



DS Gas Boiler
High Efficiency Gas Boiler

Model DSGB150
Category 1 Boiler

Installation, Operating & Service Manual



MADE IN USA
By
D.S. MACHINE SHOP
238-B Old Leacock Road
Gordonville, PA 17529
717-768-3853

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

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

WARNING: If the information in these instructions are not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

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

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance
- Do not touch any electrical switch; do not use any phone in your building
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

WARNING: Danger of property damage, bodily injury or loss of life. The boiler and any other fuel burning appliances must be provided with enough fresh air for proper combustion and ventilation of flue gases. Most homes require that outside air be supplied into the boiler room. Draft hood spillage, with unobstructed vents indicates that additional air must be brought into the structure from outside. Keep a window open (minimum 2 inches) near the appliance until a permanent air duct can be installed.

CAUTION! Label all wiring prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing. Should overheating occur or the gas supply fail to shut off, do not turn off or disconnect the electrical supply to the pump. Instead, shut off the gas supply at a location external to the appliance.

ADVERTISSEMENT. Assurez-vous de bien suivre les instructions données dans cette notice pour réduire au minimum le risque d'incendie ou d'explosion ou pour éviter tout dommage matériel, toute blessure ou la mort.

Ne pas entreposer ni utiliser d'essence ou ni d'autres vapeurs ou liquides inflammables à proximité de cet appareil ou de tout autre appareil.

QUE FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ:

- Ne pas tenter d'allumer d'appareils.
- Ne touchez à aucun interrupteur. Ne pas vous servir des téléphones dans le bâtiment où vous vous trouvez.
- Appelez immédiatement votre fournisseur de gaz depuis un voisin. Suivez les instructions du fournisseur.
- Si vous ne pouvez rejoindre le fournisseur de gaz, appelez le service des incendies.

L'installation et l'entretien doivent être assurés par un installateur ou un service d'entretien qualifié ou par le fournisseur de gaz.

ATTENTION. Au moment de l'entretien des commandes, étiquetez tous les fil avant de les débrancher. Les erreurs de câblage peuvent nuire au bon fonctionnement et être dangereuses. En cas de surchauffe ou si l'admission de gaz ne peut être coupée, ne pas couper ni débrancher l'alimentation électrique de la pompe. Fermer plutôt le robinet d'admission de gaz à l'extérieur de l'appareil.

Safety & Installation Instructions

- Warning!** To avoid possible injury, fire and explosion, read and follow these precautions and all instructions on appliance before lighting the pilot. L.P. (Propane) gas is heavier than air and will remain at floor level if there is a leak. Before lighting, sniff at floor level. If you smell gas, follow these rules
 - Get all people out of building.
 - Do not light matches or lighters. Do not turn electric lights or switches on or off in the area. Do not use an electric fan to remove gas from area.
 - Shut off gas at main shutoff or L.P. tank outside of building.
 - Do not use phone inside building. Call from a neighbor's phone.
 - Telephone gas company and/or fire department. Follow their instructions. Before hanging up, give your name, address and phone number. Do not go back into building. If help is coming wait for them to arrive.
 - If L.P. tank runs out of fuel, turn off gas at appliance. After L.P. tank is refilled, appliance must be relit according to lighting instructions on page 14.
 - If gas control valve has been exposed to water in any way, do not try to use it. It must be replaced. Do not attempt repair on gas control or appliance. Tampering is Dangerous and voids all warranties.
 - Call a qualified service person to make the repairs.
- You must install smoke and carbon monoxide detectors before you install or operate any DS boiler. Check your local codes, this installation must comply with their rulings.**
- Never leave boiler control access panel off when unattended.
- Connect gas boiler to a code approved aluminum type B gas vent or Class A chimney that is equal or greater than the exhaust on the boiler.
- The installation must conform to the requirements of the authority having jurisdiction or in the absence of such requirements, to the National Fuel Gas Code, ANSI Z223.1/NFPA 54 and/or National Gas and Propane Installation Code, CAN/CSA B149.1 Contact your local building or fire officials about restrictions and installations inspections in your area.
- On all new installs connecting to an existing class A chimney, a level 2 chimney inspection must be done by a certified chimney sweep.
- Clean chimney before installing boiler. If there is creosote attached to the liner you could create a serious chimney fire.
- Fireplaces and fan-assisted gas appliances may not be vented into the same chimney as this boiler. Vent connectors serving appliances vented by natural draft shall not be connected into any portion of mechanical draft system operating under positive pressure.
- Unlined masonry chimney construction is prohibited for use as a chimney.
- Install a gas shut-off valve 24" from the outside of the boiler cabinet. It must be conveniently located for easy access.
- 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.
- WARNING!** Keep boiler area clear from all combustible materials, gasoline, and other flammable vapors and liquids.
- Do not install boiler on carpet flooring. This could be a fire hazard.
- Maintain clearance to all combustibles, see page 16 for clearance to combustible chart.
- Do not allow anyone who is unfamiliar with the boiler to operate it.
- Make sure your single wall chimney connectors have at least 3 screws per joint.
- You must install a 30# safety valve on your boiler.**
- 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 light construction with exhaust fans, an outside air supply that is ducted into the boiler room may be required.

19. Keep all covers and shields in place while boiler is in operation.
21. Turn off gas shut off valve before disassembling boiler, performing any maintenance or repairs.
22. The boiler and its gas connections must be leak tested before placing the boiler in operation.

Air Requirements

Provisions for providing air for combustion and ventilation are listed in the section "Air for Combustion and Ventilation," of the National Fuel Gas Code ANSI Z223.1 / NFPA 54, or clause 8.2, 8.3 or 8.4 of Natural Gas and Propane Installation Code, CAN/CSA B149, or applicable provisions of the local building codes.

Most homes will require outside air be supplied to the boiler area by means of ventilation grills or ducts connecting directly to the outside or spaces open directly to the outside such as attic or crawl space. The only exception is when the boiler area meets the requirements and definitions for an unconfined space with adequate air infiltration.

If a confined space area does not join an unconfined space area then air must be provided from outdoors or spaces open to outdoors such as attics or crawl spaces.

Provide two permanent openings, one within 12 inches of top, one within 12 inches of bottom of room connecting directly, or by using ducts, with the outdoors or areas open to outdoors.

If opening connects directly to, or within vertical ducts, the free area of each opening must be at least 1 square inch per 4000 Btu/hr. combined input of appliances in area.

If horizontal ducts are used, the free area of each opening must be at least 1 square inch per 2000 Btu/hr. combined input of appliances in area.

Vent Installation

Proper vent installation and type of gas vent or vent connector.

For boilers for connection to gas vents or chimneys, vent installations shall be in accordance with "Venting of Equipment," of the National Fuel Gas Code, ANSI Z223.1/NFPA 54, or "Venting Systems and Air Supply for Appliances," of the Natural Gas and Propane Installation Code, CAN/CSA B149.1, or applicable provisions of the local building codes. Vent connectors serving appliances vented by natural draft shall not be connected into any portion of mechanical draft systems operating under positive pressure.

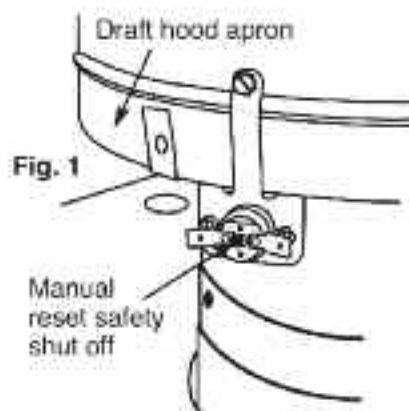
Use of cellular core PVC (ASTM F891), cellular core CPVC, or Radel® (polyphenolsulfone) in venting systems shall be prohibited.

Covering non-metallic vent pipe and fittings with thermal insulation shall be prohibited. For Category II, III and IV boilers, the venting system shall be installed in accordance with the boiler manufacturer's installation instructions.

This boiler must be properly connected to a venting system. This boiler is equipped with a manual reset vent safety shutoff system to protect against improper venting of combustion products. Tampering with or removal of this control will void the limited warranty and can result in carbon monoxide (CO) poisoning and possible death.

This boiler needs fresh air for safe operation and must be installed so there are provisions for adequate combustion and ventilation air. This boiler is equipped with a manual reset vent safety switch. The manual reset vent safety switch will cause gas flow to the main burner to shutoff due to improper venting or a blocked flue. If the manual reset vent safety switch continues to shut off the gas flow, a qualified service person must be contacted to inspect for improper venting, blockage in the vent pipe or the manual reset vent safety switch for being defective. See Fig. 1.

This boiler is equipped with a single use flame roll out switch located on the draft shield inside front cover panel by the gas burner manifold. This unit will shutoff gas flow to the manifold if the temperature



exceeds 218°F (103°C) at the flame roll out switch. If this happens call a qualified service technician to replace your flame roll out switch, and to clean out your blocked venting system. Do not override your flame roll switch in any case. Normally if your flame roll out switch fuse blows, your boiler can not vent properly. See Fig. 2.

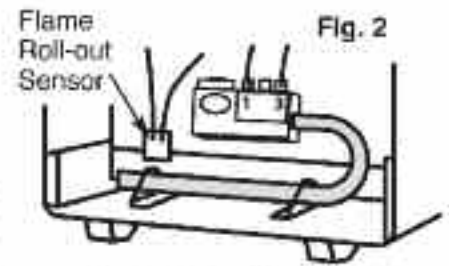


Fig. 2

1. Per ANSI Z223.1/NFPA 54 the vent terminal shall have a minimum clearance of 4 feet (1.22 m) horizontally from, and in no case above or below, unless a 4 feet (1.22 m) horizontal distance is maintained, from electric meters, gas meters, regulators and relief equipment for U.S. installations. Per B149.1 this minimum distance shall be 6 feet (1.83 m) for Canadian installations.

2. An effective flue is necessary to carry off water vapor, carbon monoxide (CO), carbon dioxide (CO₂), and other products of combustion. For proper venting, follow the following basic rules for gravity venting, which are:

- a. Keep the flue gases hot.
 - b. Follow the vent manufacturer's installation instructions.
 - c. Select the proper vent size.
 - d. Provide constant fresh air replacement.
3. Install draft hood on boiler minimum 4-1/2' from top of boiler to bottom of draft hood opening.
 4. For new installation, it is recommended that a Type "B" vent in accordance with its' listing be used. A Type "B" vent is one made of non-combustible, corrosion resistant material of sufficient thickness, cross sectional area and heat insulating quality to avoid excess temperatures on adjacent combustible material and certified by a nationally recognized testing agency. Existing brick flues should be lined to provide an effective vent. Brick chimneys, even in good repair, may be too large and will not provide sufficient draft to effectively vent a boiler.
 5. Use vent pipe of the same size as the outlet on top of boiler. In no case should a different size vent be used. Single wall vent pipe may be attached directly to the draft hood of the boiler when a clearance of 6 inches (152mm) is maintained between the single wall vent pipe and the combustible wall of the room in which the boiler is located. Use double wall vent pipe for clearances less than 6 inches (152mm) to combustibles.
 6. Avoid a horizontal run to the vent pipe when ever possible. Horizontal portions of the venting system shall be supported to prevent sagging. Follow venting Manufacturer's instructions. When a horizontal run is necessary, the pipe must pitch upward at least 1/4 inch per foot (21mm/m). It must be supported securely and joints fastened by sheet metal screws or rivets. Under no circumstances should the vent run downhill.
 7. Never put a damper or barometric draft control in a gas vent pipe.
 8. Never end a vent in an open attic or run a vent through a wall to the outside without extending it upward above the roof.
 9. Always terminate the vent with an approved vent cap.
 10. ALWAYS SECURE VENT PIPE TO THE OUTLET ON THE TOP OF THE BOILER WITH TWO SHEET METAL SCREWS.
 11. The flue pipe should extend through the wall of a masonry chimney to be flush with the inner wall.
 12. The flue pipe must be adequately supported by metal strips.
 13. When using single wall stove pipe all splices must be secured with at least 3 sheet metal screws each.
 14. For the flue pipe running through walls and roofs, use B type (1 inch (25mm) clearance to combustibles) vent pipe.

6. Les instructions d'installation du système d'évacuation doivent préciser que les sections horizontales doivent être supportées pour prévenir le fléchissement. Les méthodes et les intervalles de support doivent être spécifiés. Les instructions doivent aussi indiquer les renseignements suivants: Les chaudières de catégories I, II et IV doivent présenter des tronçons horizontaux dont la pente montante est d'au moins 1/4 po par pied (21 mm/m) entre la chaudière et l'évent;

15. Vents should extend at least 2 feet (.6m) above the roof and above any object or nearby building within 10 feet (3m).
16. Open tees should not be used in the flue pipe.
17. The boiler must not be connected to a chimney flue that is servicing a separate solid-fuel burning appliance.
18. For proper venting, do not attach a 90 degree elbow directly to the draft diverter. It is recommended to attach 2 feet (.6m) of straight vent pipe before an elbow is used. Use 45 degree elbows if possible. Run flue pipe as direct as possible with not more than two elbows.
19. The use of more than one appliance per vent system may cause the manual reset vent safety shutoff device to shut off the boiler due to the cooling of vent temperatures through the draft diverter of the second appliance.
20. The manual reset vent safety shutoff may shut down the boiler if too large or an unlined, masonry chimney is used. The vent may not warm quickly enough to get adequate vent action in a chimney before the manual reset shutoff device will shut down the boiler. If this is the case, it is recommended lining the chimney with proper size type "B" vent pipe or type "B" vent chimney liner.
21. Single-wall metal pipe should not be used outdoors in cold climates of vented gas equipment. If the vent is installed directly outside, the cold pipe may delay the venting and cause the boiler to shutoff by the manual reset vent safety switch. To prevent this problem, as well as condensation of flue products, an insulated enclosure is recommended. Use type B, vent pipe and maintain at least a one inch clearance to combustibles. Use a metal thimble to protect vent pipe as it passes through combustibles.

Removal of an existing boiler and venting system.

When an existing boiler is removed from a common venting system, the common venting system is likely to be too large for proper venting of the appliances remaining connected to it.

At the time of removal of an existing boiler, the following steps shall be followed with each appliance remaining connected to the common venting system placed in operation, while the other appliances remaining connected to the common venting system are not in operation.

1. Seal any unused openings in the common venting system.
2. Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.
3. Insofar as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of the building. Turn on clothes dryers and any appliance not connected to the common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fire

Les instructions doivent comprendre le mode opératoire d'essai indiqué ci-dessous:

Au moment du retrait d'une chaudière existante, les mesures suivantes doivent être prises pour chaque appareil toujours raccordé au système d'évacuation commun et qui fonctionna alors que d'autres appareils toujours raccordés au système d'évacuation ne fonctionnent pas:

1. Sceller toutes les ouvertures non utilisées du système d'évacuation.
2. Inspecter de façon visuelle le système d'évacuation pour déterminer la grosseur et l'inclinaison horizontale qui conviennent et s'assurer que le système est exempt d'obstruction, d'étranglement, de fuite, de corrosion et autres défaillances qui pourraient présenter des risques.
3. Dans la mesure du possible, fermer toutes les portes et les fenêtres du bâtiment et toutes les portes entre l'espace où les appareils toujours raccordés au système d'évacuation sont installés et les autres espaces du bâtiment. Mettre en marche les sècheuses, tous les appareils non raccordés au système d'évacuation commun et tous les ventilateurs d'extraction comme les hottes de cuisinière et les ventilateurs des salles de bain. S'assurer que ces ventilateurs fonctionnent à la vitesse maximale. Ne pas faire fonctionner les ventilateurs d'été.

- place dampers.
- Place in operation the appliance being inspected. Follow the lighting instructions. Adjust thermostat so appliance will operate continuously.
 - Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle, or smoke from a cigarette, cigar, or pipe.
 - After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers, and any other gas-burning appliance to their previous condition of use."
 - Any improper operation of the common venting system should be corrected so the installation conforms with the National Fuel Gas Code, ANSI Z223.1/NFPA 54, and/or the Natural Gas and Propane Installation Code, CAN/CSA B149.1. When resizing any portion of the common venting system, the common venting system should be resized to approach the minimum size as determined using the appropriate tables in Chapter 13 of the National Fuel Gas Code, ANSI Z223.1/NFPA 54, and/or the Natural Gas and Propane Installation Code, CAN/CSA B149.1 Natural Gas and Propane Installation Codes.

Fermer les registres des cheminées.

- Mettre l'appareil inspecté en marche. Suivre les instructions d'allumage. Régler le thermostat de façon que l'appareil fonctionne de façon continue.
- Faire fonctionner le brûleur principal pendant 5 min ensuite, déterminer si le coup-tirage déborde à l'ouverture de décharge. Utiliser la flamme d'une allumette ou d'une chandelle ou la fumée d'une cigarette, d'un cigare ou d'une pipe.
- Une fois qu'il a été déterminé, selon la méthode indiquée ci-dessus, que chaque appareil raccordé au système d'évacuation est mis à l'air libre de façon adéquate. Remettre les portes et les fenêtres, les ventilateurs, les registres de cheminées et les appareils au gaz à leur position originale.
- Tout mauvais fonctionnement du système d'évacuation commun devrait être corrigé de façon que l'installation soit conforme au National Fuel Gas Code, ANSI Z223.1/NFPA 54 et (ou) aux codes d'installation CAN/CSA-B149.1. Si la grosseur d'une section du système d'évacuation doit être modifiée, le système devrait être modifié pour respecter les valeurs minimales des tableaux pertinents de l'appendice F du National Fuel Gas Code, ANSI Z223.1/NFPA 54 et (ou) les codes d'installation CAN/CSA-B149.1.

IMPORTANT: Inspect venting system prior to each heating season.

Typical Methods of Safely Venting Your Boiler

- Any horizontal run of vent pipe must slope upward a minimum of 1/4" per foot (21mm/m). Secure all joints of the vent with sheet metal screws.
- Where the vent passes through the ceiling or wall, a thimble is required to keep the ceiling from catching fire. Use only a thimble designed for use with Type "B" gas vent, certified by a nationally recognized testing agency.
- The vertical (straight up and down) part of the vent must end 2 feet above any part of the roof within 10 feet of the vent. This is to make sure the "draw" of the vent is not obstructed in any way.
- A vent cap, approved by a nationally recognized testing agency, must be installed on top of the vent to keep out rain and snow and to prevent obstructions of the vent. The vent cap will also prevent excessive downdraft that can cause carbon monoxide to enter into the home. Do not use a homemade vent cap. They are dangerous and can restrict the draft of the vent.
- Safe clearances are shown on page 16. To prevent a fire, make sure the boiler is installed no closer than the distances shown in the figures that apply to your type of venting.
- If you are venting into a masonry chimney, it must be lined, in good repair and must not serve a

1. Les chaudières de catégories I, II et IV doivent présenter des tronçons horizontaux dont la pente montante est d'au moins 1/4 po par pied (21 mm/m) entre la chaudière et l'évent;

wood or coal burning appliance. The flue must be at least as large in diameter as the vent connector. The top of the chimney must be two (2) feet higher above any part of the roof within ten (10) feet horizontally of the chimney and must be three (3) feet higher than the point where it passes through the roof line.

Gas Piping Installation



ASSURE GAS PIPING IS LEAK FREE AND OF PROPER SIZE
and type for the connected load.



SHUT OFF MAIN GAS SUPPLY
prior to installing or servicing boiler gas piping.

1. Remove tape / cover from left side of gas valve and connect to 1/2" Female NPT with approved and properly sized gas line.
2. Determine the boiler's maximum gas demand and minimum gas supply pressure (printed on the boiler's rating label) and the demand of other gas appliances served by the same gas meter.
3. Ensure that gas piping, fittings, and gas meter capacities can supply the maximum gas demand of all appliances at pressures above their minimum allowable gas pressure.
4. For materials or conditions other than those listed above, refer to the National Fuel Gas Code, NFPA 54/ANSI Z223.1, or size the system using standard engineering methods acceptable to authority having jurisdiction.



USE PROPER THREAD COMPONENTS
on all gas connectors.



USE THREAD (JOINT) COMPOUNDS
(pipe dope) rated for liquefied petroleum gas.



DO NOT USE GAS PIPING AS A GROUNDING ELECTRODE
Refer to National Electrical Code NFPA 70.



DO NOT CHECK FOR LEAKS USING OPEN FLAMES
such as matches or candles or devices that spark.

5. Bond all above-ground gas piping to a grounding electrode and ensure the piping is electrically continuous.
6. Install sediment trap, ground-joint union and manual shutoff valve upstream of boiler gas control valve and outside jacket, but within two foot of outside of boiler jacket. See drawing Fig. 3.
7. When the piping is completed, the boiler and its gas connection must be leak tested before placing the boiler in operation.
 - (1) When leak testing over 1/2 psig (3.5 kPa), disconnect the boiler and its individual shut-off valve from the gas supply piping.
 - (2) When leak testing at 1/2 psig (3.5 kPa) or less, isolate boiler from gas supply piping by closing boiler's individual manual shut-off valve.
 - (3) Locate leaks using approved combustible gas detector

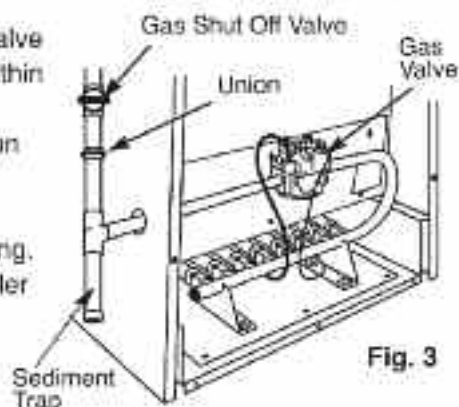


Fig. 3

or nonflammable, non-corrosive leak detection solution.

8. Repair any detected leaks.
9. The boiler piping system of a hot water boiler connected to heating coils located in air handling units where they may be exposed to refrigerated air circulation must be equipped with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

Adjusting Gas Input Rate

1. Verify inlet gas pressure (1) does not exceed maximum inlet gas pressure shown on rating label; and (2) exceeds minimum inlet gas pressure shown on rating label.
2. Connect manometer or pressure gauge to gas valve outlet pressure tap; see Fig. 4. Place shut-off valve between gas valve and manometer (gas pressure can be introduced gradually to avoid pressure surge when gas valve opens that could blow liquid out of manometer. See Fig. 4)
3. Check manifold pressure with burner on and gas valve open.
4. **Liquefied Petroleum Gases** (LP Propane). Adjust gas valve pressure regulator to provide outlet pressure of 10 inches water column.
OR

Natural Gas Adjust gas valve pressure regulator to provide manifold outlet pressure of 4 inches water column. Check input rate by clocking gas meter.

• Adjust gas valve pressure regulator, if necessary, to change output rate (turn counterclockwise to decrease pressure and decrease output, see Fig 5.



DO NOT FORCE THE ADJUSTMENT SCREW

• Contact your DS Stoves LLC wholesale distributor for alternate main burner orifices if outlet pressure is less than 3.2 inches water column or greater than 4 inches water column. Provide current main burner orifice size, outlet gas pressure and measured input rate.

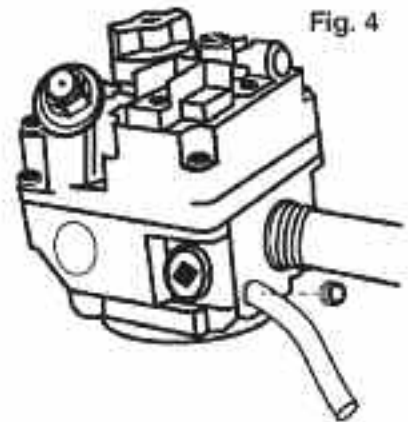


Fig. 4

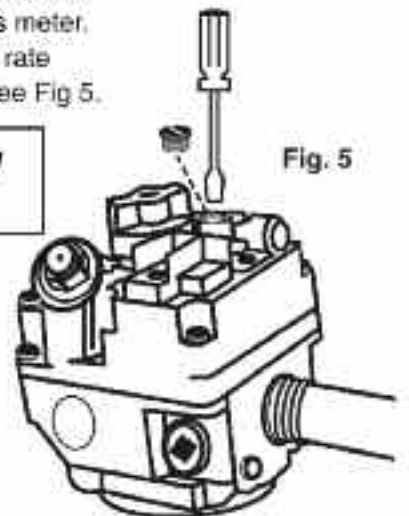


Fig. 5

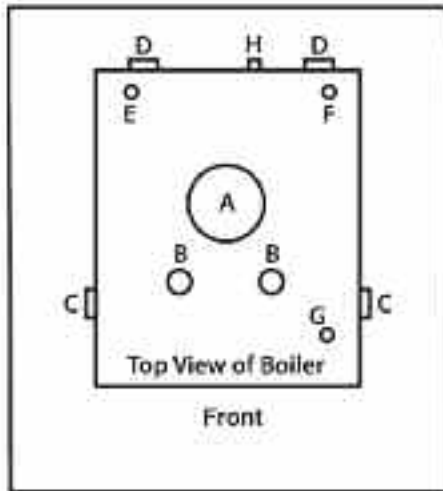


Fig. 6

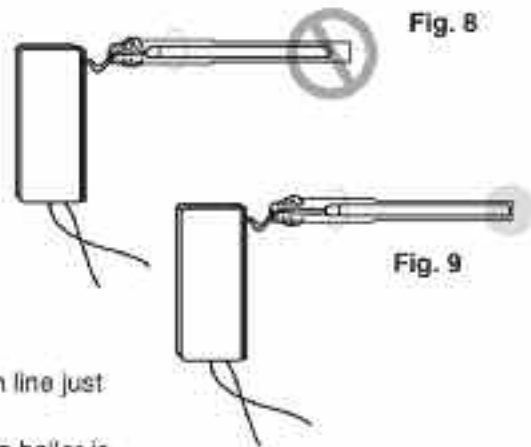
- A - 6" Exhaust
- B - 2" Feed Outlet
- C - 2" Side Feed Outlet
- D - 2" Return Outlet
- E - 3/4" Relief Valve Port
- F - 1/2" Temperature / Pressure Gauge Port
- G - 3/4" Optional Aquastat Port
- H - 3/4" Boiler Drain Port

Boiler Water Piping Installation Instructions

1. Apply sealant to all threads.
2. Screw 30# relief valve into port E on top back left corner of boiler. See Figs. 6 & 7 for port location.
3. Follow all installation instructions on relief valve when installing.
4. **Warning! PIPE THE RELIEF VALVE DISCHARGE to a location where it will not harm people or damage property. The relief valve may discharge scalding hot water or steam.**
5. **Warning! BLOCKING THE RELIEF VALVE may result in boiler explosion.**
6. Screw temperature pressure gauge into port F on top back right corner of boiler. See fig. 6 for port location.
7. Apply sealant and tighten 3/4" boiler drain on back center port H of boiler. See fig. 6 for port location.
8. Install aquastat in well stem on inside front panel. Be sure to insert sensor bulb into well stem as far as possible. See pages 12 & 13 for standard aquastat location. See Figs. 8 & 9 for proper installation. Then attach aquastat housing to well stem and tighten with screwdriver. See Fig. 13 for wiring schematic.
9. Port's B of boiler are hot water feed outlets. See Fig. 6.
10. Port's D of boiler are cold water return ports. See Fig. 6.
11. Port's C of boiler are optional hot water feed ports for gravity or circulator systems that require a lower outlet. You must install an auto air vent on top of boiler when using side outlets for hot water feed. See Fig. 6.
12. Install a properly sized expansion tank.
13. Install a feed water regulator set @ 12 psi in the return line just before the boiler. See pages 12 & 13.
14. Install a low-water cut off (LWCO) device whenever the boiler is installed above the level of the lowest heat emitter or radiator. Also add a low-water cut off when required by local code requirements. It is recommended that the LWCO control is installed above the boiler to provide the highest level of protection. However, where the LWCO control is approved by the LWCO control manufacturer for installation in a high boiler tapping of a water boiler, the use of the listed LWCO control is permitted when it is installed according to the LWCO manufacturer's



Fig. 7

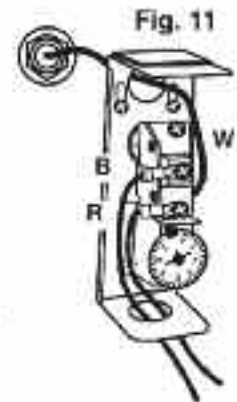
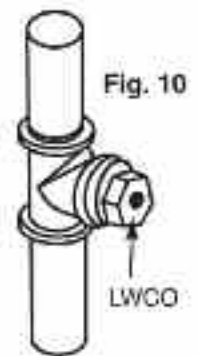


instructions. See Fig. 13 for wiring schematic.

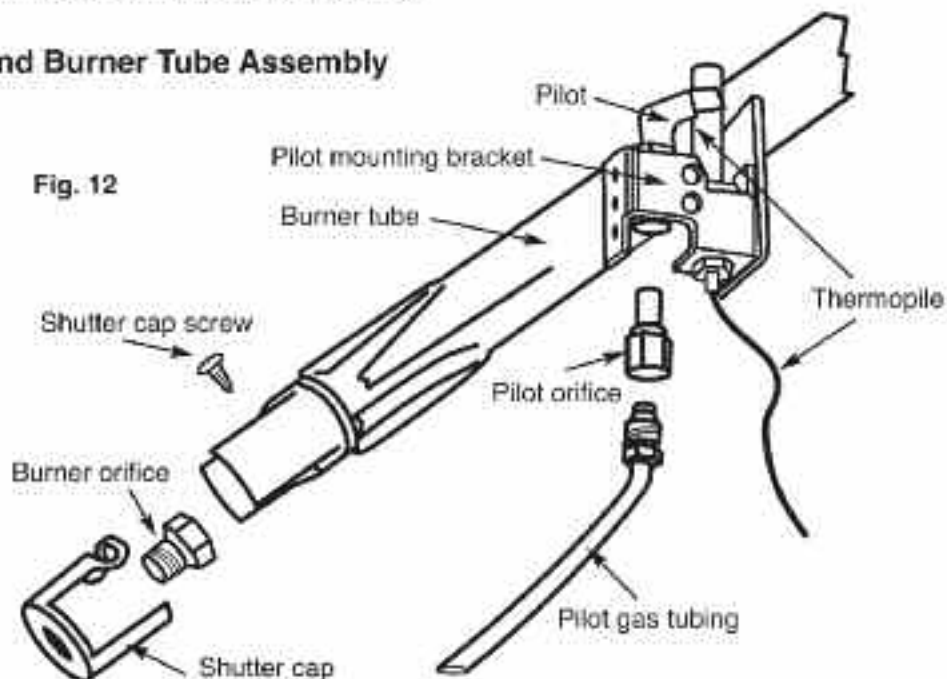
15. Install an air purger and an auto air vent in your system. Preferably in the hot water feed line within 5' of the boiler.
16. If any part of this system is exposed to an unheated or uninsulated area add an inhibited antifreeze solution.
17. You may plug any B, C or D Ports that are not needed for your system.
18. Port G is an optional aquastat port.
19. The High Limit Control is a secondary control to prevent water temperature from exceeding 250 degree Fahrenheit.
19. **This installation is not complete until relief valve is installed.**

Note on Aquastat Settings

1. The aquastat shuts the burner off when the water temperature reaches the temperature setting minus 10°F plus the differential setting.
2. The aquastat can be used as a high limit aquastat, where you have a thermostat that turns on the burner when there is a call for heat. Burner will stay on till either thermostat is satisfied or water temperature reaches aquastat set point minus 10°F plus differential setting. If boiler water reaches aquastat set point temperature minus 10°F, plus differential, it will turn burner off till boiler water temperature drops under aquastat set point minus 10°F. Then burner can turn back on providing there is still a call for heat from the thermostat.
3. The aquastat can be used to maintain boiler water temperature. This is where you install a jumper wire from one T/W port to the other T/W port on the power strip on the inside front panel. This will maintain water temperature of the boiler between the set point of the aquastat minus 10°F and the set point of the aquastat minus 10°F plus the differential setting.
4. The differential setting: This setting determines when the aquastat will turn on and off based on the actual aquastat setting. For example: with an actual aquastat setting of 160°F and a differential setting of 10°F on a temperature drop the aquastat will turn on at 150°F and turn off at 160°F. With and actual aquastat setting of 160°F and a differential setting of 20°F on a temperature drop the aquastat will turn on at 150°F and turn off at 170°F. With and actual aquastat setting of 160°F and a differential setting of 30°F on a temperature drop the aquastat will turn on at 150°F and turn off at 180°F. setting. It overrides all other controls.

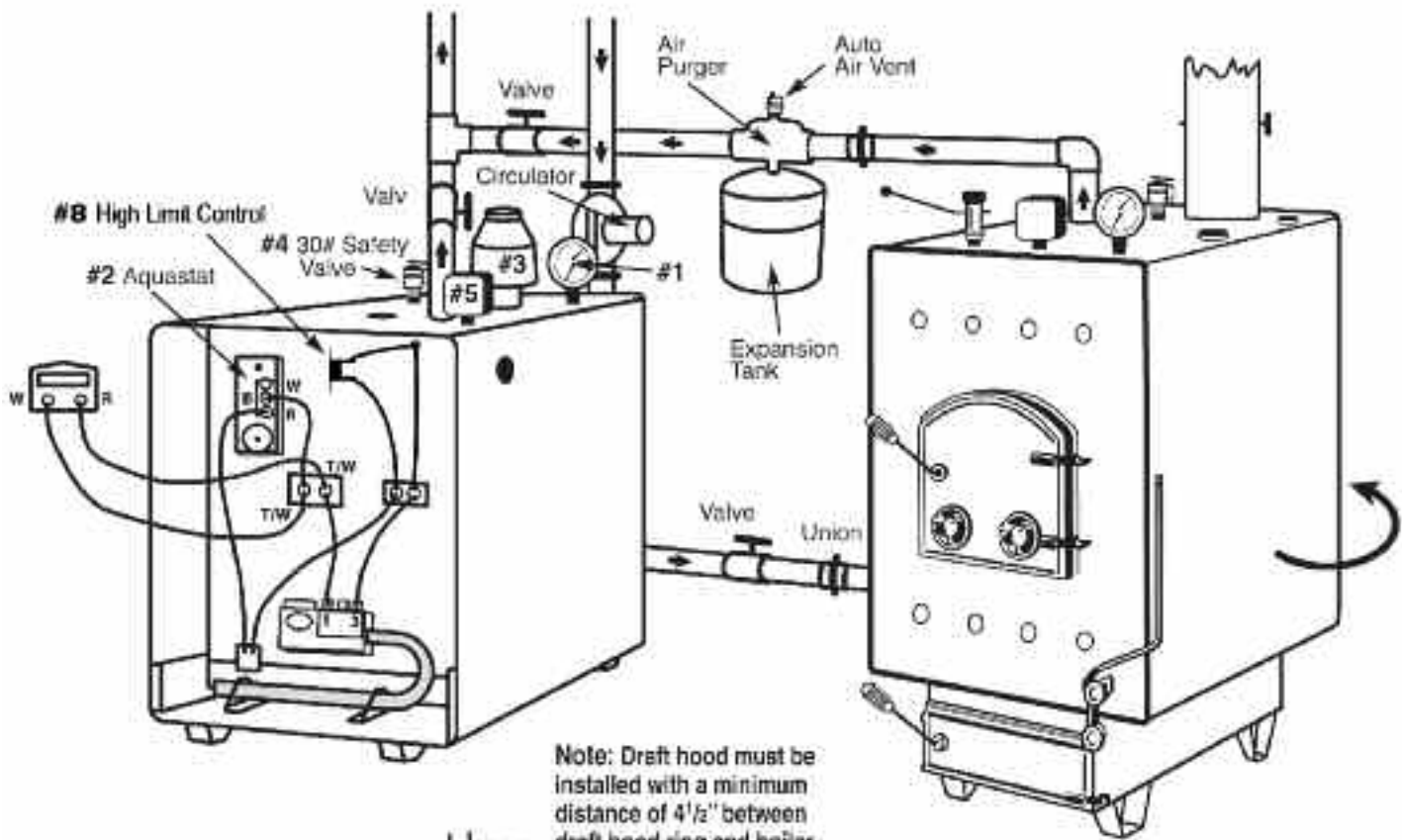


Pilot and Burner Tube Assembly

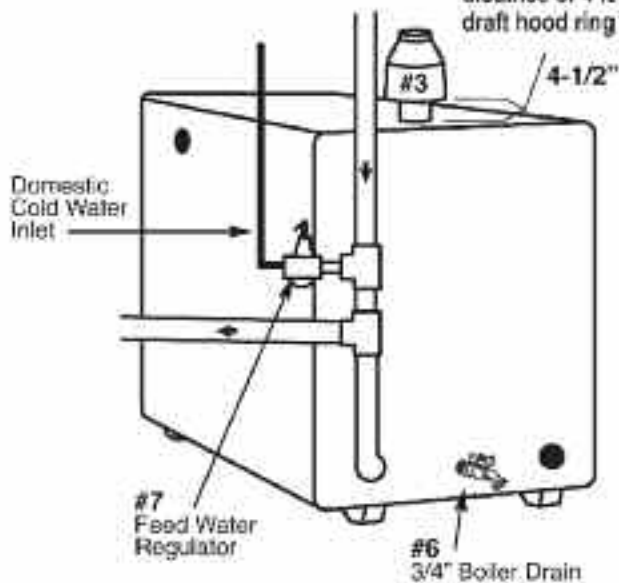


ALL BOILERS MUST BE INSTALLED BY A NFI GAS CERTIFIED SPECIALIST AND PLUMBED BY A QUALIFIED LICENSED PLUMBER OR D.S. IS NOT RESPONSIBLE FOR WARRANTY

Boiler Installation Instructions



Note: Draft hood must be installed with a minimum distance of 4 1/2" between draft hood ring and boiler.



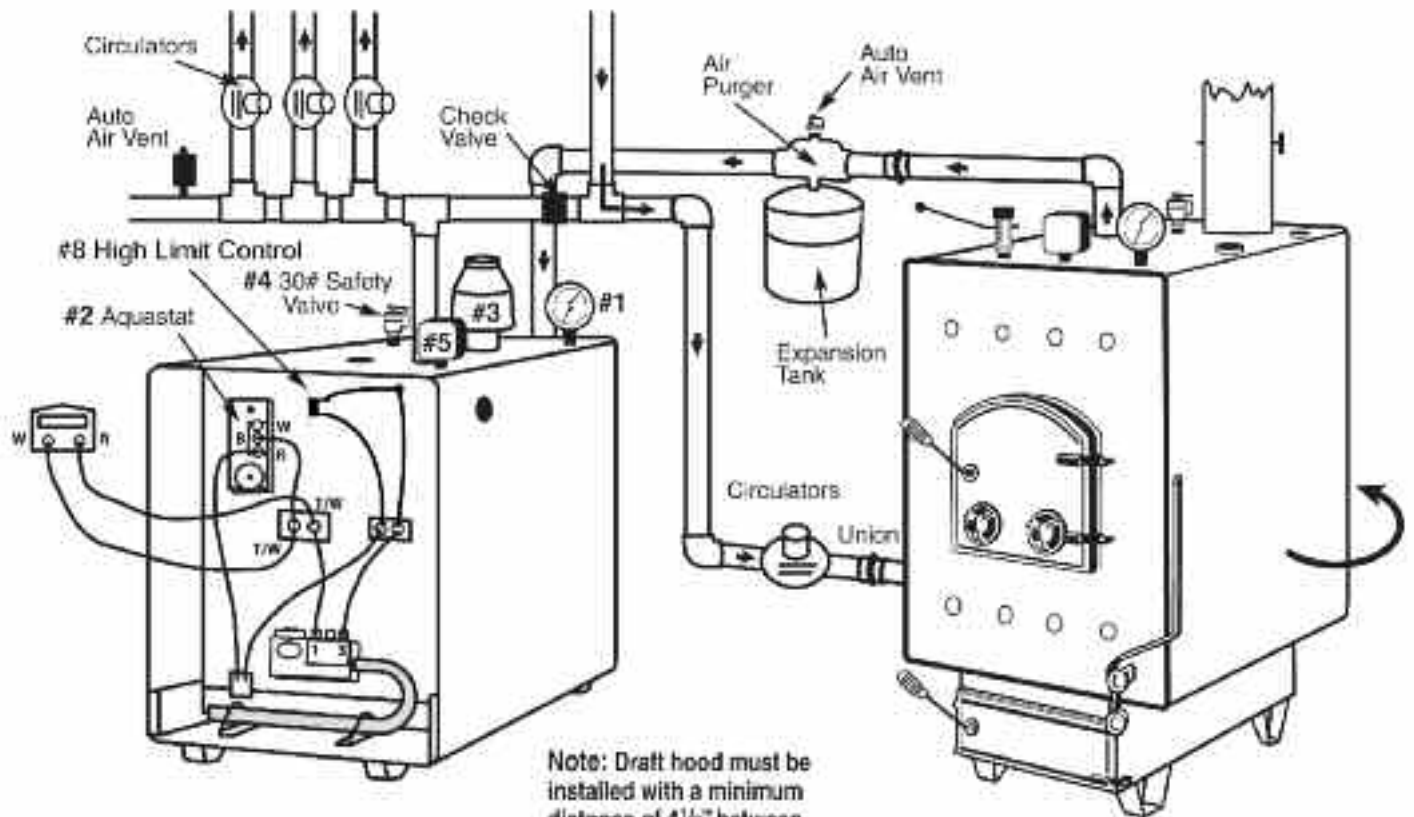
NOTE: Add Boiler Seal to all new boilers. On initial setup, fill boiler with water to the point where you can still add Boiler Seal mixed with water and pour into top of boiler. OR, follow instructions on Boiler Seal.

- 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.

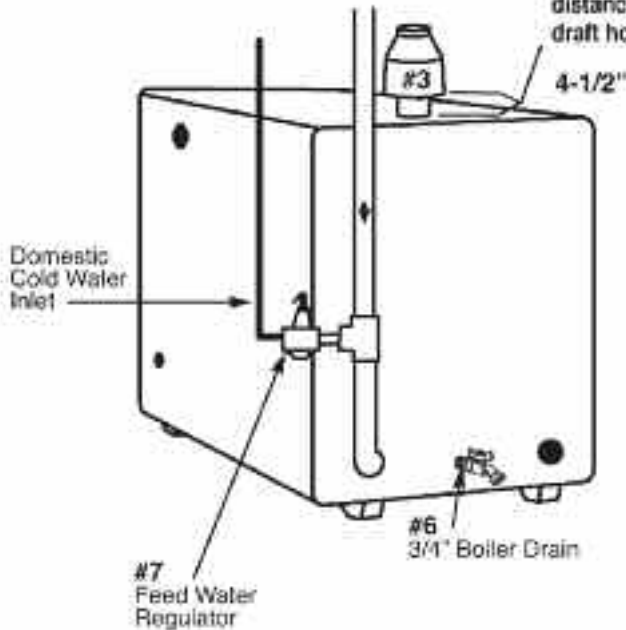
- #1 Temperature Pressure Gauge
- #2 Standard Aquastat
- #3 Draft Hood
- #4 30# Safety Valve
- #5 Optional Aquastat
- #6 3/4" Boiler Drain
- #7 Feed Water Regulator
- #8 High Limit Control

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

Boiler Installation Instructions



Note: Draft hood must be installed with a minimum distance of 4 1/2" between draft hood ring and boiler.



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.

- 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.

- | | |
|----|----------------------------|
| #1 | Temperature Pressure Gauge |
| #2 | Standard Aquastat |
| #3 | Draft Hood |
| #4 | 30# Safety Valve |
| #5 | Optional Aquastat |
| #6 | 3/4" Boiler Drain |
| #7 | Feed Water Regulator |
| #8 | High Limit Control |

FOR YOUR SAFETY READ BEFORE LIGHTING
Pour votre sécurité lisez avant d'allumer.

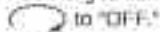
WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life. **AVERTISSEMENT.** Quiconque ne respecte pas à la lettre les instructions dans la présente notice risque de déclencher un incendie ou une explosion entraînant des dommages, des blessures ou la mort.

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>A) This appliance has a pilot which must be lighted by hand. When lighting the pilot, follow these instructions exactly.</p> <p>B) BEFORE LIGHTING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
 WHAT TO DO IF YOU SMELL GAS</p> <ul style="list-style-type: none"> • Do not try to light the appliance. • Do not touch any electric switch: do not use any phone in your building. • Immediately call your gas supplier from a neighbor's phone. Follow the gas suppliers instructions. • If you cannot reach your gas supplier, call the fire department. <p>C) Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified technician. Force or attempted repair may result in a fire or explosion.</p> <p>D) Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.</p> | <p>A) Cet appareil est muni d'une veilleuse qui doit être allumée manuellement. Respectez les instructions ci-dessous à la lettre.</p> <p>B) Avant allumer la veilleuse, renifllez tout autour de l'appareil pour détecter une odeur de gaz. Renifllez près du plancher, car certains gaz sont plus lourds que l'air et peuvent s'accumuler au niveau du sol.
 QUÉ FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ</p> <ul style="list-style-type: none"> • Ne pas tenter d'allumer d'appareil. Ne touchez à aucun interrupteur; ne pas vous servir des téléphones se trouvant dans le bâtiment. • Appelez immédiatement votre fournisseur de gaz depuis un voisin. Suivez les instructions du fournisseur. • Si vous ne pouvez rejoindre le fournisseur, appelez le service des incendies. <p>C) Ne poussez ou tournez la manette d'admission du gaz qu'à la main; ne jamais utiliser d'outil. Si la manette reste coincée, ne tentez pas de la réparer; appelez un technicien qualifié. Le fait de forcer la manette ou de la réparer peut déclencher une explosion ou un incendie.</p> <p>D) N'utilisez pas cet appareil s'il a été plongé dans l'eau, même partiellement. Faites inspecter l'appareil par un technicien qualifié et remplacez toute partie du système de contrôle et toute commande qui ont été plongés dans l'eau.</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

OPERATING INSTRUCTIONS
MODE D'EMPLOI

1. **Stop!** Read the safety information above on this label.
2. Set the thermostat to the lowest setting.
3. Turn off all electric power to appliance.
4. Remove control access panel.
5. Push in gas control knob slightly and turn clockwise

to "OFF".



GAS CONTROL KNOB SHOWN IN "OFF" POSITION



NOTE: Knob cannot be turned from "PILOT" TO "OFF" unless knob is pushed in slightly. Do not force.

6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
7. Find pilot - follow metal tube from gas control. The pilot is between the two burner tubes behind the pilot access panel.

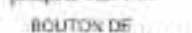


8. Turn knob on gas control counterclockwise



1. **Arrêtez!** Lisez les informations de sécurité ci-dessus sur cette étiquette.
2. Réglez le thermostat à la température la plus basse.
3. Coupez l'alimentation électrique de l'appareil.
4. Retirez le panneau d'accès de contrôle.
5. Enfoncez légèrement le bouton de réglage du gaz et tournez dans le sens des aiguilles d'une montre

jusqu'à «OFF».



BOUTON DE CONTRÔLE DU GAZ INDIQUE EN POSITION "OFF"



Remarque: Le bouton ne peut pas être tourné de "PILOT" à "OFF". Sauf si le bouton est légèrement enfoncé. Ne forcez pas.

6. Attendre cinq (5) minutes pour laisser échapper tout le gaz. Renifllez tout autour de l'appareil, y compris près du plancher, pour détecter une odeur de gaz. Si vous sentez une odeur de gaz, **ARRÊTEZ!** Passez à l'étape B des instructions de sécurité sur la portion supérieure (à gauche) de cette étiquette. S'il n'y a pas d'odeur de gaz, passez à l'étape suivante.
7. Trouvez le pilote - suivez le tube métallique du contrôle du gaz. Le pilote se situe entre les deux tubes du brûleur derrière le panneau d'accès du pilote.



8. Tournez le bouton de réglage du gaz dans le sens antihoraire



9. Push in control knob all the way and hold in. Immediately light the pilot with a match. Continue to hold the control knob in for about one (1) minute after the pilot is lit. Release knob and it will pop back up. Pilot should remain lit. If it goes out, repeat steps 5 through 10.
 - If knob does not pop up when released, stop and immediately call your service technician or gas supplier.
 - If the pilot will not stay lit after several tries, turn the gas control knob to "OFF" and call your service technician or gas supplier.
10. Turn gas control knob counterclockwise to "ON." ↺
11. Replace control access panel.
12. Turn on all electric power to appliance.
13. Set thermostat to desired setting.

9. Enfonchez complètement le bouton de commande et maintenez-le enfoncé. Allumez immédiatement la veilleuse avec une allumette. Continuez à maintenir le bouton de commande enfoncé pendant environ une (1) minute après l'allumage de la veilleuse. Relâchez le bouton et il va remonter. Le pilote doit rester allumé. S'il s'éteint, répétez les étapes 5 à 10.
 - Si le bouton ne s'affiche pas, arrêtez-vous et appelez immédiatement votre technicien de service ou votre fournisseur de gaz.
 - Si la veilleuse ne reste pas allumée après plusieurs essais, tournez le bouton de réglage du gaz sur «OFF» et appelez votre technicien de maintenance ou votre fournisseur de gaz.
10. Tournez le bouton de commande de gaz dans le sens antihoraire ↺ sur "ON".
11. Remplacez le panneau d'accès de commande.
12. Allumez tous les appareils électriques.
13. Réglez le thermostat sur le réglage souhaité.

TO TURN OFF GAS TO APPLIANCE DÉSACTIVER LE GAZ À L'APPAREIL

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove control access panel.
4. Push in gas control knob slightly and turn clockwise ↻ to "OFF." Do not force.
5. Replace control access panel.

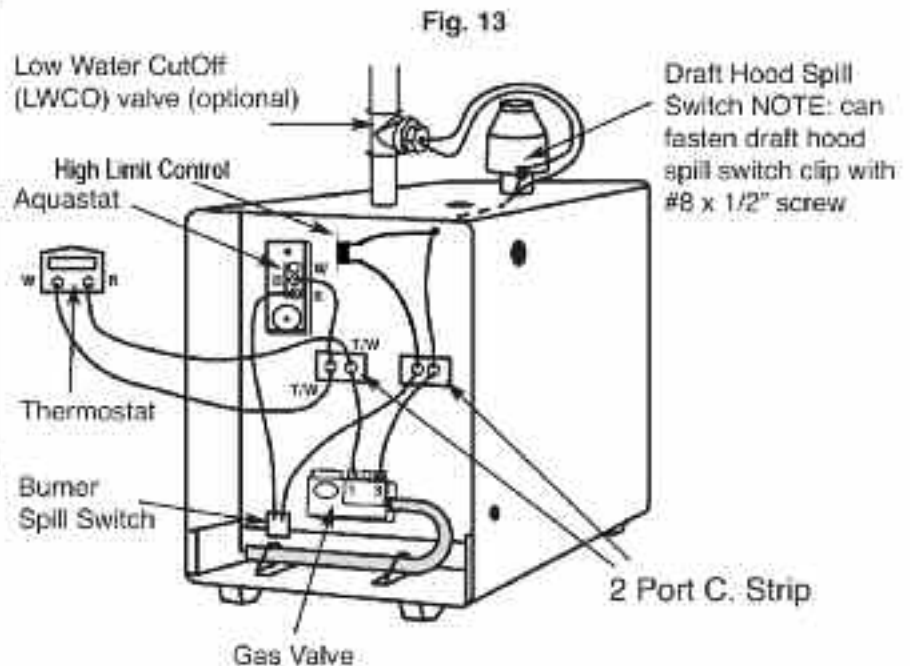
1. Réglez le thermostat sur le réglage le plus bas.
2. Eteignez toute alimentation électrique de l'appareil si un entretien doit être effectué.
3. Retirez le panneau d'accès de contrôle.
4. Enfoncez légèrement le bouton de réglage du gaz et tournez dans le sens des aiguilles d'une montre ↻ jusqu'à «OFF». Ne forcez pas.
5. Remplacez le panneau d'accès de commande.

Wiring Schematic

Caution: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

ATTENTION. Au moment de l'entretien des commandes, étiquetez tous les fil avant de les débrancher. Les erreurs de câblage peuvent nuire au bon fonctionnement et être dangereuses.

NOTE: Boiler Aquastat must be installed by plumber. Put high heat transfer oil packet with aquastat into well stem before inserting heat sensor bulb into well stem. Insert heat sensor bulb as far into well stem as possible.



Boiler Installation Instructions

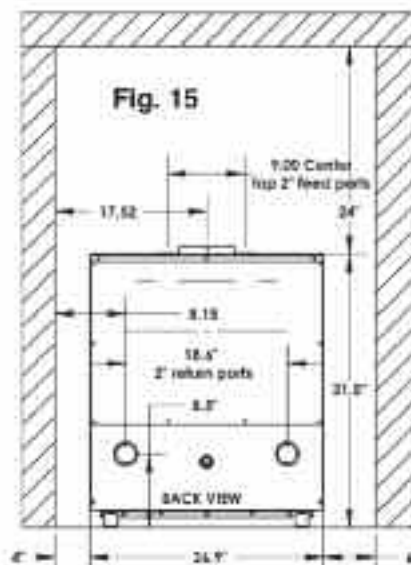
- Propane gas units need #55 orifice, pilot with orifice #4211 and a gas valve for propane gas.
- Natural gas units need #44 orifice, pilot with orifice #6221 and a gas valve for natural gas.
- Gas pressure for propane is 11" water column (WC) and not to exceed ½ PSI or 13" WC at the gas valve on boiler.
- Gas pressure for natural gas is not to exceed 10.5" WC at the gas valve on boiler.
- Compounds used on threaded joints of gas piping shall be resistant to liquified petroleum.
- If its not already installed, a drip leg (sediment trap) must be added to the gas supply line going to the gas valve on the boiler.
- Install boiler on a solid combustible level floor. In an area away from any source of flammable liquids or gases. Make sure nothing is obstructing the flow of combustion and ventilation air.
- PROTECT IGNITION SYSTEM COMPONENTS from sources of water that may spray, drip or rain on them during installation or service.
- This is a millivolt system. For best operation of a millivolt system, the lead wires from the valve to the wall thermostat should not exceed the recommended maximum lengths shown below.

Wire Size	Max. Length
14 GA.	100 FT.
16 GA.	64 FT.
18 GA.	40 FT.
20 GA.	25 FT.
22 GA.	16 FT.

CAUTION:
Do not store or use furnishings, gasoline or other flammable vapors or liquids in the vicinity of this boiler.

1. Maintain all clearance to combustibles per chart at right. See Figs. 14 & 15.
2. Maintain a minimum of 18" clearance from front of unit, for servicing unit.
3. Conform to the requirements of the authority having jurisdiction or, in the absence of such requirements, to the National Fuel Gas Code, ANSI Z223.1/NFPA 54, and/or National Gas and Propane Installation Code, CAN/CSA B149.1.

ATTENTION:
Ne pas entreposer ni utiliser d'essence ou ni d'autres vapeurs ou liquides inflammables à proximité de cet appareil ou de tout autre appareil.



Clearance to Combustibles

Front	18"	Single Wall Stove Pipe	6"
Left Side	6"	B Vent Pipe	1"
Right Side	4"	Hot Water Pipes	1/2"
Back	16"	Draft Hood	6"
Ceiling	24"		

- Contact your local building or fire officials about restrictions and installations inspections in your area.
4. Check for gas leaks with an approved combustible gas detector or nonflammable, non-corrosive leak detection solution.
 5. Venting should be 6" diameter B-Vent meeting manufacturers specifications and local building codes, lined masonry or metal chimney build to the Standards for Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances, ANSI/NFPA 211 and all local and national building codes for USA or Canada. Never use a chimney with a diameter larger or smaller than the diameter on the exhaust ring of the boiler. Unlined masonry chimney construction is prohibited for use as a chimney.
 7. You must install a draft hood in the vent pipe. You need at least 4 1/2" between the boiler and draft hood ring to allow proper air flow into draft hood. See drawings on pages 12 & 13.

Perform Startup Checks and Adjustments



FAILURE TO PERFORM THESE CHECKS of the boiler's combustion and safety systems may result in serious property damage, injury, or death.



IF YOU SMELL GAS, STOP and repair the leak. Lighting the boiler when gas is leaking may cause explosion or fire.

1. Verify that the venting, water piping, gas piping, and electrical systems are properly installed and checked.
2. Adjust zone thermostat to maximum setting.
3. Allow gas line to purge of air.
 - Boiler lights cleanly within 60 seconds.
4. Adjust gas input rate. See Page 9 - *Adjusting Gas Input Rate*. Check main burner and pilot flames. See Fig. 16.
 - Pilot and main burner flames appear clean and blue.
5. Disconnect thermopile wires from gas valve. (see Fig. 21)
 - Boiler shuts off.
6. Reconnect thermopile wires to gas valve.
 - Boiler restarts.
7. Adjust zone thermostat to minimum setting.
 - Boiler shuts off.
8. Adjust zone thermostat to maximum setting.
9. Observe temperature gauge as boiler heats.
10. Adjust the high limit setting to its minimum level. (see aquastat setting on page 11)
 - Boiler shuts off when temperature gauge reads within 15°F of high limit setting.
11. Return high limit to the desired setting (see aquastat setting on page 11)
12. Check draft. (see page 7, numbers 4 & 5 under Removal of an Existing Boiler)
 - No spillage observed.
13. Check combustion in the vent stack and record results in the spaces provided below.

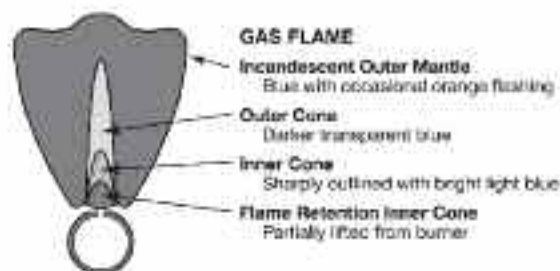


Fig. 16

_____ CO₂ (less than 7%)
 _____ O₂ (more than 9%)
 _____ CO (less than 50 ppm, air free)

Maintenance

CAUTION:

LABEL ALL WIRES prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

Attention.

Au moment de l'entretien des commandes, étiquetez tous les fils avant de les débrancher. Les erreurs de câblage peuvent nuire au bon fonctionnement et être dangereuses.

FAILURE TO MAINTAIN THE BOILER in proper working condition may lead to fire, explosion, personal injury or death, and extensive property damage.

TURN OFF ALL GAS AND ELECTRIC power supplies to the boiler before servicing. Contact with or release of dangerous flammable gas, electrical voltage, moving parts, and very hot water under pressure may cause serious personal injury, property damage, or death.

LOCK ELECTRICAL BOXES AND GAS VALVES CLOSED to prevent someone from inadvertently restoring power or gas before the heating system is safe to operate.

General Maintenance and Cleaning Instructions

1. Keep boiler area clear and free of combustible materials and obstructions to the free flow of combustion and ventilation air to the boiler.
2. Do not store or use gasoline, other flammable vapors, liquids or sources of hydrocarbons in the vicinity of the boiler or any other appliance.
3. Do not store or use halogen-containing products (bleaches, cleaners, fabric softeners, refrigerants, chemicals, etc.) in the vicinity of the boiler.

Monthly Maintenance

Inspect Inlet Air and Vent System. Check the following. If corrective action is required contact qualified service agency.

1. Blocked vent switch must be attached to the draft hood canopy.
2. Vent pipe must be full round shape, showing no damage from impact or excessive temperature.
3. All vent pipe joints must be secure.
4. The vent system must be free of corrosion and other deterioration.
5. Horizontal runs must not sag.
6. Supports must not be loose or broken.

Inspect Pilot and Main Burner Flames

1. Remove jacket front panel.
2. View flames under draft shield panel.
3. Adjust thermostat to highest setting.
4. Check pilot flame. See Fig.17. The pilot produces three (3) flames. The center flame should be steady, medium hard blue enveloping 3/8" to 1/2" of the thermopile. If flame is yellow and lazy, contact qualified service agency. See Fig. 18 for pilot key location to adjust pilot flame.

Fig. 17



- A. To adjust pilot flame remove pilot adjustment cap.
- B. Adjust pilot key to provide properly sized flame on the thermopile. The flame should cover the upper 3/8" of the tip.
- C. Replace pilot adjustment cap.

Important: Do not use GAS COCK DIAL to adjust gas output.

5. Check main burner flames. Flame should have clearly defined inner cone with no yellow tipping. Orange-yellow streaks caused by dust should not be confused with true yellow tipping. If yellow flames are observed, contact qualified service agency. Adjust shutter cap, check gas pressure or clean orifices and burner tubes to improve main burner health. See Fig. 19 for shutter cap drawing. See adjusting gas input rate. Page 9

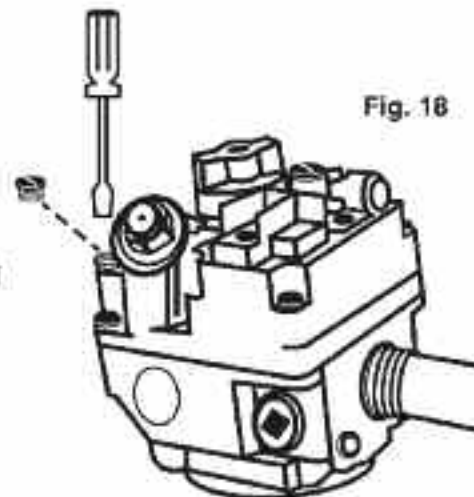
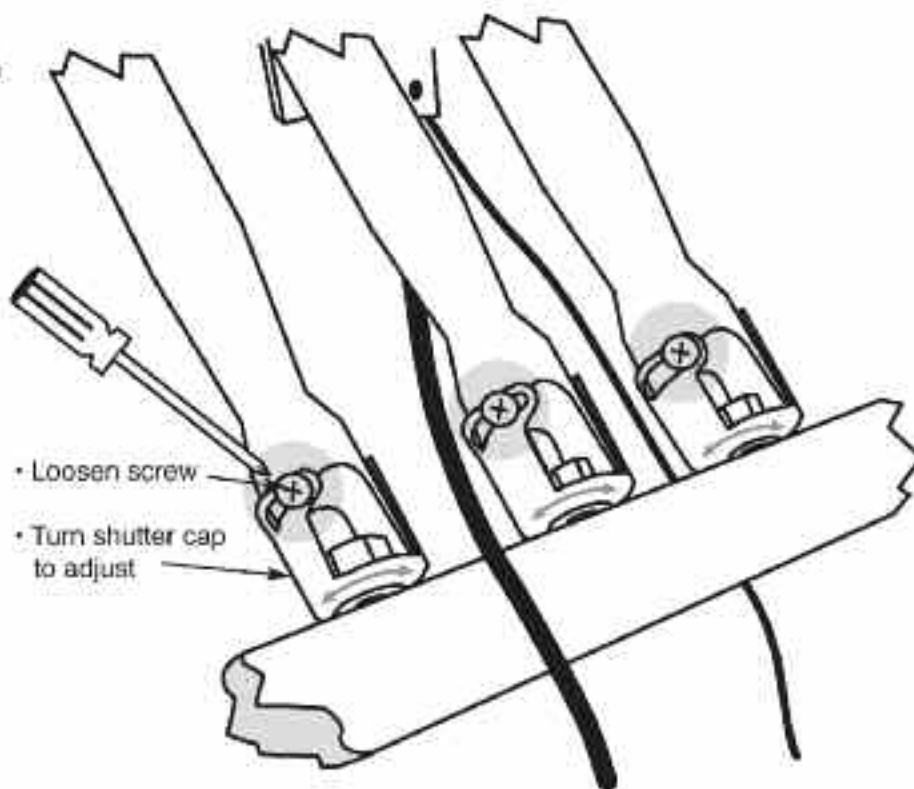


Fig. 18

Fig. 19



- Loosen screw
- Turn shutter cap to adjust

- A. Loosen pan head screw on shutter cap.
 - B. Adjust shutter cap to improve yellow tipping or lifting of the burner tube flame. Restrict air flow for lifting of the flame. (turn shutter cap clockwise)
Allow more air flow for yellow tipping. (turn shutter cap counterclockwise)
See Fig. 16 for healthy flame diagram.
 - C. Tighten pan head screw on shutter cap.
6. Adjust thermostat to normal setting.

Annual Maintenance or at Beginning of each Heating Season

Annual Maintenance must be preformed by a qualified technician.

- Turn off all gas and electric power supplies to the boiler before performing any maintenance or service to this boiler
- Lock electrical boxes and gas valves closed to prevent someone from inadvertently restoring power or gas before the heating system is safe to operate.
- Failure to maintain the boiler in proper working condition may lead to fire, explosion, personal injury or death, and extensive property damage

CAUTION: LABEL ALL WIRES prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

ATTENTION. Au moment de l'entretien des commandes, étiquetez tous les fil avant de les débrancher. Les erreurs de câblage peuvent nuire au bon fonctionnement et être dangereuses.

1. Inspect vent for obstruction and signs of condensation, distortion, overheating or gas leakage.
2. Remove draft hood sensor, vent pipe and draft hood. Vent pipe, draft hood and all flue gas passages shall be cleaned using poly flue brush and vacuum, removing all soot and any other obstructions.
3. Remove back top side panel. Remove clean out cover plate. Remove the 2 pieces insulation. Take a small poly flue brush and clean off all 3 levels of baffles. Check boiler for any leaks or deterioration. Check all insulation for deterioration and replace as needed. Perform all startup checks and performances before placing unit back in service. See page 17.
4. Remove front panel, take 3 – ¼ x ½ hex bolts out of burner assembly mounting plate, located on bottom inside front panel. Turn off gas coming to boiler. Disconnect gas connection to gas valve on manifold. Provide plug for disconnected gas line. Slide burner assembly out of boiler, mark location of pilot main burner on the manifold if the marking on the manifold is missing or obliterated. Label all wiring before disconnecting wire terminals from gas valve. Disconnect pilot tube and all wiring from gas valve. Take screws out of shutter caps and remove all burner tubes for cleaning. Must remove burner tubes to access orifices. Clean orifices with soft bristle brush. Use compressed air or soft bristle brush to clean burner tubes and pilot. Clean thermopile of any residual buildup. When cleaning is completed, reassemble unit, check for gas leaks using an approved combustible gas detector or nonflammable, noncorrosive leak detection solution. Check gas pressure before relighting boiler after performing service. Follow all lighting and operating instructions when relighting unit after performing maintenance. See page 14. Perform start up checks and adjustments before placing unit back in service. See page 17

Complete Burner Assembly Replacement Instructions.

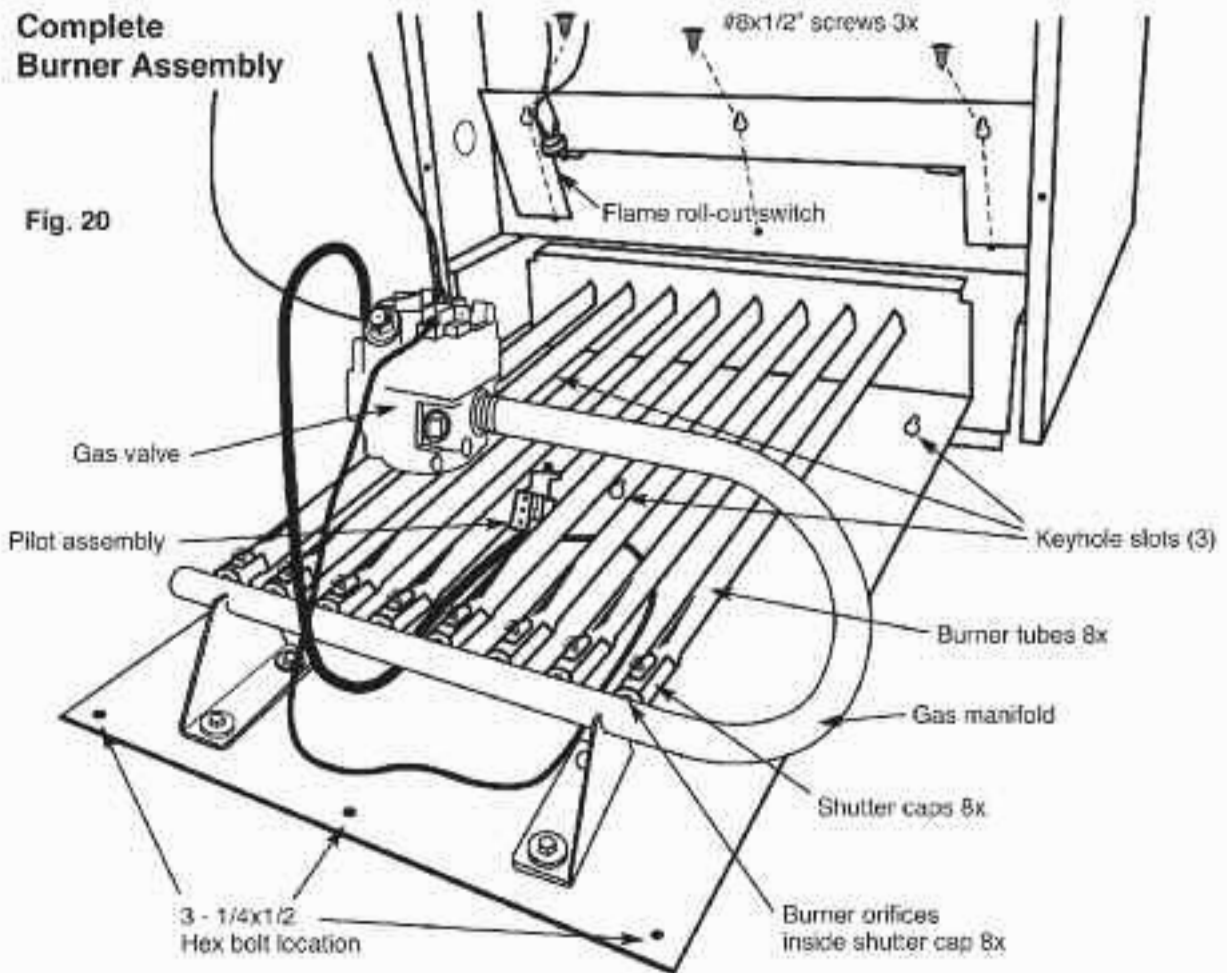
- A. DS Machine stocks both a NG and a LP gas complete burner assemblies.
 1. DSGB150-NGB ships complete with a NG Gas Valve, NG orifice in pilot and NG orifices in manifold.
 2. DSGB150-LPB ships complete with a LP Gas Valve, LP orifice in pilot and LP orifices in manifold.
- B. When replacing a complete burner assembly. Service must be provided by a qualified service technician.
- C. **CAUTION!** Label all wiring prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing. See page 15 for wiring schematic.
- D. Turn off gas at main shut off valve. Apply lockout, tag out.
- E. Instructions to remove complete burner assembly.

ATTENTION. Au moment de l'entretien des commandes, étiquetez tous les fil avant de les débrancher. Les erreurs de câblage peuvent nuire au bon fonctionnement et être dangereuses.

S'assurer que l'appareil fonctionne adéquatement une fois l'entretien terminé.

1. Remove front access panel.
 2. Disconnect all gas piping and wiring from gas valve and flame roll out sensor.
 3. Remove Draft Shield from behind gas manifold by loosening 3 - #8 x 1/2" screws. See Fig. 20.
 4. Remove the 3 - 1/4 x 1/2" bolts on the bottom panel located on the inside of the front access panel. See Fig. 20.
 5. Slide the burner assembly front about 1 1/4". Lift whole burner assembly up enough to lift key hole slots up over the key hole studs and pull the burner assembly out the front of the unit.
- F. Instructions to install complete burner assembly.
1. Inspect the sides and back burner insulation to make sure it is intact, not broken, deteriorated and that it is in proper position before installing complete burner assembly. Replace insulation if any cracks, deterioration or abrasion appears. See page 22 for burner insulation part #'s.
 2. Slide burner into front bottom opening of boiler. You must lift burner assembly enough to slide over top of keyhole studs. Line keyhole slots up with keyhole studs and push complete burner assembly back until keyhole slots drop over top of keyhole studs. Then with keyhole studs in key hole slots push complete burner assembly back until bolt holes on front bottom panel of complete burner assembly line up with the 3 - 1/4" - 20 riv nuts on the bottom panel of unit. Bolt complete burner assembly to bottom using 3 - 1/4 x 1/2" hex bolts.
 3. Install draft shield with flame roll out sensor. Connect the wiring for flame roll out sensor. See page 15 for wiring schematic.
 4. Connect gas piping. Follow all gas piping installation instructions on page 8.
 5. Connect all wiring to gas valve. See wiring schematic on page 15. Verify proper operation after servicing.
 6. Complete a gas leak test before lighting pilot.
 7. Follow all lighting and operating instructions when relighting unit.
- G. Perform Startup Checks and Adjustments before placing unit back in service. See page 17.

Complete Burner Assembly



DSGB150 Parts List

Qty per Unit	Description	Model	Part #
1	Outside Front Panel	GB150	DSGB150-SPF
1	Inside Front Panel	GB150	DSGB150-IFP
1	R / H Side Panel	GB150	DSGB150-SPRH
1	L / H Side Panel	GB150	DSGB150-SPLH
1	Back Bottom Panel	GB150	DSGB150-SPBB
1	Back Top Panel	GB150	DSGB150-SPBT
1	Top Panel	GB150	DSGB150-SPT
1	Bottom	GB150	DSGB150BOT
1	Back Burner Tube Support	GB150	DSGB150-BBTS
4	Boiler Legs	GB150	DSGB150-LEG
1	Draft Shield	GB150	DSGB150-DS
1	Draft Hood Spill Switch Mounting Clip	GB150	DSGB150-SDB
1	Back Insulation	GB150	DSGB150-BINS
2	Side Insulation	GB150	DSGB150-SINS
1	Draft Hood	GB150	6-350
1	Draft Hood Spill Switch	GB150	DSTK32-176
1	Flame Roll Out Spill Switch	GB150	DSTF-218
1	Aquastat	GB150	L6006A
1	Aquastat Well Assembly	GB150	123871A
1	Gas Valve NG	GB150	DS-700-504-NG
1	Gas Valve LP	GB150	DS-700-504-LP
8	NG Burner Orifices	GB150	DS-44-NG
8	LPG Burner Orifices	GB150	DS-55-LP
1	Pilot Assembly	GB150	DS-J99MYA-2H
1	Pilot Tubing	GB150	DSGB150-PT
1	Thermopile	GB150	DSGB150-THPL
8	Shutter Caps	GB150	DSGB150-SC
1	Burner Tube w/Pilot Mount	GB150	DSGB150-PMBT
7	Burner Tube	GB150	DSGB150-BT
1	Manifold	GB150	DSGB150-GBM
2	Port Terminal Strip	GB150	DSGB150-2TS
1	30# Safety Valve	GB150	SV-30
1	Temperature Pressure Gauge	GB150	H25-18
1	3/4" Boiler Drain	GB150	34-BD
1	5/16" I.D. Rubber Grummet	GB150	DS-643663-C
1	NG Pilot Orifice	GB150	DS-NG6221
1	LPG Pilot Orifice	GB150	DS-LP4211
1	LP Regulator Cover Plates Kits	GB150	DS-LP1751-013
1	LP Complete Burner Assembly	GB150	DSGB150-LPB
1	NG Complete Burner Assembly	GB150	DSGB150-NGB
1	Clean Out Door	GB150	DSGB150-COD
1	Clean Out Door Gasket Insulation	GB150	DSGB150-CODI
1	Clean Out Insulation	GB150	DSGB150-COI
1	High Limit Control	GB150	DS-TK24

SEE YOUR LOCAL DEALER FOR PARTS

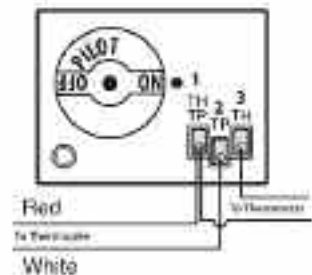
Trouble Shooting

Problem 1 – Pilot does not stay on.

1. After unit cools down try relighting unit. See lighting instructions on page 6.
 2. Remove all non thermopile wires from gas valve terminals 1 & 3. If the pilot now stays lit, trace the wiring circuit for a ground. May be grounded to boiler, gas supply, nails or staples.
 3. Clean thermopile.
 4. Thermopile may need replaced.
 5. Is pilot flame close enough to thermopile?
 6. Adjust pilot flame.
 7. The pilot orifice may need to be cleaned out.
 8. The millivolt system and individual components may be checked with a millivolt meter having a 0-1000 MV range. Before checking system, be certain wall thermostat lead wire does not exceed length recommended in the installation instructions section on page 16. Make sure all connections are clean and tight.
- Conduct each check in chart shown below by connecting meter test leads to terminals as indicated. All readings are closed circuit.

Component Check	Connect Meter Test Leads to Terminals	Wall Thermostat Contacts Should Be	Meter Reading Should Be	See Check Results Below
Valve Operator System	2 & 3	Closed	Greater than 100 MV	A
Wall Thermostat	1 & 3	Closed	Less than 80 MV	C
Thermopile and Magnet	1 & 2	Open	Greater than 325 MV	B

Fig. 21



A. TEST RESULTS

1. If the reading is more than 100 millivolts and the automatic valve does not come on, replace the valve operator. If the closed circuit reading is less than 100 millivolts, determine the cause by proceeding with steps "B" and "C".

B. TEST RESULTS

- If "B" reading is less 325 MV, clean and tighten all electrical connections and adjust pilot if necessary to increase millivolt output. If unable to adjust to least the specified minimum, change the thermopile. When proper thermopile output is obtained, the magnet may then be checked. With pilot operation, allow meter reading at dropout point of magnet. If magnet remains locked up to a reading of 120 MV or less, the magnet is good.

C. TEST RESULTS

- If "C" reading is more than that specified for the system being checked, clean and tighten thermostat leads and connections, shorten lead wires if possible or use heavier gauge wire. Rapidly cycle thermostat to clean contacts, or change the thermostat.

Problem 2 – Burner Does Not Light or Stay on when needed.

- Check draft hood and burner spill switches. Chimney may be blocked.
- Is boiler water temperature above high limit set point of the aquastat?
- Is thermostat turned on?
- Is there a call for heat?
- Is the gas turned on?
- Check gas pressure. Gas pressure should not exceed $\frac{1}{2}$ PSI or 14" water column.
- Check all wiring for breaks and terminals for corrosion. Repair or tighten as needed.

Problem 3 – Burner flames lift with poor burn or has high yellow flames.

- Adjust burner tube shutter cap. This controls the amount of air supplied to burner tubes. Burner may need more air. See Fig. 19.
- Check venting. Is it clogged? Has it been cleaned out recently? Are there other appliances hooked to it? Is everything sized properly?
- Clean burner tubes with soft bristle brush and use blow gun to clean out all holes in burner tubes, shutter caps, and orifices

Limited Warranty



LIMITED WARRANTY DSGB150 Gas Boiler

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.

	Time Period
1 - Boiler / Sheet Metal	Five Years
2 - Burner and Components	One Year
3 - Gas Valve	One Year
4 - Electrical Components	One Year

D.S. Stoves 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.

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

– D.S. Stoves
238-B Old Leacock Road
Gordonville, PA 17529
717-768-3853