft section above)
- Check all gaskets and seals on boiler and auger fittings for cracks or leaks
- Coal hopper lid not sealed

Problem 6 - Heat in auger pipe

- Increase auger feed rate



Limited Warranty



LIMITED WARRANTY DS Stoker Boilers

Please read this warranty carefully!

D.S. Stoves warrants this DS 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.**

	Time Period
1 - Boiler / Base	Five Years
2 - Pot / Auger	Five Years
3 - Doors	Five Years
4 - Pot and Auger Components (bushings and wear plates)	One Year
5 - All Electrical Components	One Year

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

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

Failure to follow installation and basic operation recommendations written in this manual, negligence abuse modifications to the boiler or over firing 210 degrees water temperature maximum, as determined by D.S. Stoves or its authorized dealers will also void your warranty.

This Limited Warranty is in lieu of all other warranties either expressed or implied. (US Environmental Protection Agency. The boiler is only for burning Coal. Use of any other solid fuel except for Coal ignition purposes is a violation of federal law.)

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

– D.S. Stoves
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