INSTALLATION AND OPERATION MANUAL

Reliance (RLN)

High Efficiency Hydronic Boilers
500,000 - 3,000,000 BTU/HR

Serial/ National Board Number _____

Model _____

Fulton Order _____

Sold To _____

Job Name _____

Date _____

RLN-IOM-2012-1205

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Overview

Prior to shipment, the following inspections and tests are made to ensure the highest standards of manufacturing for our customers:

- Material inspections
- Manufacturing process inspections
- American Society of Mechanical Engineers (ASME) welding inspection
- ASME hydrostatic test inspection
- Electrical components inspection
- Operating test
- Final engineering inspection
- Crating inspection

This manual is provided as a guide to the correct operation and maintenance of your Fulton equipment, and should be read in its entirety and be made permanently available to the staff responsible for the operation of the boiler. It should not, however, be considered as a complete code of practice, nor should it replace existing codes or standards which may be applicable. Fulton reserves the right to change any part of this installation, operation and maintenance manual.

Installation, start-up, and maintenance of this equipment can be hazardous and requires trained, qualified installers and service personnel. **Trained personnel are responsible for the installation, operation, and maintenance of this product, and for the safety assurance of installation, operation, and maintenance processes. Do not install, operate, service or repair any component of this equipment unless you are qualified and fully understand all requirements and procedures. Trained personnel refers to those who have completed Fulton Service School training specific to this product.**

When working on this equipment, observe all warnings, cautions, and notes in literature, on stickers and labels, and any additional safety precautions that apply. Follow all safety codes and wear appropriate safety protection. Follow all jurisdictional codes and consult any jurisdictional authorities prior to installation.

Warnings & Cautions

WARNINGS and CAUTIONS appear in various chapters of this manual. It is critical that all personnel read and adhere to all information contained in WARNINGS and CAUTIONS.

- WARNINGS must be observed to prevent serious injury or death to personnel.
- CAUTIONS must be observed to prevent damage or destruction of equipment or loss of operating effectiveness.

All Warnings and Cautions are for reference and guidance purposes, and do not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes or regulations.

Disclaimers and Local Codes

Installation of the equipment shall conform to all the requirements or all national, state and local codes established by the authorities having jurisdiction or, in the absence of such requirements, in the US to the National Fuel Gas Code ANSI Z223.1/NFPA 54 latest edition, and the specific instructions in this manual. Authorities having jurisdiction should be consulted prior to installation.

When required by local codes, the installation must conform to the American Society of Mechanical Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers (ASME CSD-1).

The boiler heat exchanger is manufactured and stamped in accordance with ASME Boiler and Pressure Vessel Code, Section IV for a maximum allowable working pressure and operating temperature of 160 psig and 210 F (121 C) respectively.

⚠ WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

Crystalline silica may be present in components of this equipment. Exposure to crystalline silica may pose significant health hazards, including but not limited to eye and respiratory system damage. Per the Centers for Disease Control and Prevention (CDC) and Occupational Safety and Health Administration (OSHA), appropriate personal protective equipment must be worn to minimize exposure to hazardous substances. Refer to most current guidelines offered by the CDC and OSHA for more information, including personal protective equipment recommendations.

⚠ CAUTION

This boiler is certified for indoor installation only.

This boiler is not designed for use in systems where water is continuously replenished. The warranty is valid for closed loop systems only.

Fulton cannot be held responsible for the selection, engineering, installation, or sizing of any additional equipment or components of the hydronic heating system.

A qualified engineer must be consulted for equipment selection and heating system components.

Product Overview

Prior to the performance of installation, operation, or maintenance procedures, personnel should become familiar with the equipment (Table 1 and Figure 1) and its components.

The Fulton Reliance hot water boiler is an automatic, fuel-fired, high-efficiency boiler. The boiler can either be of the sealed combustion/direct vent type or utilize conventional combustion air intake and flue methods.

The boiler is capable of sidewall venting when the appropriate venting materials are used, and when permitted by local code requirements. It features low emission pre-mix combustion with pulse width modulation and fully automatic safety controls.

The Fulton Reliance boiler is constructed to ASME Section IV and certified to Underwriters Laboratories (UL) 795 Issue 2006/10/27 Edition 6 Standard for Safety Commercial-Industrial Gas Heating Equipment. All Reliance boilers are hydrostatically tested, test fired and shipped as a complete packaged unit.

This boiler is to be installed as part of a hydronic heating system. A qualified engineer must be consulted for the selection of the equipment and components of the heating system. Various system conditions can result in incorrect heat distribution to users of the heating system.

Each Reliance Boiler is supplied with the following:

- Outer cabinet utilizing an air gap as insulation
- Integrated combustion supervision and temperature operating control
- Operating and high temperature dual temperature probe
- Low water flow switch
- Fully matched modulating premix combustion system including burner, blower and fuel train controls.
- ASME pressure relief valve
- Instruction manual
- Wiring diagram
- Combustion Air Adapter
- Temperature and pressure (T&P) gauge

The customer should examine the equipment for any damage. It is the responsibility of the installer to ensure all parts supplied with the equipment are fitted in a correct and safe manner.

Placement & Rigging

Proper placement of your Fulton product is essential. Attention paid to the following points will save a great deal of difficulty in the future. Correct placement is the first step to trouble-free installation, operation, and maintenance.

Adhere to the following for placement and rigging:

1. Check building specifications for permissible floor loading. Use Table 1 for unit reference.
2. Conform to all the requirements of all national, state and local codes established by the authorities having jurisdiction and/or the U.S. to the National Fuel Gas Code, latest edition. Authorities having jurisdiction should be consulted before installations are made. Where required by local codes, the installation must conform to American Society of Mechanical Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers (ASME CSD-1).
3. Since an external electrical source is utilized, the boiler, when installed, must be electrically ground in accordance with the National Electric Code, American National Standards Institute (ANSI) National Fire Protection Association (NFPA) 70, latest edition.
4. This boiler is certified for indoor installation only. National Electrical Manufacturers Association (NEMA) 3R Configuration is available as an option from the factory, but an existing boiler cannot be retrofitted for outdoor installation.
5. Install so that all system components are protected from water (dripping, spraying, rain, etc.) during boiler operation and service.
6. Install on a level, non-combustible surface in the vertical position. Concrete is strongly recommended.
7. Provide combustion and ventilation air in accordance with applicable provisions of local building codes or: USA – NFPA 54/ANSI Z223.1, Section 5.3, Air for Combustion and Ventilation.
8. Locate the boiler so that the air supply and exhaust piping between the boiler and outside wall/roof are within the maximum lengths for horizontal or vertical venting if sealed combustion will be used. See **Clearances and Serviceability section** of this manual.

Clearances and Serviceability

Adhere to the following for clearances and serviceability:

1. All local and national codes (NFPA, ANSI, UL, CSA, ASME) must be followed for proper clearances and serviceability for your boiler or heater. Authorities having jurisdiction should be consulted before installations are made.

⚠ WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/ professional codes and regulations.

Competent personnel in accordance with all applicable local codes should carry out the installation of the Fulton equipment. All state and jurisdictional codes beyond the scope of the applicable ASME Boiler and Pressure Vessel Codes, for its corresponding classification, should be followed in all cases. Jurisdictional authorities must be consulted prior to installation.

A competent rigger experienced in handling heavy equipment should handle rigging your equipment into position.

The equipment must be installed on a non-combustible surface.

Failure to provide required and safe access to the equipment could impede commissioning and maintenance. Service technicians are instructed not to commence commissioning if hazardous conditions exist.

Failure to provide proper minimum clearances between equipment and combustible materials may result in fire.

⚠ CAUTION

Do not allow weight to bear on equipment components to prevent damage.

Boiler must be installed in such a way as to protect from water (including dripping, misting, etc.) during boiler operation.

TABLE 1A - OPERATING REQUIREMENTS

Reliance Model Size		500	750	1000	1500	2000	2500	3000
Fuel Type		Natural Gas or Propane*						
Input BTU/Hr	Max	500,000	750,000	1,000,000	1,500,000	2,000,000	2,500,000	3,000,000
	Min	100,000	150,000	200,000	300,000	400,000	500,000	600,000
Electrical Requirements (Amps)	(120V/60/1)	<3	<3	<3	<6	<6	NA	NA
	(240V/60/3)	NA	NA	NA	NA	NA	<10	<10
Water Content	Gal	2.7	3	3	7.3	7.3	11	11
	Liter	10.2	11.4	11.4	27.6	27.6	41.6	41.6
Dry Weight	LB	675	700	700	1000	1000	1400	1400
	KG	306	318	318	454	454	635	635
Operating Weight	LB	700	725	725	1060	1060	1492	1492
	KG	317.5	329	329	481	481	676.75	676.75
Anchor Bolt Size	IN	.75	.75	.75	.75	.75	.75	.75
	MM	19	19	19	19	19	19	19

TABLE 1B - BOILER DIMENSIONS (REFER TO FIGURE 1)

Reliance Model Size		500	750 & 1000	1500 & 2000	2500 & 3000
A. Boiler Width	IN	24	24	32.125	34
	MM	610	609.6	815.9	863.6
B. Boiler Height	IN	45	50.7	67.9	72
	MM	1143	1287.8	1724.6	1828.8
C. Boiler Depth	IN	29.3	29.3	34.3	42.2
	MM	744.2	744.2	871.2	1071.8
D. Boiler Depth with Trim	IN	43.9	43.9	49.3	55.9
	MM	1115	1115	1115	1419.8
E. Air Inlet Diameter	IN	4	6	8	10
	MM	101.6	152.4	203.2	254
F. Flue Outlet Diameter	IN	4	6	8	10
	MM	101.6	152.4	203.2	254
G. Water Inlet/Outlet Size	IN	2	2	2.5	3
	MM	50.8	50.8	63.5	76.2
H. Min Clearance to Walls	IN	1	1	1	1
	MM	25.4	25.4	25.4	25.4
I. Min Clearance to Front and Rear	IN	36	36	36	36
	MM	914.4	914.4	914.4	914.4
J. Min Clearance to Ceiling	IN	24	24	24	24
	MM	609.6	609.6	609.6	609.6

Notes:

Specifications and dimensions are approximate. We reserve the right to change specifications and dimensions without notice.

*The use of propane is allowable with concentration of up to 5% propylene, commonly referred to as HD5. The use of off-standard grades of propane, such as propane HD10 (10% propylene) is not permitted unless a system is in place to reduce propylene concentration to less than 5% prior to reaching any fuel delivery piping. This is the responsibility of the customer. Verify propylene concentration with supplier prior to commissioning and operation of equipment.

2. Appropriate front, back, side and top clearances must be maintained (Figure 1). This will allow access around the equipment to facilitate maintenance and a safe work environment. An 1 inch (25.4 mm) side clearance is acceptable between boilers.
3. Ensure all labels on the boiler will be fully visible for maintenance and inspection.

Install Boiler Trim

Each Reliance boiler is supplied with a safety relief valve sized in accordance with ASME requirements. Adhere to the following installation requirements:

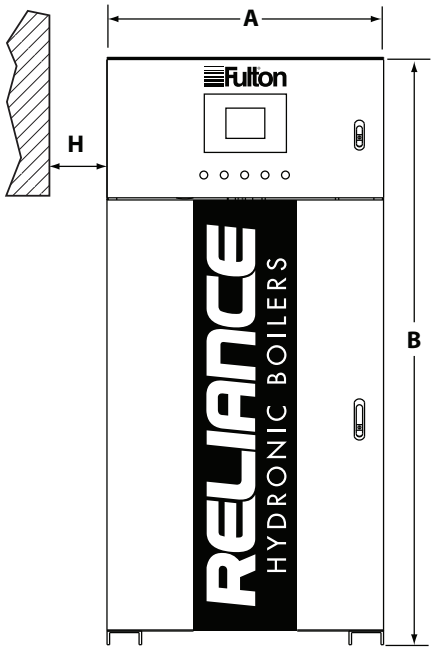
1. The safety relief valve (Figure 2) must:
    - » Be connected to the coupling located in the top rear outlet section of the boiler.
    - » Be installed in the vertical position.
    - » Be installed with a 4 inch (101.6 mm) nipple between the boiler and the safety valve.

➨ *NOTE: Safety relief valve size is determined by trim pressure and is supplied in the trim kit along with appropriate bushing, inlet and outlet sizes.*

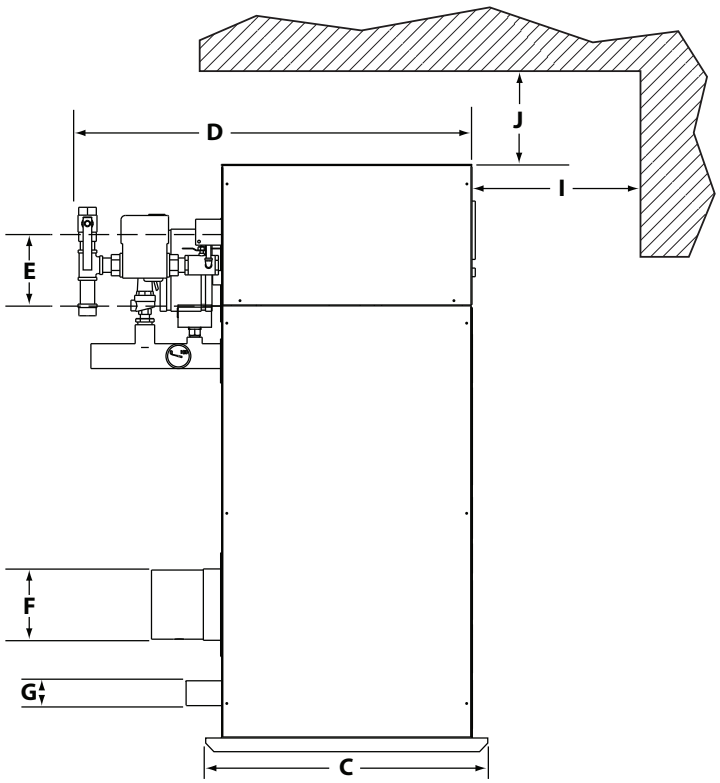
The discharge pipe must:

- » Not have a diameter less than the full area of the valve outlet.
- » Be as short and straight as possible and so arranged as to avoid undue stress on the valve.
- » Be supported by means other than the safety valve itself.
- » Be piped to avoid danger of scalding personnel.

➨ *NOTE: Each boiler is equipped with a pressure-temperature gauge to be installed in the outlet piping section of the boiler.*



Front View



Right Side View

FIGURE 1 -RELIANCE HYDRONIC BOILER CLEARANCES (REFER TO TABLE 1B)

⚠ WARNING

Ensure tank return line is not clogged. Obstructions in the line could cause damage to the pump seal.

The discharge from the safety relief valve must be arranged to ensure no danger of scalding personnel, or equipment damage.

Provisions must be made to properly pipe the safety relief discharge away from the boiler to the point of discharge.

No shutoff of any kind shall be placed between the safety relief valve and the boiler, or in the discharge pipe between the valve and the atmosphere. Doing so may cause an explosion from overpressure.

The hydronic system should never be flushed while the boiler is attached to the system since the debris could accumulate in the boiler and block water from passing through the heat exchanger.

Ensure all labels on the boiler are legible. All connections and safety devices, both mechanical and electrical, must be kept clean, with ease of access for inspection, use and maintenance.

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

⚠ CAUTION

Low flow conditions will cause excessive cycling, damage and failure of equipment.

Ensure water piping arrangements allow for heat-up times at or below 30 seconds; this will reduce condensation which may contribute to equipment failure.

Install Water Piping

All water supplies contain some solids, dissolved gases or dissolved minerals. These may promote corrosion, deposition and/or fouling of equipment. To prevent these contaminants from impacting boiler performance, valve operation and general pipe longevity, each location must be analyzed and treated accordingly.

Adhere to the following for water piping installation (See Figure 3-5):

1. Boiler requires a minimum temperature differential across the heat exchanger at high fire, and has a minimum flow requirement. Use Table 2 to identify ideal flow rates for the Reliance boiler.

*TABLE 2 - IDEAL FLOW RATES/GALLONS PER MINUTE**

RLN Model	500	750	1000	1500	2000	2500	3000
Min. GPM	23	45	45	75	90	130	140
Max. GPM	43	63	83	130	150	200	210

*The boiler warranty does not cover heat exchanger failure related to water flow rates outside of these parameters. The minimum return water temperature must be greater than 140 F (60 C) at all times to avoid condensation in the heat exchanger. Warranty does not cover heat exchanger failure due to condensation of products of combustion.

2. Ensure piping arrangements allow for heat-up times at or below 30 seconds; this will reduce condensation which may contribute to equipment failure.
3. Pipe unions and isolation valves are recommended on both water connections for ease of service.
4. Install piping so that the boiler is not supporting any additional piping.
5. The top water connection on the back of the boiler is the hot water outlet and must be connected as the supply to the system. The bottom connection is the return/boiler inlet. See Figure 6.
6. Install a hot water circulator, remote mounted from boiler. Do not attach directly to the boiler. Refer to Figures 3 - 5 for proper location of circulators.
7. Install manual purging valves in all loops and zones. Install a pressure reducing (automatic fill) valve in the cold water fill line to the boiler system. Check that the proposed operation of zone valves, zone circulator(s) and diverting valves will not isolate air separator(s) and/ or expansion tank(s) from the boiler. Clearance from hot water pipes to combustibles must be at least 6 inch (152.4 mm).
8. The boiler, when used in conjunction with a refrigeration system, must

be installed so the chilled medium is piped in parallel with the boiler with appropriate valves to prevent the chilled medium from entering the boiler. If the boilers are connected to heating coils, located in air handling units where they may be exposed to refrigerated air circulation, such boiler piping systems shall be equipped with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

9. The boiler is not provided with a drain valve directly on the boiler. A drain valve should be installed near the system return (water inlet) connection to the boiler and piped to a drain.

10. Before installing a Reliance boiler into a hydronic loop, be sure that the system piping and any other components of the system are clean and free of debris and any foreign matter. The hydronic system should be completely flushed prior to installing the boiler itself.

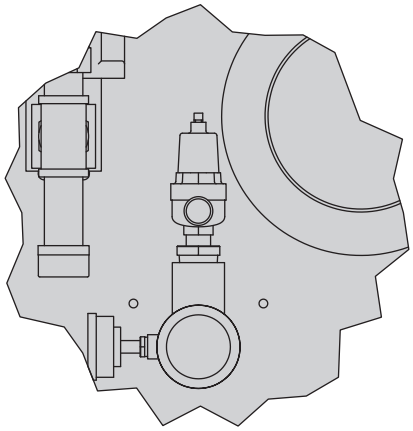


FIGURE 2 - SAFETY VALVE

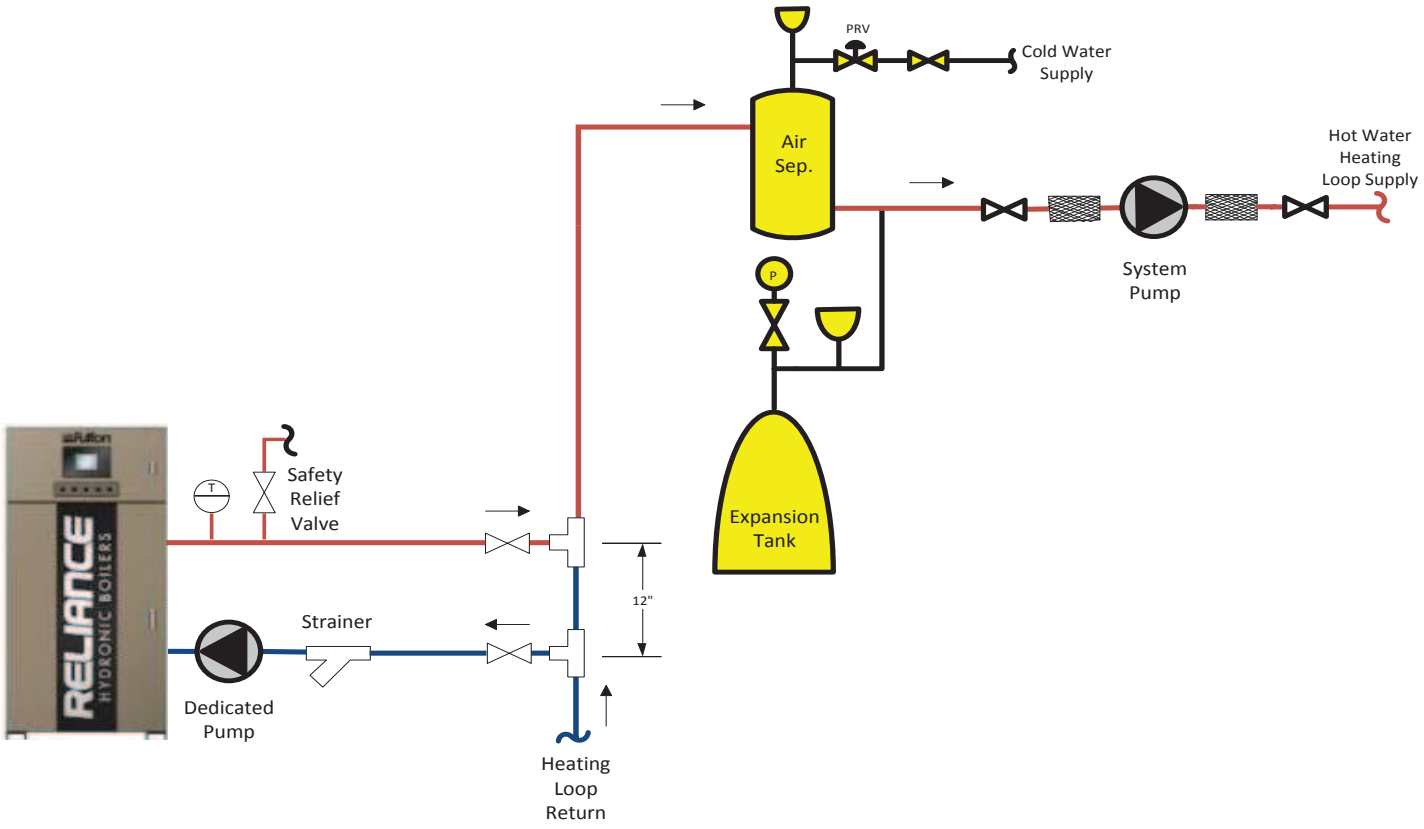


FIGURE 3 - SAMPLE PIPING LAYOUT: SINGLE BOILER WITH RETURN WATER TEMPERATURE >140 F (60 C)

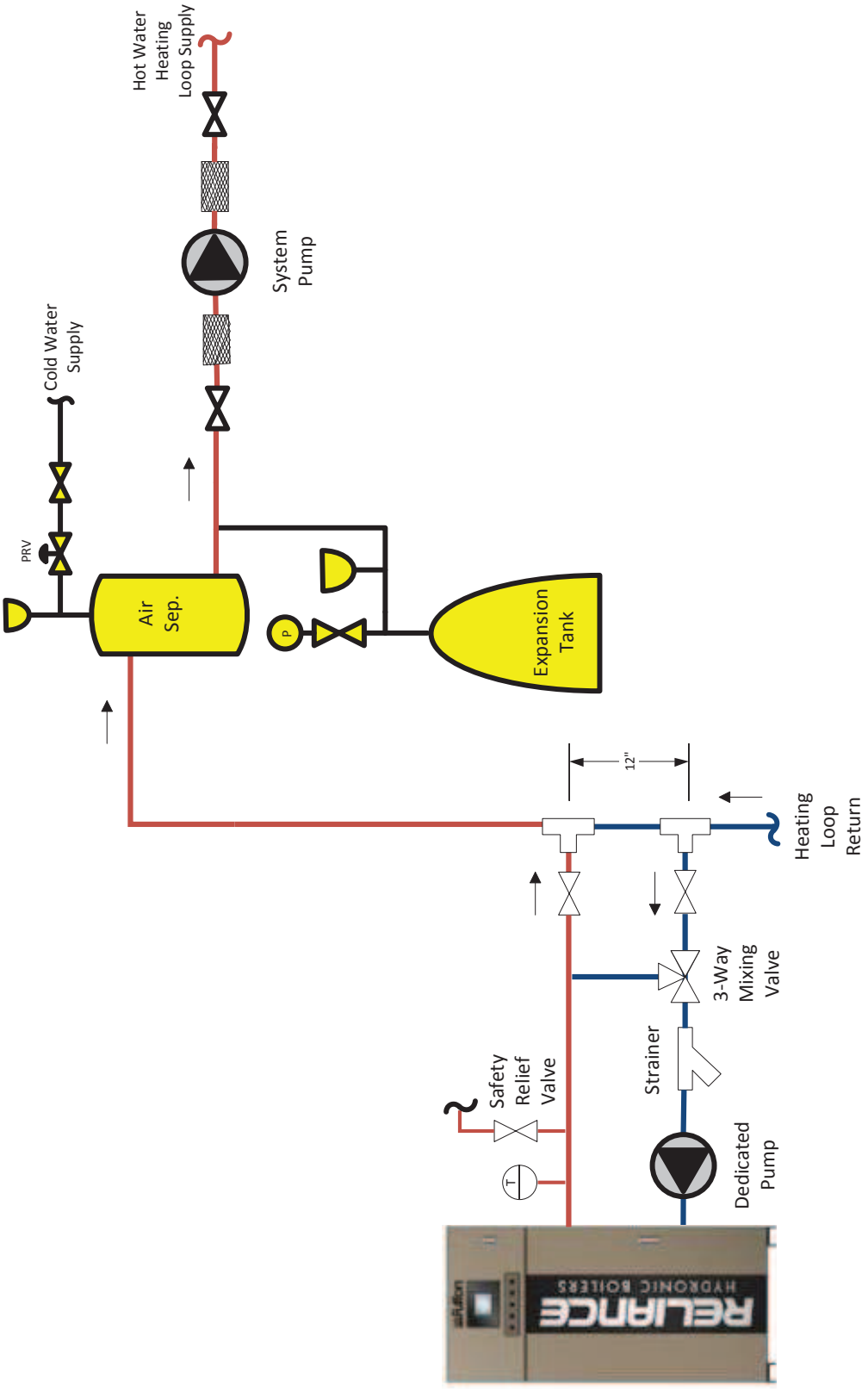


FIGURE 4 - SAMPLE PIPING LAYOUT: SINGLE BOILER APPLICATION, WITH MIXING VALVE

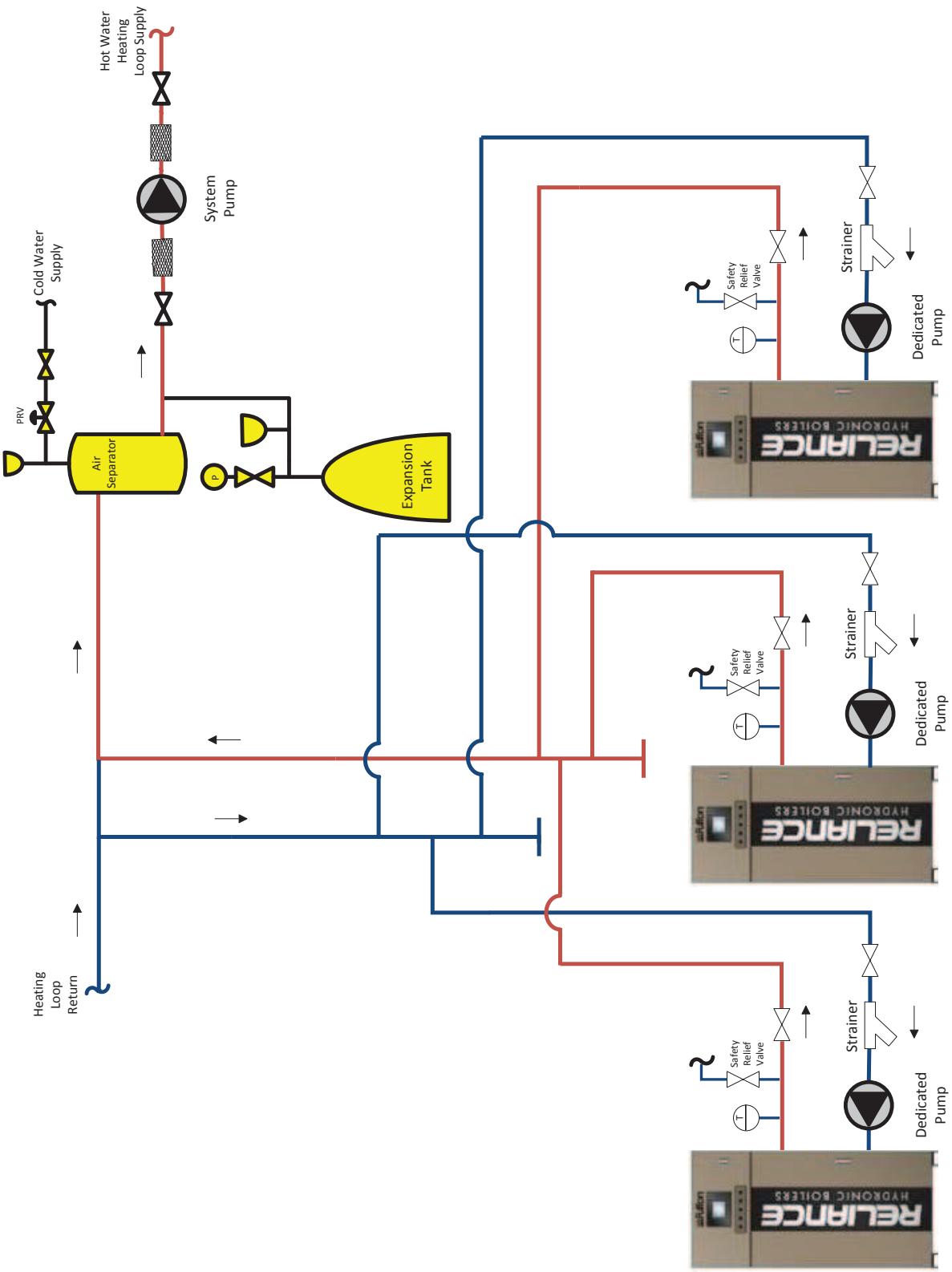


FIGURE 5 - SAMPLE PIPING LAYOUT: MULTIPLE BOILERS IN A COMMON HYDRONIC LOOP, RETURN TEMPERATURE >140 F (60 C)

⚠ WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

The boiler must be disconnected at the boiler shut off valve from the gas supply piping system during any pressure testing of the system.

⚠ CAUTION

Small levels of chlorides and/or sulfur presence in the combustion air or fuel will negatively impact the heat exchanger components. Any presence of these contaminants will void the warranty.

Some soaps used for leak testing are corrosive to certain types of metals. Rinse all piping thoroughly with clean water after leak check has been completed.

Install a strainer upstream of each boiler to ensure that no foreign matter will have the opportunity to get inside the heat exchanger.

■ Low Water Cut Off

The Reliance boiler comes with an installed flow-switch type low water cut-off (LWCO). The LWCO does not require field piping or wiring. If the flow switch does not sense flow, the boiler will shut down and an alarm condition will be annunciated on the SOLA color screen display.

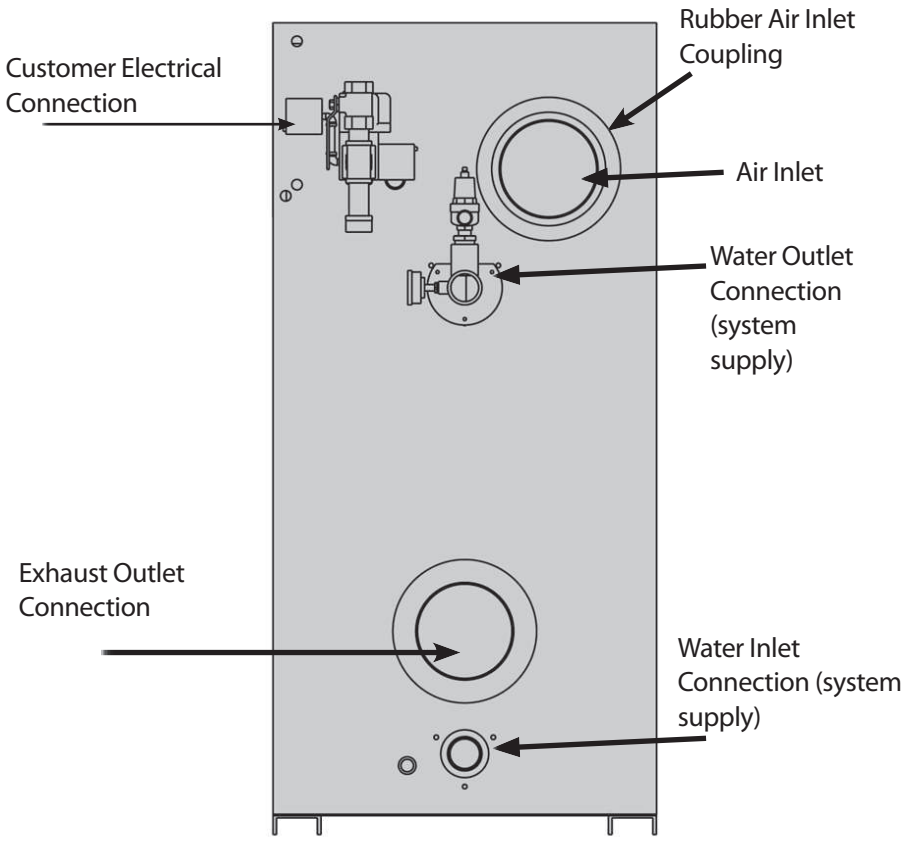


FIGURE 6 - WATER INLET AND OUTLET CONNECTIONS

Meet Water Chemistry Requirements

System water chemistry requirements are as follows:

- Maximum hardness of 8.5 grains (150 ppm)
- Acceptable pH range of 7.5-10
- Solids less than 2500 ppm
- Alkalinity less than 500 ppm

- Foreign matter: Oils, fats, grease, and other matter should be limited to 10 ppm.

Adhere to the following:

1. Refer to your water conditioning or chemical treatment supplier for analysis and recommendations for proper system conditions.
2. Follow a program with appropriate monitoring and maintenance of system water conditions as provided by your water conditioning or chemical treatment supplier.
3. Appropriate flow rates and return water temperature may be achieved through primary and secondary flow loops. Please refer back to Figures 3 - 5 for example systems. Multiple pumps, valves and heating zones operating at a variety of conditions will cause system flow to vary. System design professionals should consider the variety of conditions the heating system will experience.
4. Operate the boiler in a closed-loop system using water or water/glycol (not requiring a make-up water supply). A large amount of improperly treated make-up water can cause premature failure of the heat exchanger resulting from scale build up. Scale build up will reduce the efficiency and useful life of the boiler.

■ Prevent Freezing

It is imperative to prevent freezing; adhere to the following:

- If water/glycol is to be used in the system, a hazard analysis should be performed to determine proper use and disposal. No greater than 40% glycol should be used.
- Precautions for freeze protection are recommended for boiler installations where freezing potential exists and for installations that will use sealed combustion with potential for outdoor air to fall below freezing point.

■ Prevent Oxygen Contamination

There are several ways to prevent boiler water oxygen contamination:

- Minimize system leaks to minimize make up water requirement
- Do not use open tanks or fittings
- Do not use oxygen permeable materials anywhere in the water system
- Repair leaks in the system quickly
- Eliminate fittings wherever possible
- Use air elimination devices in system piping

⚠ WARNING

If the water supply must be temporarily disconnected, the boilers must be turned off to prevent accidental flue gas emission into the boiler room.

△ CAUTION

Care needs to be taken to eliminate oxygen from the water system, as excess oxygen in the system will reduce the life of any boiler. The boiler warranty does not cover heat exchanger replacement due to oxygen contamination of boiler water.

Heat exchanger failure due to inappropriate water quality, foreign matter or debris damage is not covered under the warranty.

If the piping system attached to this unit will be chemically cleaned, the boiler must be disconnected from the system and a bypass installed so that the chemical cleaning solution does not circulate through the boiler.

The hydronic system should never be flushed while the boiler is attached to the system since the debris could accumulate in the boiler and block water from passing through the heat exchanger. This will lead to premature boiler failure.

⚠ WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/ professional codes and regulations.

Do not use matches, candles, flame or other sources of ignition to check for gas leaks.

DO NOT USE GASOLINE, CRANKCASE OIL OR ANY OIL CONTAINING GASOLINE. If in doubt, contact your Fulton representative prior to operation.

⚠ CAUTION

Some soap used for leak testing is corrosive to certain types of metals. Clean all piping thoroughly after completing the leak check.

■ Eliminate System Air

➨ *NOTE: There are no built-in boiler air eliminating features.*

Adhere to the following for air elimination:

1. The installation of an air separator and air eliminator (air vent) is required.
2. To prevent scale corrosion in boiler and associated piping, make up water must be kept to a minimum. This is best achieved by ensuring immediate repair of all leaks and that system pressure is maintained.
3. If a sealed diaphragm-type expansion tank is used, install an air eliminator in the hot water piping at the air separator.
4. If an air cushion type expansion tank is used, pipe tank directly into boiler supply.
5. On multi-zoned systems (or a system with both space and domestic water heating), air elimination must be provided either in the common piping or on every loop.
6. When the boiler is installed at a higher level than baseboard radiation (if used), air elimination must be provided directly above the unit.

Fill the Boiler With Water

To be sure that the boiler is not air-bound, open the pressure-relief valve located at the rear of the boiler. Leave the relief valve open until a steady flow of water is observed. Close the valve and finish filling the system.

Install Gas Piping

The Reliance boiler is factory test fired and combustion is adjusted per the boiler data plate and test fire sheet.

The gas train (Figure 7) components are UL-795 certified to operate at specific gas pressure requirements. If available gas pressure is greater than 14"W.C., a lock up style gas pressure regulator must be provided to reduce the provided pressure to the acceptable range of 3.5"W.C. to 14"W.C. for natural gas, and 7" W.C to 14"W.C. for propane.

Adhere to the following for gas piping installation:

1. See Table 3 for required natural gas pipe size, based on overall length of pipe from the meter plus equivalent length of all fittings. Approximate sizing may be based on 1,020 BTU for 1 cubic foot of natural gas.
2. Piping must be installed such that no piping stresses are transmitted to the boiler. The boiler cannot be used as a pipe anchor.
3. The boiler and all gas piping connections must be pressure-tested and checked for leaks before being placed into service. Test with compressed air or inert gas if possible.

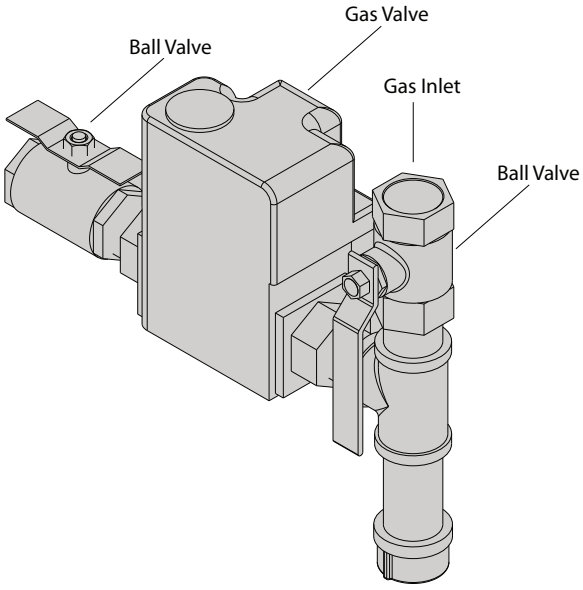


FIGURE 7 - TYPICAL GAS TRAIN

4. The boiler must be disconnected at the boiler manual shutoff valve (located at the end of the supplied gas train) from the gas supply piping system during any pressure testing of the system at pressures in excess of 1/2 psig (14 inch W.C.).

5. Gas piping must be installed in accordance with National Fuel Gas Code, ANSI Z223.1 1991 or latest addenda and any other local codes, which may apply.

6. The pipe and the fittings used must be new and free of dirt or other deposits.

7. Piping must be of the proper size to ensure adequate gas supply. A drip leg and union connection must be installed upstream of the gas safety shut off valves.

8. Connect gas supply line to the open end of the tee on which the drip leg is installed.

9. When making gas-piping joints, use a sealing compound resistant to liquefied petroleum gases. Do not use Teflon tape on gas line threads.

10. After gas piping is completed and before wiring installation is started, carefully check all piping connections, (factory and field), for gas leaks. Use a soap and water solution.

Install Condensate Drain (Optional)

A condensate drain kit (Figure 8) is intended for use with the Fulton Reliance boiler.

The Condensate Drain is Fulton Model Part Number 4-57-000440. Its recommended Operating Temp. is 175 F max; capacity is 4 QT; Inlet Size is 1inch; Outlet Size is 1 ½ inch; Water Supply is 100 psi max.; and Max. Btu's input per drain kit is 12 MMBtu.

PH neutralization kits are available from the factory, if desired.

Adhere to the following for installation:

1. The 3/4" condensate drain on the Reliance unit must be connected to the drain of the "Boot Tee" that must be installed on the exhaust outlet of the boiler and then tied together to the 1" inlet on the drain kit. One or more drain lines may be connected to this inlet (maximum of 12 MBH total per drain kit) through a common header.

TABLE 3 - NOMINAL PIPE SIZE

Nominal Pipe Size	**ID**	**Equivalent Pipe Length**		**Max Capacity in ft3 of natural gas per hour. Pressure drop of 0.5"wc/Equivalent length of pipe (feet)**						
(")	(")	90 Elb (Feet)	Tee (Feet)	20	40	60	80	100	150	200
1-1/4	1.380	3.45	6.9	950	-----	-----	-----	-----	-----	-----
1-1/2	1.610	4.02	8.04	1460	990	810	-----	-----	-----	-----
2	2.067	5.17	10.3	2750	1900	1520	1300	1150	950	800
2-1/2	2.469	6.16	12.3	4350	3000	2400	2050	1850	1500	1280
3	3.068	7.67	15.3	7700	5300	4300	3700	3250	2650	2280
4	4.026	10.1	20.2	15800	10900	8800	7500	6700	5500	4600

⚠ WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

Do not store or use gasoline or other flammable vapors and liquids or corrosive materials in the vicinity of this or any other appliances. Cements for plastic pipe should be kept away from all sources of ignition. Proper ventilation should be maintained to reduce the hazard and to minimize breathing of cement vapors.

An uninterruptible water supply is required and shall be connected to the ¼" compression fitting on the condensate drain. The water supply maintains a water level in the drain kit to prevent accidental flue gas emission into the boiler room.

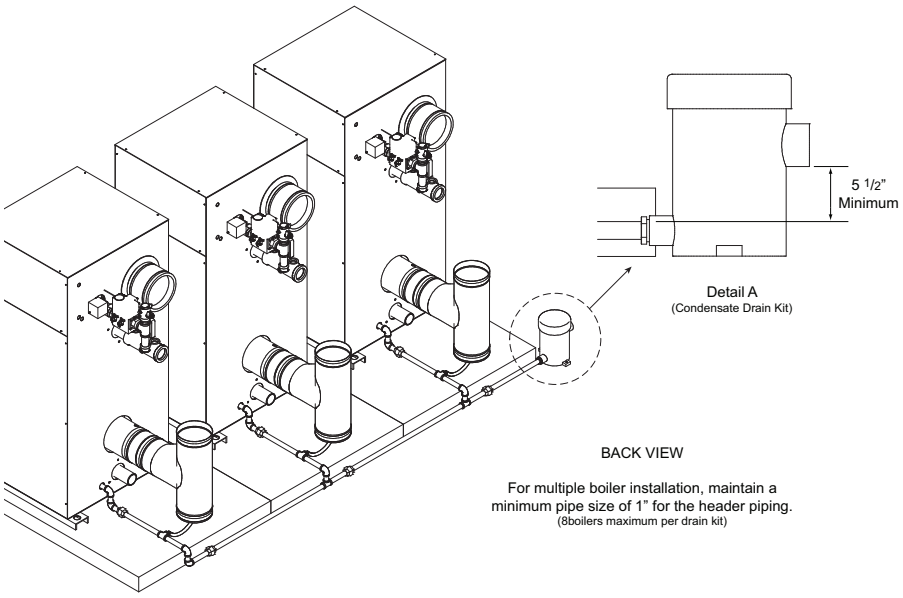


FIGURE 8 - OPTIONAL CONDENSATE DRAIN KIT

2. An uninterruptible water supply is required and shall be connected to the 1/4" compression fitting on the drain float. The water supply maintains a water level in the drain kit to prevent the flue gas from entering the boiler room through the condensate connection.

3. The 1 1/2" connection shall be piped to an appropriate drain for disposal. If the water supply must be temporarily disconnected, the boiler(s) must be turned off to prevent accidental flue gas emission into the boiler room.

4. The cover should be kept on at all times, except during maintenance of the drain. This drain should be monitored and checked regularly in your Reliance maintenance schedule.

5. If the water supply must be temporarily disconnected, the boilers must be turned off to prevent accidental flue gas emission into the boiler room.

6. The condensate drain cover must be kept on at all times, except during maintenance of the drain. This drain should be checked regularly in your boiler maintenance schedule.

7. A condensate collecting tank and condensate pump will be required if a floor drain is not available to collect condensate (collecting tank and pump are not supplied with the boiler).

8. All piping (Figure 9) must be galvanized, or stainless steel and should be free of leaks. Copper, carbon steel/iron pipe, PVC or CPVC are not acceptable.

9. Connect 3/4" condensate drain(s) to the 1" header connected in a manifold as shown in Figure 10. The header must be at least 5 1/2" below the

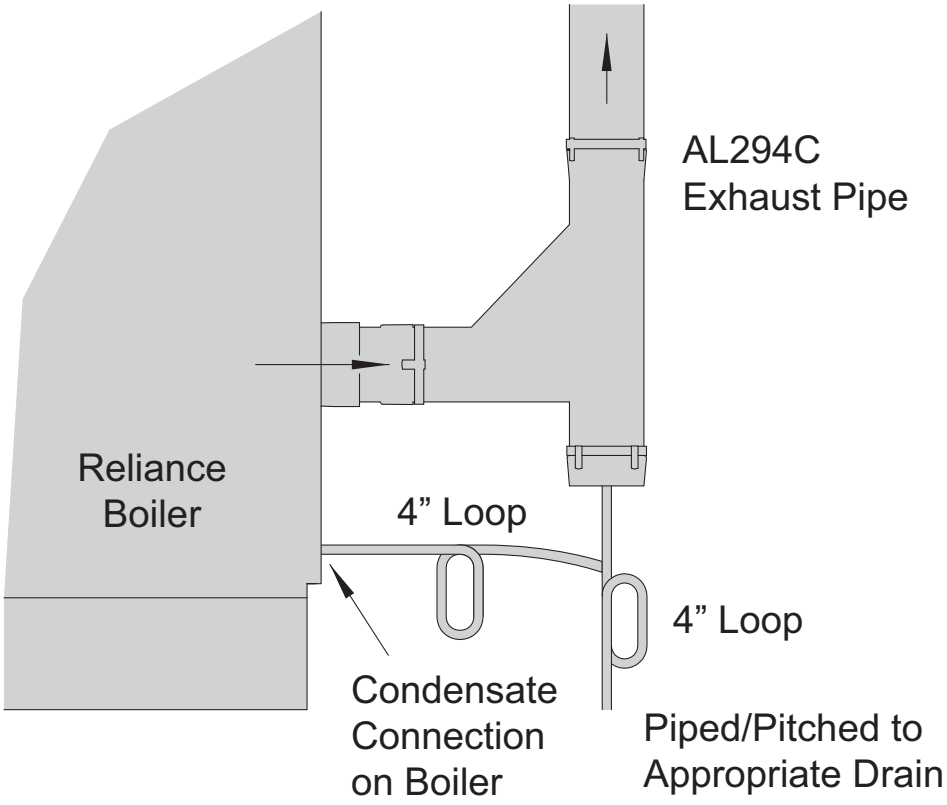


FIGURE 9 - CONDENSATE DRAIN PIPING FOR RELIANCE BOILERS

condensate outlet of the individual boiler and must remain flooded by being at least 5 ½" below the outlet of the condensate drain trap.

10. Connect 1 1/2" drain outlet to an appropriate waste line following applicable codes. The 11/2" drain connection on the condensate drain must be the highest point prior to going to the drain. Failure to keep drain piping lower than this point will result in overflow of the condensate drain. Slope the drain pipe away at a minimum pitch of 1 inch (25.4 mm) for every 12 feet (3.65 m).

11. Attach a 1/4" water supply to the compression fitting on the float. The water line must be connected to an uninterruptible supply. Fulton recommends connecting it before the "Fast-Fill" valve to the boiler supply but after the back flow preventer to avoid contamination of a potable water supply. Maximum allowable water pressure to the compression fitting is 100 PSI.

Venting

Adhere to the following venting requirements:

1. The boiler can be installed with either sealed combustion or a conventional venting arrangement. With either venting configuration, the difference in pressure readings at the boiler exhaust connection and air intake connection cannot exceed +2.0"W.C. This equates to 70 feet (21.3 m) and 8 elbows when combining the distances on the air intake and exhaust with the piping diameters matching the standard connections.

2. The pressure at the boiler exhaust connection must not exceed 0.04"W.C. negative. This pressure must remain relatively constant throughout the operation of the boiler.

3. The boiler should not be operated with a negative pressure in the boiler room (unless there is sealed combustion [intake piped outside]). Pay particular attention to other equipment installed in the boiler

⚠ WARNING

Do not use the boiler as support for ducted air piping. Ducted piping must be supported independently of the boiler.

Cements for plastic pipe are flammable liquids and should be kept away from all sources of ignition. Proper ventilation should be maintained to reduce the hazard and to minimize breathing of cement vapors. Avoid contact of cement with skin and eyes.

room such as compressors and air handling units.

4. Consult your venting pipe supplier for assistance with sizing of vent materials and other potentially required accessories.

➨ *NOTE: The installation of an air intake filter is recommended for any Reliance installation where particulate matter >50 microns could enter the boiler. An air intake filter is available as an option from Fulton if required. The air intake filter must be inspected and, if required, cleaned and/or replaced on a monthly basis at a minimum.*

■ Combustion Air Supply From the Boiler Room

Adhere to the following for installation:

1. Adequate combustion air and ventilation must be supplied to the boiler room in accordance with local codes and NFPA54/ANSI Z233.1, Section 5.3, Air for combustion and ventilation.
2. The boiler room must meet the NFPA criteria for a non-confined space.
3. It is important to provide free access of air to the boiler. To burn fuel properly, it requires 0.4 square inch opening of fresh air for every 1,000 BTU input of fuel (2.58 cm2 for every 252Kcal).
4. Consistent proper ventilation of the boiler room is essential for good combustion. Install two fresh air openings, one at a low level, within 12 inches (305 mm) from the floor but not less than 3 inches (76 mm), and one at a higher level within 12 inches (305 mm) of the ceiling but not less than 3" in the boiler room wall. This will provide a flow of air to exhaust the hot air from the boiler room. Each opening must have a minimum of $1in_2$ per 1000 Btu/hr and be no less than $100in_2$.
5. Consider the blocking effect of louvers and grills.
6. A combustion air supply damper (which can be shipped mounted to the boiler from the factory) is recommended for sealed combustion installations with high draft flow. This is typical of installations with a total of 70 ft linear distance or greater of the combined distance of air intake and exhaust piping. In cold ambient conditions, high natural draft through an idle boiler can cause the water inside the heat exchanger to freeze.

■ Combustion Air Piped From Outside Building Without Sealed Combustion

Adhere to the following for installation:

1. If the boiler room is deemed a confined space two permanent ducts connected to the outdoors must be installed.

➨ *NOTE: Assembly should be completed within 20 seconds after last application of cement. Do not use a hammer to insert pipe.*

2. After assembly, wipe excess cement from pipe at end of fitting socket. A properly made joint will show a bead around its entire perimeter. Any gaps may indicate a defective assembly due to insufficient cement. Handle joints carefully until completely set. Galvanized steel joints should be sealed with adhesive aluminum tape.

Exhaust Venting

The Reliance boiler is equipped with a round vent connection (Figure 6) at the lower rear of the boiler.

■ Standard Venting Configuration, Category IV

The Reliance boiler is standardly configured as a Category IV appliance. The vent connection sizes are adequate for a Category IV arrangement. Venting material must be appropriate for condensing, positive pressure applications (condensing occurs in the stack).

Adhere to the following:

1. Venting material supplied for the Reliance boiler configured as Category IV must be AL29-4C or 316L SS, listed and labeled to UL 1738, and guaranteed appropriate for the application by the manufacturer and supplier of the venting.
2. Do not utilize automatic vent dampers or barometric dampers with the Reliance boiler. Because the exhaust system operates at a positive pressure, utilizing dampers could result in flue gases leaking into the boiler room.
3. The exhaust line must be sloped down toward a drain with a pitch of at least ¼" per foot. Failure to do so can result in a condensate pocket, which can result in an inoperative boiler. This must be no low spots in the exhaust pipe, as this can also result in a condensate pocket. A high spot is acceptable, provided the pitch from the high spot is maintained back to the drain.

■ Optional Venting Configuration, Category I

The Reliance boiler can be configured as a Category I appliance. The boiler must be ordered this way from the factory. The operating controls will be configured to limit the minimum modulation point to 50% of full input, thus preventing condensing from occurring in the stack.

Adhere to the following:

1. Shipped loose with the boiler will be a stack increaser fitting and a barometric draft regulator. These components must be used when venting the Reliance as a Category I appliance. The stack material must be 4" diameter larger than the stack connection on the boiler.
2. Venting material must be appropriate for non-condensing, negative pressure applications and should be B-Vent style material. This must be guaranteed appropriate for the application by the manufacturer and

⚠ WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

Do not use the boiler/burner as support for ducted air piping. Ducted piping must be supported independently of the boiler.

Do not terminate venting into an enclosed area.

Never use open flame or smoke from a cigarette, cigar, or pipe as a testing method during boiler installation, operation, or maintenance.

Foreign substances, such as combustible volatiles in the combustion system can create hazardous conditions. If foreign substances can enter the air stream, the boiler combustion air inlet must be piped to an outside location.

Regular maintenance of the filter is required (as per the filter manufacturer's recommendations) to maintain the warranty.

Particulate matter or chemicals in the combustion air supply to the boiler will cause damage or failure to the burner and is not covered under warranty.

⚠ WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

Use of automatic vent dampers or barometric dampers with the Reliance boiler in positive pressure systems may result in exhaust leaking into the boiler room.

⚠ CAUTION

Failure to slope the exhaust line toward the drain with a pitch of at least 1/4" per foot may result in a condensate pocket, which can result in an inoperative boiler.

supplier of the venting.

3. Category I Installations, individual piping for each boiler: The pressure drop of the exhaust piping (not including the air intake piping) should be a negative during all possible operating conditions, between -0.02 and -0.04"wc. Vertical rise in the exhaust pipe is typically required to achieve the desired negative pressure.

■ For Both Venting Configuration Options

Adhere to the following:

1. The exhaust vent installer should be familiar with and adhere to the National Fuel Gas Code, ANSI A233.1, Part 10 or any other applicable provisions of local building codes.
2. The exhaust vent installer should follow the vent manufacturer's instructions for proper installation procedures.
3. A tee/boot tee with a drain must be installed at the first elbow from the boiler flue outlet. There must be a minimum of 4" of water within a loop style trap (loop diameter 4"). The loop style trap can be high temperature silicone rated for 500 F (see Figure 9) and must be piped/pitched to drain freely.
4. The loop style trap must be filled with water before connecting it to the exhaust pipe. It is important that this trap is periodically checked and verified that it remains flooded during regular operation of the equipment. Failure to do this could result in flue gases leaking into the boiler room.
5. The condensate connection on the boiler should be piped into the stack drain piping (see Figure 9). The pipe from the boiler directed to the drain should be installed at a slope of ¼" per foot.
6. Ensure that condensate drain piping will not be exposed to temperatures where water condensate will freeze in the lines.

■ Common Air Intake and Exhaust Venting of Multiple Boilers

Combining multiple Reliance boilers into a common pipe for combustion air supply, exhaust, or both is only permitted on a case by case basis and must be accomplished with an engineered solution.

Adhere to the following:

1. The engineered solution must guarantee the prevention of flue gases moving backwards through idle boilers. This is important to prevent flue gases from entering the mechanical room (if sealed combustion is not being used) and also to prevent flue gases from corroding the heat exchanger and/or other components in the upper cabinet of the boiler.
2. Reliance boilers should not be common vented with other types of equipment.
3. Fulton requires the use of a combustion air supply damper (which can be provided shipped mounted on the boiler by Fulton and incorporated into

control logic) for any common air intake/exhaust applications.

4. The pressure drop across an exhaust pipe shared by multiple boilers must have a negative pressure at all operating conditions up to -0.05" wc. A mechanical draft assist system, such as a variable speed fan, may be required to accomplish this.

5. Combustion air dampers and/or a variable speed exhaust fan may be required. Please contact your venting manufacturer for proper vent size and arrangement.

Venting Terminations

Adhere to the following for installation (see Figure 10):

1. All vent pipes and fittings must be installed with appropriate air space clearances to combustibles. These air space clearances apply to indoor or outdoor vents—whether they are open, enclosed, horizontal or vertical or pass through floors, walls, roofs, or framed spaces. The air space clearances should be observed to joists, studs, subfloors, plywood, drywall or plaster enclosures, insulating sheathing, rafters, roofing, and any other material classed as combustible.

2. The required minimum air space clearances also apply to electrical wires and any kind of building insulation.

3. Adequate provision must be made to support the weight of the exhaust venting. It cannot be supported by the boiler exhaust connection.

4. Listed termination parts must be used.

5. Select the air intake point of penetration where a minimum of 1/4" per foot upward pitch can be maintained.

6. When penetrating a non-combustible wall, the hole through the wall must be large enough to maintain the pitch of the vent and provide sealing. Use adhesive material to seal around the vent on both sides of the wall. When penetrating a combustible wall, a wall thimble must be used. See Figure 11 for installation instructions. Minimum wall thickness through which vent system may be installed is 3.25 inches (82.5 mm). Maximum wall thickness through which vent system may be installed is 20 inches (508 mm).

⚠ WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

Fulton cannot assume responsibility for an air intake or exhaust arrangement where Reliance boilers are common vented with any other type of equipment.

⚠ WARNING

The exhaust vent installer should be familiar with Federal Codes as well as local codes and regulations.

Fulton cannot assume responsibility for an air intake or exhaust arrangement where Reliance boilers are common vented with any other type of equipment.

⚠ CAUTION

To prevent the possible re-circulation of flue gases, the vent designer must take into consideration such things as prevailing winds, eddy zones, building configurations, etc. It is the responsibility of the installer to locate the exhaust duct in such a way that it does not become blocked due to snow, ice, and other natural or man-made obstructions.

Do not locate the vent termination too close to shrubbery as flue products may stunt their growth or kill them.

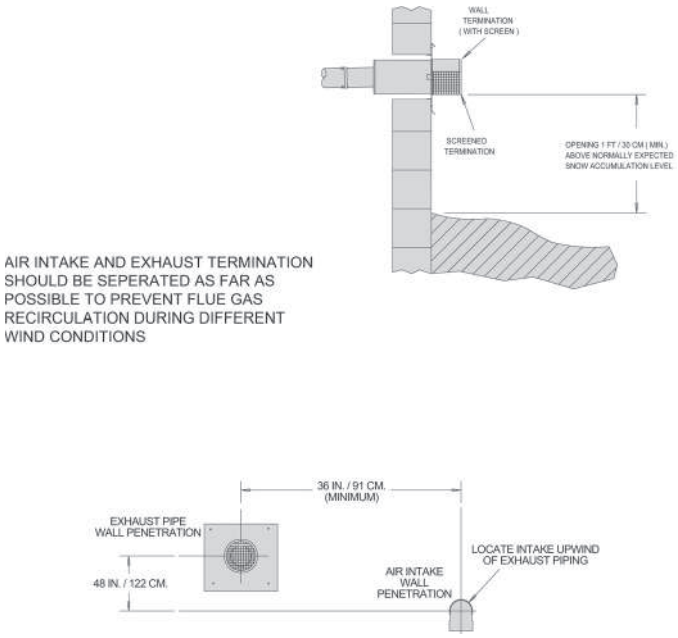


FIGURE 10 - VENTING TERMINATIONS

■ Wall Thimble Installation

Adhere to the following for installation (see Figure 11):

1. The thimble is inserted through the wall from the outside. Secure the outside flange to the wall with nails or screws, and seal with adhesive material.
2. Install the inside flange to the inside wall, secure with nails or screws, and seal with adhesive material.
3. Pass the vent pipe through the thimble from the outside and join to the rest of the vent system.
4. Seal the pipe to the thimble flange with adhesive material.
5. Install two pipe retaining clamps around the intake as well as vent pipes on both ends of the wall thimble (on the inside and outside of the wall) through which intake and vent pipes are passed. They will prevent the intake and vent pipes from being pushed or pulled.

■ Horizontal Vent Termination

Adhere to the following for installation:

1. The vent termination is joined to the vent pipe outside the wall. Use the same joining procedures for vent pipe and fittings. The termination of the vent system must be at least 12 inches (304.8 mm) above the finished grade, or at least 12 inches (304.8 mm) above normal snow accumulation

level (for applicable geographical areas). The termination of the vent system shall not be located in traffic areas such as walk ways, adjacent buildings, operable windows and building openings unless the venting system is at least 7 ft (21.3 m) above finished grade, (National Fuel Gas Code, ANSI Z223.1). The vent terminations must be at least 4 feet (1.22 m) horizontally from electric meters, gas meters, regulators, and relief equipment. See Figure 12.

2. When installing inlet and exhaust terminations on the same wall, the exhaust outlet must be installed 3 ft (.914 m) minimum above and downwind from air supply inlet to prevent exhaust recirculation. Under certain wind conditions, some building materials may be affected by flue products expelled in close proximity to unprotected surfaces. Sealing or shielding of the exposed surfaces with a corrosion resistant material (such as an aluminum sheet) may be required to prevent staining or deterioration.

3. Do not locate the vent termination too close to shrubbery as flue products may stunt their growth or kill them.

4. The minimum vent height should extend at least 3 ft (.914 m) above the roof, or at least 2 ft (.609 m) above the highest part of any structure within 10 ft (3.04 m) of the vent.

5. If the exhaust vent terminates within 10 ft (3.04 m) horizontally of the air inlet, the exhaust vent must be at least 4 ft (1.22 m) above the inlet. Dimensions listed above and those illustrated are minimum, and may or may not be sufficient for conditions at a specific job site.

6. To prevent the possible re-circulation of flue gases, the vent designer must take into consideration such things as prevailing winds, eddy zones, building configurations, etc. Fulton cannot be responsible for the effects such adverse conditions may have on the operation of the boilers. It is important to locate the exhaust duct in such a way that it does not become blocked due to snow, ice, and other natural or man-made obstructions.

Electrical Connections

Adhere to the following when installing electrical connections:

1. Install wiring and ground boiler in accordance with authority having jurisdiction, or in absence of such requirements utilize National Electrical Code, ANSI/NFPA 70.

2. This boiler requires an independent 120V 60Hz single phase connection. Connect power to the terminal strip as supplied on the inside cover of the panel box.

➨ *NOTE: Connect a ground wire to green colored ground lug in electrical control box.*

⚠ WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

Cements for plastic pipe are flammable liquids and should be kept away from all sources of ignition. Proper ventilation should be maintained to reduce the hazard and to minimize breathing of cement vapors. Avoid contact of cement with skin and eyes.

Assure all electrical connections are powered down prior to attempting replacement or service of electrical components or connections of the boiler.

⚠ WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

Do not use any dangerous source of fire or smoke (e.g., lighter, candle) to test equipment at any time.

Assure all electrical connections are powered down prior to attempting replacement or service of electrical components or connections of the boiler.

⚠ CAUTION

Never install a barometric damper on flue systems designed with positive pressure.

■ Air Piped From Outside Boiler Room

Adhere to the following:

1. The combustion air supply can be piped directly to the air inlet of the boiler.
2. A rubber air intake coupling is recommended with boilers specified for installation with ducted air supply. It must be used to connect the intake piping to the boiler air inlet. This rubber air inlet coupling is available from Fulton as an option. See Figure 6.
3. The air intake must be piped out of the building if the boiler room contains contaminated air.

■ Intake Duct Sizing

1. Air intake ducting must be sized in conjunction with the exhaust venting to provide no greater than a +2.0" W.C. combined pressure drop. This equates to 70 feet and 8 elbows when combining the distances on the air intake and exhaust with the piping diameters matching the standard connections.
2. The installation of a recognized termination screen is required. Contact your local venting supplier for assistance in venting sizing.
3. Air Intake pipes and fittings shall be Schedule 40 PVC pipe or galvanized steel. All Schedule 40 PVC pipe, fittings, primer and cement must conform with American National Standard Institute and the American Society for Testing and Materials (ANSI/ASTM standards.)
4. Intake PVC piping must be assembled using cement. This will ensure that the intake is airtight and will not allow contaminates from the boiler room into the boiler. The cement shall be free flowing and contain no lumps, un-dissolved particles or any foreign matter that adversely affects the joint strength or chemical resistance of the cement. The cement shall not show gelation, stratification, or separation that cannot be removed by stirring.

▶ CEMENTING JOINTS

The following procedure for cementing joints (per ASTM D2855) should be adhered to:

1. Measure and cut PVC pipe to desired length.
2. Chamfer end of pipe, removing any ridges or rough edges. If end is not chamfered, the edge of the pipe may remove cement from the fitting socket and result in a leaking joint.
3. Clean and dry the surfaces to be joined.
4. Test fit joint and mark depth of fitting on pipe outside.
5. Uniformly apply a liberal coat of primer to inside socket surface of fitting and male end of pipe to depth of fitting socket.

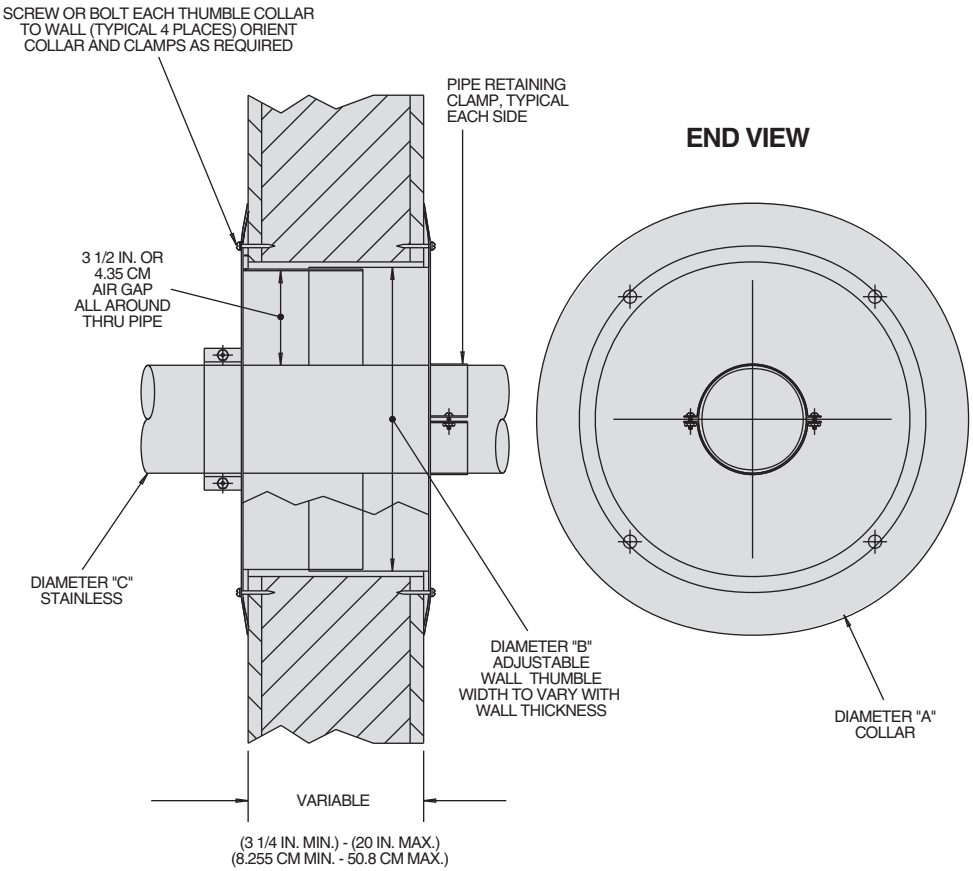


FIGURE 11 - WALL THIMBLE INSTALLATION

6. Promptly apply solvent cement to end of pipe and inside socket surface of fitting. Cement should be applied lightly—but uniformly—to inside of socket. Take care to keep excess cement out of socket. Apply second coat to pipe end

➨ *NOTE: Time is critical at this stage. Do not allow primer to dry before applying the cement.*

7. Immediately after applying last coat of cement to pipe, while inside socket surface and end of pipe are wet with cement, insert end of pipe into socket, turn pipe 1/4 turn to distribute cement evenly, continue to insert pipe until it bottoms out.

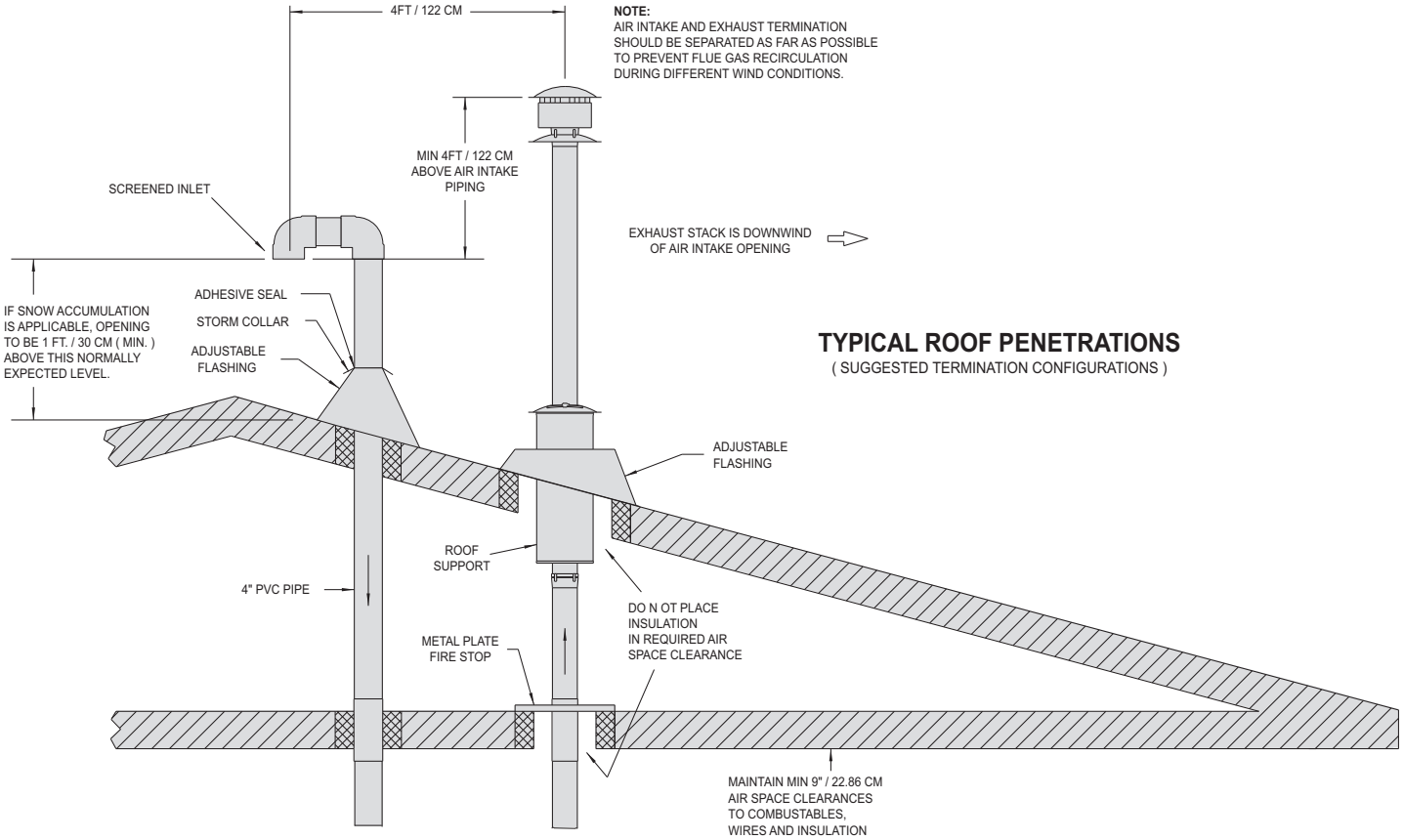


FIGURE 12 - ROOF PENETRATION DETAILS

⚠ WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/ professional codes and regulations. Failure to follow instructions may result in a fire or explosion, causing property damage, personal injury, or loss of life.

Crystalline silica may be present in components of this equipment. Exposure to crystalline silica may pose significant health hazards, including but not limited to eye and respiratory system damage. Per the Centers for Disease Control and Prevention (CDC) and Occupational Safety and Health Administration (OSHA), appropriate personal protective equipment must be worn to minimize exposure to hazardous substances. Refer to most current guidelines offered by the CDC and OSHA for more information, including personal protective equipment recommendations.

This boiler is equipped with an ignition device, which automatically lights the burner. Do not try to light the burner by hand.

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

Use only your hand to turn the valve handle. Never use tools. If the knob will not turn by hand, don't try to repair it. Call a qualified service technician. FORCE OR ATTEMPTED REPAIR MAY RESULT IN A FIRE OR EXPLOSION.

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. -A qualified installer, service agency or the gas supplier, must perform installation and service.

Perform Pre-Start-Up Inspection

Prior to start-up, perform the following:

1. Smell all around the boiler area for gas. Be sure to smell next to the floor, as some gas is heavier than air and will settle. 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.

2. Ensure the boiler is located with the proper clearances as shown in the **Clearances and Serviceability** section of this manual.
3. Ensure that relief valves have been properly piped to floor drains.
4. Ensure flue gas from the boiler is properly vented.
5. Ensure the water system has been flushed and is free of debris.
6. Ensure combustion air openings are not obstructed in any way and have adequate capacity.
7. Ensure there are no flammable liquids, materials or hazardous fumes present in the environment.
8. Ensure nothing was damaged or knocked loose during installation and/or shipment.
9. Inspect the main gas train and trim assembly to be sure they were not damaged during shipment and/or installation.

Fill and Purge the System

Completely fill and purge the heating system as follows:

1. Close combination shutoff/purge valve in supply, all drain cocks, the shutoff valve for the pressure reducing (fill) valve, and all manual air vents.
2. Open all other system shutoff valves and one of the zone valves, the vent on the combination shutoff / purge valve and the shutoff valve to the pressure-reducing (fill) valve.
3. Water will now begin to fill the system. Air will escape through the vent on the combination shutoff/ purge valve. Continue filling until a constant stream of water (no bubbling) is discharged from the vent.
4. Close the zone valve on the purged loop, and open the zone valve on the next loop to be purged. When all air has escaped and only water is discharged, close the zone valve. When all zones have been purged (one at a time), close the vent on the combination shutoff/purge valve.
5. At this point, the system has been initially filled. However, air pockets may still remain at high points in the system and in heating loops above

the level of the combination shut/off purge valve. It is quite possible, depending on the particular system that all piping above the combination shutoff/purge valve still contains air. If manual vents are installed on the system high points, these should be opened to vent these locations. When only water is discharged from all vents, the initial purging is complete.

6. Open the combination shutoff/ purge valve (keep the vent closed). With the gas shutoff valve closed, turn on power to the boiler and operate the circulator. Circulate the system water for approximately 30 minutes to move all air to the automatic air separation point.
7. Again, open manual air vents at high points of heating loop until a constant stream of water is discharged from the vent. Close the vent and make sure it's watertight. Repeat procedure for all high points and for every zone.
8. Check temperature/pressure indicator reading, which should equal the pressure-reducing (fill) valve set pressure. No more water should be entering the system. Close the shutoff valve on the cold-water fill line.
9. Visually inspect all pipe joints and equipment connections for leaks. If necessary, drain system, repair leaks and refill/purge the system. If no pressure drop is detected for a period of two hours under pressure, the system may be considered watertight.
10. When purging is completed, make sure the following are open—combination shut-off/purge valve, shutoff valve to pressure reducing (fill valve), shutoff valve in cold water fill line, and shutoff valve in return line.
11. Make sure the following are closed - all drain cocks, the vent on the combination shutoff-purge valve, & all manual vents. Reset zone valves to normal mode of operation and turn off power to boiler.
12. Open fuel shutoff valve, allowing fuel to flow to boiler.

SOLA Control Program Presets

The SOLA control (Figures 13 - 19) has been factory-programmed and requires no alteration of program presets. Only factory-trained personnel should attempt to alter password protected preset values.

Commission The Boiler

Adhere to the following when commissioning the boiler:

1. Verify with authorized personnel that the gas lines have been purged. Do not proceed without verification.
2. Familiarize all personnel on all aspects of boiler use, safety, and contents of this manual. This includes, but is not limited to, the use of the controls, lighting, and shutdown procedures.
3. Review the unit-specific control schematics, and follow appropriate instructions.

⚠ WARNING

Do not attempt to start the boiler for any testing before filling and purging the boiler. A dry fire will seriously damage the boiler and may result in property damage or personnel injury and is not covered by warranty.

Before commissioning the boiler, verify with authorized personnel that the gas lines have been purged.

Never attempt to operate a boiler that has failed to pass all the safety checks.

Never leave an opened manual air vent unattended. In the event an opened vent is left unattended, water damage could occur.

Check daily that the equipment area is free and clear of any combustible materials, including flammable vapors and liquids.

⚠ CAUTION

Do not use this equipment if any part has been under water (or subjected to heavy rains/water if the equipment does not have NEMA 4 wiring, controls and instrumentation). Immediately call a qualified service technician to inspect the equipment and to replace any part of the control system and/or gas control(s) which have been under water.

Commissioning/Start up by a non-Fulton authorized person will void the product warranty.

Please read these instructions and post in an appropriate place near the equipment. Maintain in good legible condition.

⚠ WARNING

Non-Fulton product information is for reference purposes only. No Fulton document should substitute for full review of documentation available from the component manufacturer.

⚠ CAUTION

After checking controls by manual adjustment, make sure they are always reset to their proper settings.

■ Test of Ignition Safety System

Test the ignition system safety shutoff as follows:

1. Remove the black plug/connector from the main gas valve (it is held on with a central screw).
2. With the main gas cock (inlet manual gas valve) open, the burner should be cycled on. After all the safety limits such as gas pressure, water flow and temperature are satisfied, the blower will run and pre-purge the boiler.
3. Once the purge is complete (15-30 seconds), the ignition transformer will be energized. There will be a 4 second trial for ignition period.
4. The main gas valve will not open because there is no power to the valve due to the disconnected wires. Hence, no flame will be established and the flame safeguard will not receive a flame signal from the UV scanner.
5. After 4 seconds, the flame safeguard programmer will assume a "Flame Failure" condition and go to a "lockout" mode. Lockout will require manual reset of the flame safeguard. The control will allow one retry before locking out.
6. After completing this test, turn off the boiler and reconnect the wires to the main gas valve.

Perform Test of Low Water Cut Off

This boiler is equipped with a flow switch type low water cut-off in the outlet nozzle. Once the boiler is full of water the following test can be accomplished:

1. Turn the boiler off.
2. Turn system pump off.
3. Turn the boiler back on. The "Hold 63 LCI Off" will annunciate, after a call for heat from the Temperature Control. The boiler should not start until the pump is started.
4. Perform appropriate test for any external or factory-installed probe-type low water cut-off.

Perform Test of Limit Controls

Fire the boiler and test the high limit control as follows:

1. Access the High Limit screen of the SOLA control.
2. Alter high temperature limit to a value lower than the anticipated loop temperature. Turn the boiler on. Water temperature will rise until the boiler locks out. This condition has to be manually reset. Alter the high limit cut off temperature to normal level, typically 10-20 degrees above set point.

Perform Test of Low Gas Pressure Switch

Test the low gas pressure switch as follows:

1. With the boiler running increase the low gas pressure setpoint until a lock out is annunciated.
2. Reset the switch to normal level, re-start the boiler.

Perform Test of High Gas Pressure Switch

Test the high gas pressure switch as follows:

1. Close the downstream main gas cock and start the boiler.
2. Once the trial for ignition period is reached, the main gas valve will open, pressurizing the line. This will trip the high gas pressure switch.
3. Manually reset the high gas pressure switch after it trips.

Perform Test of Air Switch

Fire the boiler and test the air switch as follows:

1. At low fire turn the adjustment on the switch clockwise until the switch trips and the boiler shuts down.
2. Back out the adjustment to previous position.

Test of High Back Pressure Switch

Fire the boiler and test the high back pressure switch as follows:

1. At high fire turn the adjustment on the switch counter clockwise until it opens and the boiler shuts down.
2. Turn the adjustment in two turns.

Normal Operation of the Boiler

Under normal operating circumstances, this boiler functions as a fully automatic appliance. The automatic control senses the water outlet temperature and fires the boiler when heat is needed by the system. Additionally this boiler may function as part of an integrated building management system.

Outlet water temperature, fan speed and set point are displayed on the SOLA touch screen display on the front of the boiler. Figure 13 shows a sample screen display on the SOLA control.

⚠ WARNING

Non-Fulton product information is for reference purposes only. No Fulton document should substitute for full review of documentation available from the component manufacturer.

⚠ CAUTION

When making changes to the controls profile, a combustion analyzer is required.

⚠ WARNING

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This boiler is equipped with an ignition device which automatically lights the burner. Do not try to light burner by hand.

■ CHANGING THE OPERATING SET POINT

From the main screen do the following:

1. Tap "Configure"
2. Tap "Central Heat Configuration"
3. Tap "CH Set Point"
4. Tap "Clear"
5. Enter New Set Point
6. Tap "OK"
7. Tap the escape arrow in top right hand corner

■ SETTING COMBUSTION

To Set Combustion, perform the following:

1. Obtain the following tools: Calibrated combustion analyze, manometer to measure inlet gas pressure
2. From home screen tap "Operation."
3. Tap the yellow background "rpm" box next to firing rate.
4. Under "Firing Rate Control" tap "Manual in Run." Refer to Figure 16.
5. Using test fire sheet enter the light off rpm's in the "Manual Firing Rate" box.
6. Once the rpm's are entered tap "OK", then return to the home screen.
7. Turn the local/off/remote switch to the local position.
8. Once burner has started and you have verified flame signal return to the "Manual Firing Rate" box.
9. Increase the firing rate in 500 rpm increments until you reach the high fire rpm's from the factory test fire sheet.
10. At each point check combustion. CO2/CO should remain constant throughout firing range.
11. Monitor inlet gas pressure during combustion.
12. Once the high fire rpm setting is reached make fine tuning adjustments on the gas ratio valve "flow rate" to match factory test fire settings. The "flow rate" adjustment requires a 3mm hex wrench.

➨ *NOTE: Turning the screw counterclockwise increases gas flow, clockwise decreases gas flow.*

➨ *NOTE: Combustion changes are made at high and low fire only, as the gas ratio valve has a 1:1 ratio.*

13. Manually decrease the firing rate by 500 rpm increments observing combustion down to the low fire rpm setting (minimum) on the factory test fire sheet. If required low fire combustion may be altered by adjusting the offset adjustment screw with either a Torx®T40 or a 5mm hex wrench.

➨ *NOTE: Turning the screw counterclockwise decreases gas flow, clockwise increases gas flow.*

14. Before leaving the "Firing Rate" screen, tap "Automatic" firing rate control. Do not leave the unit in the "Manual in Run" mode.

Shut Down Procedures

■ Normal Shut Off Procedures

1. Place the local/off/remote switch in the off position.
2. Close all manual gas valves.
3. Turn off electrical power.

■ Emergency Shut Off Procedures

The main gas cock should be closed immediately. If overheating occurs or the gas supply fails 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 boiler.

■ Shutting the Boiler Down for an Extended Period of Time

If the boiler is to be shut off for a period greater than 3 months:

1. Perform normal shut down procedure
2. Isolate water supply and flow circuit from boiler
3. Drain boiler
4. Disconnect electrical supply

■ Starting Boiler After Prolonged Shutdown

Perform initial start up procedures as described in this manual.

SOLA Control Features

■ Flame Detection

The flame signal can be viewed from the Main Screen and the Status Detail screen on the Control. See Figure 13.

⚠ WARNING

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⚠ CAUTION

Only factory-trained personnel should attempt to alter password protected Control preset values.

⚠ WARNING

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⚠ CAUTION

Only factory-trained personnel should attempt to alter password protected Control preset values.

■ Cycle and Run Hours Monitoring

Burner cycles, burner run time, and pump cycles can be viewed from the Statistics Configuration screen on the Control. See Figure 14.

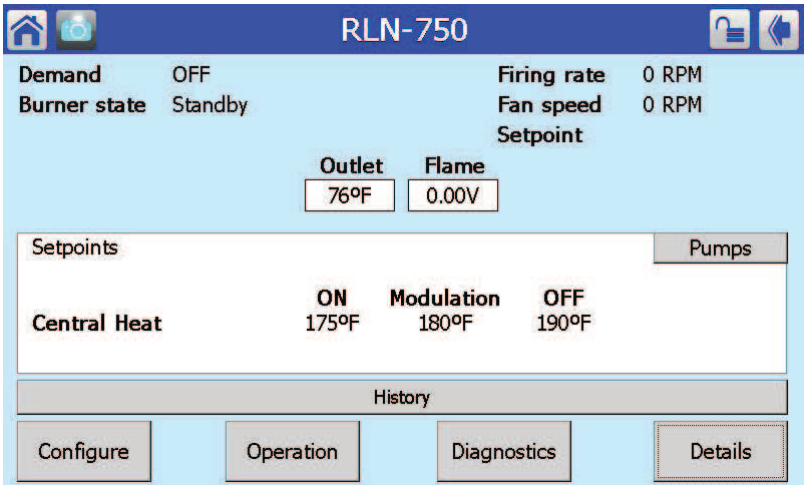

FIGURE 13 - MAIN/HOME SCREEN

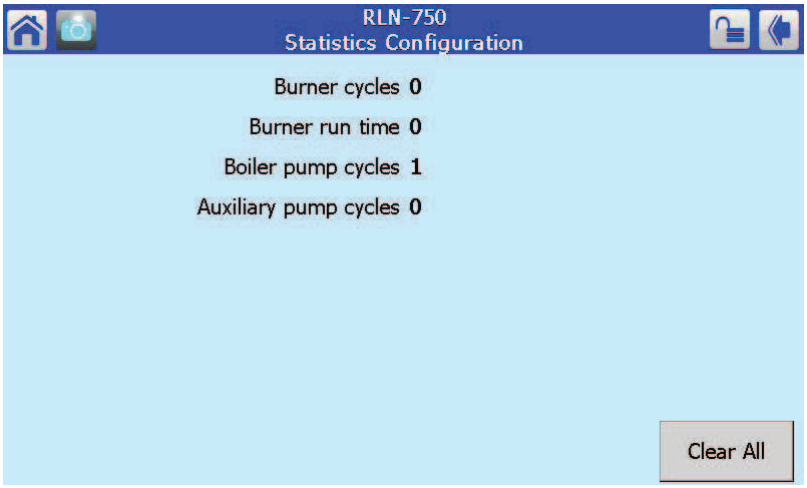

FIGURE 14 - CYCLE AND RUN HOURS MONITORING

■ Setpoint Configuration

Refer to Figure 15 for Setpoint Configuration data.

■ Setting the Central Heat Setpoint

Refer to Figures 15 -17 for CH Configuration and Operation details.

■ Reviewing Status Detail

Refer to Figure 18 for flame signal status detail.

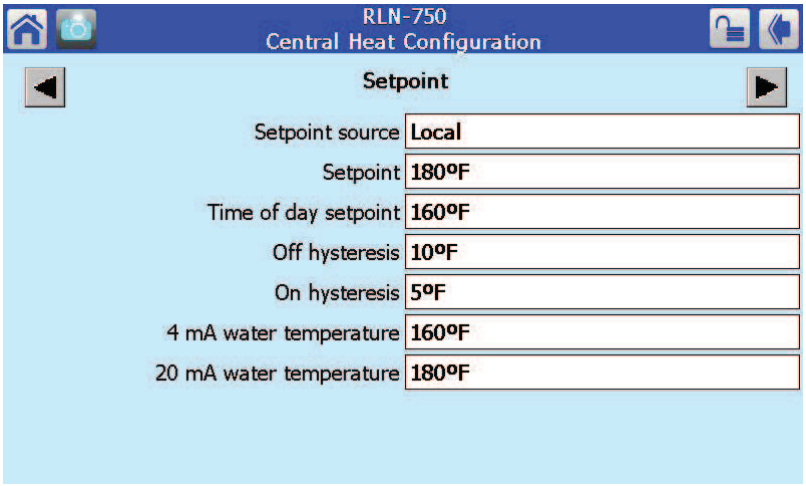

FIGURE 15 - SETPOINT CONFIGURATION

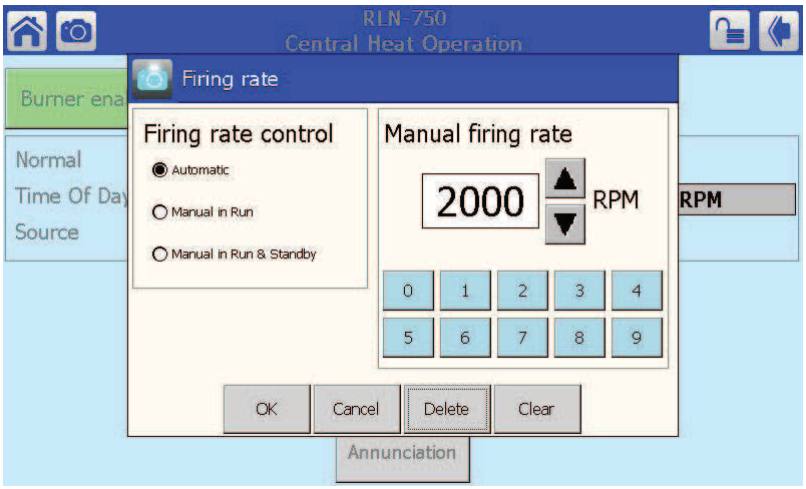

FIGURE 16- EDITING THE MANUAL FIRING RATE

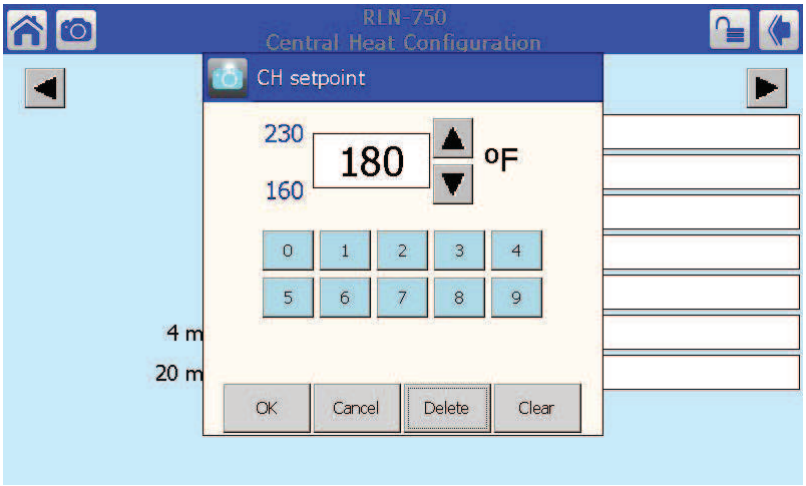

FIGURE 17 - CENTRAL HEAT CONFIGURATION SCREEN

⚠ WARNING

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⚠ CAUTION

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⚠ WARNING

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⚠ CAUTION

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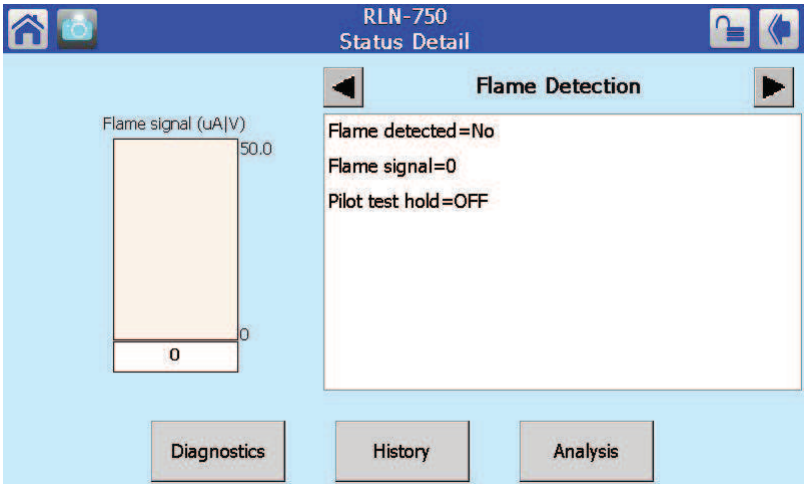

FIGURE 18 - FLAME SIGNAL STATUS DETAIL

■ Lead/Lag Outdoor Reset for Single Boiler Applications

Refer to Figure 19.

- **Maximum Outdoor Temperature** – highest outdoor temperature in the outdoor reset curve. This outdoor temperature correlates to the Low Water Temperature
- **Minimum Outdoor Temperature** – lowest outdoor temperature in the outdoor reset curve. This correlates to the Central Heat Configuration (Setpoint)
- **Low Water Temperature** – lowest water temperature the boiler will try to maintain in relation to the corresponding Maximum Outdoor Temperature
- **Minimum Boiler Water Temperature –** Limits the boiler temperature. This will "cut the curve off" and not allow the boiler to go below this temperature.

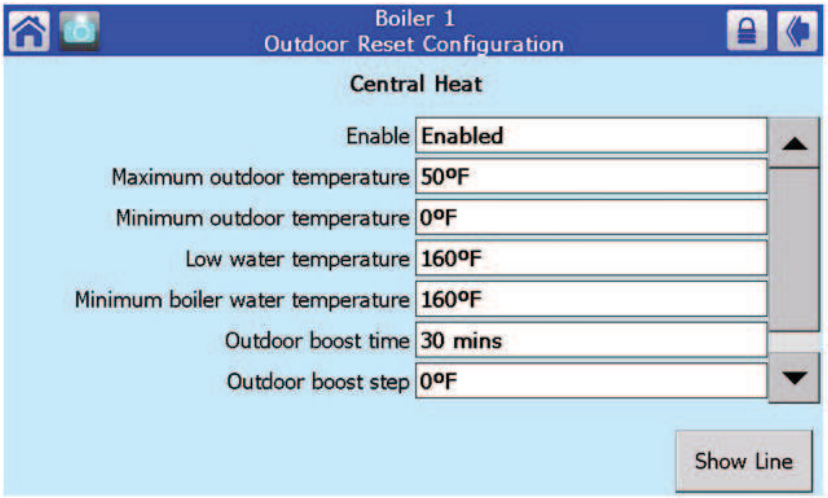

FIGURE 19 - LEAD/LAG OUTDOOR RESET FOR SINGLE BOILER APPLICATIONS

- **Central Heat Configuration (Setpoint)** – (See Figure 20) The highest water temperature the boiler will try to maintain in relation to the to the Minimum Outdoor Temperature
- **Time of Day Setpoint –** Forces the Outdoor Reset line to parallel shift down to a lower setpoint, also known as a night time setback. A contact closure is required on connector J10 terminals (2&3) to utilize Time of Day setpoint.

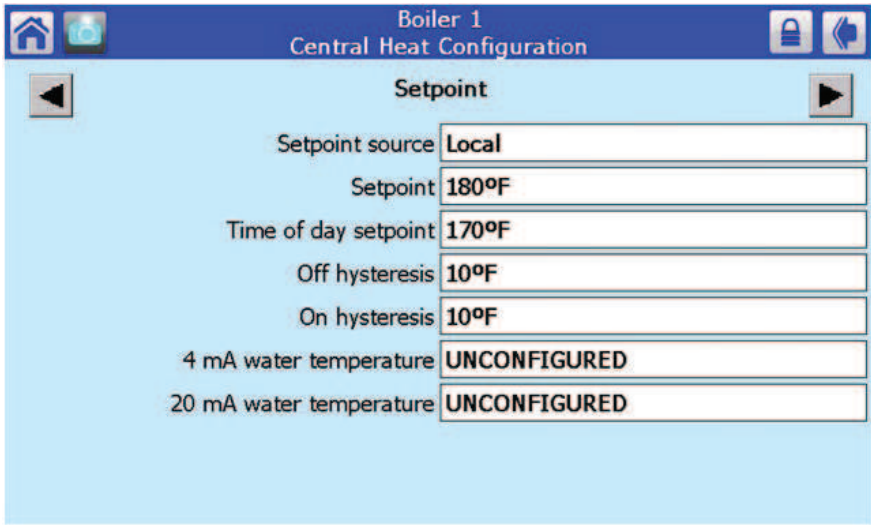

FIGURE 20 - CENTRAL HEAT CONFIGURATION SETPOINT

Example (See Figure 21): If the outdoor temperature is at 20 degrees Fahrenheit the boiler temperature will be 172 degrees Fahrenheit. The boiler will modulate to maintain this temperature and shutdown at 172 plus off Hysteresis, which from the above Central Heat Configuration Screen is 10, so the unit would shut down at 172F +10 (Off Hysteresis) = 182 degrees. The boiler will get a call for heat at 172F+/- 10 (On Hysteresis) = 162.

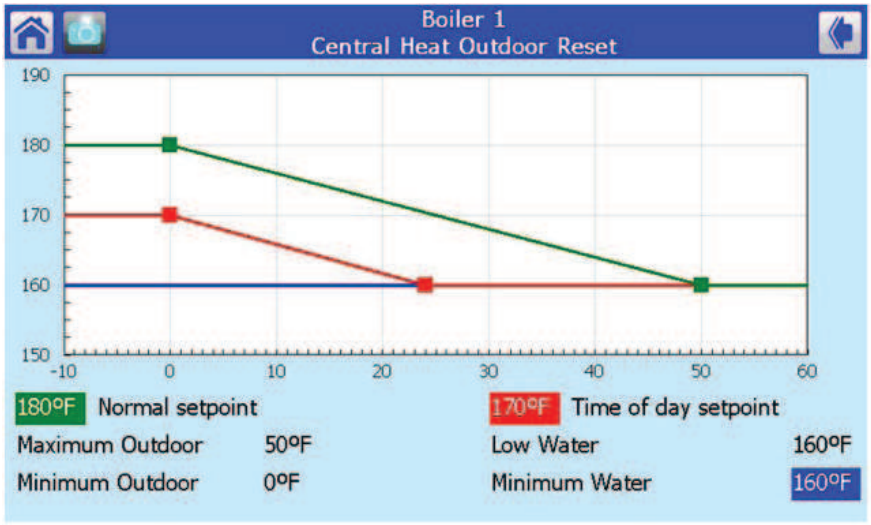

FIGURE 21 - EXAMPLE SCREEN

⚠ WARNING

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⚠ CAUTION

Only factory-trained personnel should attempt to alter password protected Control preset values.

⚠ WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

Prior to any maintenance concerning electrical components of this equipment, ensure electrical supply to the equipment is disconnected. Label all wires prior to disconnection; wiring errors may cause improper and hazardous operation.

Follow all proper lockout/tagout procedures for service.

Before beginning any maintenance, ensure area is free of any combustible materials and other dangers.

What to do if you smell gas:
Do not try to light the appliance.
Do not touch any electrical switch.
Do not use any phone in the building.
Leave building and contact gas supplier from neighbor's phone. If you cannot reach gas supplier, phone the fire department.

After initial start-up by qualified personnel, control settings and fuel pressures should not be readjusted.

⚠ CAUTION

All maintenance procedures should be completed by trained personnel. Appropriate training and instructions are available from the Fulton Service Department at (315) 298-5121 or your local Fulton Representative.

In order to meet warranty conditions, ensure all appropriate maintenance activities are performed.

General

Your Reliance boiler has been designed to provide years of trouble free performance. To ensure continued safety and efficiency of the boiler, please follow the maintenance and inspection directions outlined in this section of the manual.

Daily Maintenance and Inspection Schedule

Daily maintenance and inspection must include the following:

1. Observe operating temperature and general conditions.
2. Make sure that the flow of combustion and ventilating air to the boiler is not obstructed.
3. Assure that boiler area is free and clear of any combustible materials, including flammable vapors and liquids.

Weekly Maintenance and Inspection Schedule

Weekly maintenance and inspection must include the following:

1. Observe the conditions of the main flame. A normal high fire flame shows an orange screen with a blue halo. In Low fire the burner should display a reddish orange glow.
2. Correct air adjustment is essential for the efficient operation of this boiler. If an adjustment to the combustion is necessary, the flue gas composition should be checked with a carbon dioxide (CO2) or oxygen (O2) analyzer to set conditions.

Monthly Maintenance and Inspection Schedule

Monthly maintenance and inspection must include the following:

1. View flame detection strength via the SOLA Control. See **Operation** section of this manual for screen details.
1. Test high-limit control by reducing setting below the operating temperature. Burner should shut off. Return high limit to previous setting.
2. Test operating temperature control by reducing temperature setting as necessary to check burner operation.
3. Check flue gas temperature at outlet. If there is a temperature increase over previous readings, the probable cause is soot or water-scale build-up on the tubes. Consult Fulton Heating Solutions immediately if there is a concern.
4. Test low gas pressure switch and high gas pressure switch utilizing the procedure in operation section.

5. Test the water flow switch by trying to restart boiler with system pump off. The boiler should not operate.
6. If an air inlet filter is included with the boiler, inspect and clean filter of any dust or lint. See **Procedure for Cleaning the Air Inlet Filter.**
7. Verify the water loop style traps in the exhaust venting system are flooded.

Procedure for Cleaning the Air Inlet Filter

The air filter is an optional part and does not come with every boiler.

Proceed as follows:

1. Remove the filter. The filter sits in a custom slot on the air inlet connection to the boiler.
2. Remove all debris and dirt from the filter using a non-corrosive soap and water.
3. Return the filter to its original position in the slot.

Relief Valve Testing

The relief valve should be tested as per manufacturer instructions or every two months by lifting the lever for 5 seconds and allowing the valve to snap shut. Please see the manufacturer's recommendations on the relief valve tag.

Annual Maintenance and Inspection Schedule

Annual maintenance and inspection must be performed prior to each heating season, and includes the following tasks which must be done by a factory trained technician.

Observe the general operation of the unit to verify the following:

1. Stack temperature readings are in line with factory test fire and regular maintenance reports.
2. Boiler is lighting off reliably and quietly.
3. There are no unusual sounds coming from the burner or blower assembly.
4. It is considered good practice to remove and inspect the burner and ignition assembly on an annual basis. Follow **Procedure for Removing/ Cleaning Burner** in this manual if there is evidence of foreign matter built up on the burner or ignition assembly. See Figure 22.
5. It is considered good practice to inspect the copper finned tubes in the heat exchanger on an annual basis. This can be done from the inside of the heat exchanger while the burner is removed, or by removing the front outer jacket panel.

- To remove the outer jacket panel, open the front lower door of the outer

⚠ WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

Never use open flame or other sources of ignition to check for gas leaks.

Crystalline silica may be present in components of this equipment. Exposure to crystalline silica may pose significant health hazards, including but not limited to eye and respiratory system damage. Per the Centers for Disease Control and Prevention (CDC) and Occupational Safety and Health Administration (OSHA), appropriate personal protective equipment must be worn to minimize exposure to hazardous substances. Refer to most current guidelines offered by the CDC and OSHA for more information, including personal protective equipment recommendations.

△ CAUTION

Use caution when using any cleaning solutions. Refer to local regulations for proper cleaning solution disposal.

Do not allow oil leaks, dust, or dirt to accumulate around the boiler.

Hazard analysis should be performed by end user to ensure safety of employees/personnel.

Any damage to the burner or any other aspect of the boiler because of an air filter that was not cleaned and maintained regularly will void the warranty on the Reliance boiler.

⚠ WARNING

Follow proper lockout / tag out procedures for the electrical, gas and water connections. Use caution when lifting heavy parts.

⚠ CAUTION

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All maintenance procedures should be completed by trained personnel. Appropriate training and instructions are available from the Fulton Service Department at (315) 298-5121 or your local Fulton Representative.

In order to meet warranty conditions, ensure all appropriate maintenance activities are performed.

jacket. Remove the two vertical rails and the upper and lower bands. Now the front third of the inner jacket may be removed.

- If soot or other debris is present, the heat exchanger must be cleaned. If cleaning is necessary, remove the burner/blower assembly prior to washing the copper finned tubes with water and non-corrosive soap.
- Examine the gaskets and note signs of deterioration, replace if necessary.
- Green scale on the copper tubes indicates that the boiler is or has been experiencing flue gas condensation in the heat exchanger; this is detrimental to the life of any copper finned tube heat exchanger. This may be the result or an improperly designed system operating at low water temperatures, or substantial cold start-up periods. Copper finned tube heat exchangers are susceptible to failure if there are system return water temperatures below 140 F present. Inspect for the presence of leaking or failed tubes. A replacement heat exchanger may be necessary.

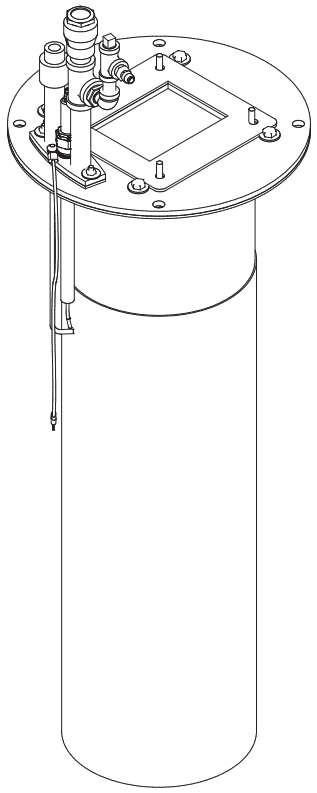

FIGURE 22 - BURNER WITH IGNITION ASSEMBLY MOUNTED

Examine the Venting System

1. Check all joints and pipe connections for tightness.
2. Check vent for corrosion or deterioration. If any venting needs replacing, do so immediately.
3. Perform any recommended maintenance as required by the vent material manufacturer.

4. Check to ensure loop traps are flooded.

■ Inspect Heating System for Other Problems

1. Perform combustion analysis and adjust if necessary.
2. Leak test gas valves. Leak Test must be performed only by qualified personnel, who have been trained in this procedure in a Fulton Service School.

Procedure for Removing/Cleaning The Burner

Perform the following to remove/clean the burner:

1. Remove top and side panels from the boiler outer jacket.
2. Disconnect both wire plug connectors to the pre-mix blower.
3. Disconnect the UV scanner/flame rod, ignition wire and ground wire block.
4. Disconnect air sensing tubing from Venturi mixing unit, carefully swing the tubing away.
5. Disconnect air switch sensing tubing between switch and Venturi mixing unit inlet.
6. Disconnect high backpressure sensing tubing between switch and ignition assembly connection point.
7. Disconnect the four bolts between the Venturi mixing unit flange and the gas train flange. Verify the gas train is properly supported prior to removing the above-mentioned four bolts, also verify supply gas is isolated. Inspect gasket located between these two flanges for signs of deterioration.
8. Undo four nuts holding pre-mix blower to the burner/blower mounting plate. Use care, the pre-mix blower/venturi-mixing unit is heavy. Inspect gasket for signs of deterioration.
9. Undo four nuts holding burner/blower-mounting plate to the outlet water header.
10. Remove burner, being careful not to scrape burner on heat exchanger or outlet water header. Inspect gasket for signs of deterioration.
11. Inspect burner and wipe off (do not scrub or use wire brush) any soot or foreign material that may have accumulated. If available, use compressed air to clear the burner. Wipe out the inside of the burner with a clean cloth.
12. Check that the gap between the electrode and the ground rod. Gap should be 1/8-inch (3mm) +/- 1/16,-0. For Liquid Propane, the gap should be exactly 1/8-inch (3mm).
13. Check the horizontal gap between the point of ignition and the exterior of the mesh burner. The required gap is 5/16-3/8-inch (8-10 mm).

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All maintenance procedures should be completed by trained personnel. Appropriate training and instructions are available from the Fulton Service Department at (315) 298-5121 or your local Fulton Representative.

In order to meet warranty conditions, ensure all appropriate maintenance activities are performed.

⚠ WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

If any manual reset limit device trips, do not reset without determining and correcting the cause. These include flame safeguard, high or low gas pressure, and high temperature limit.

△ CAUTION

All maintenance procedures should be completed by trained personnel. Appropriate training and instructions are available from the Fulton Service Department at (315) 298-5121 or your local Fulton Representative.

14. To inspect the gasket between burner/blower mounting plate and mesh burner undo the 4 bolts.
15. Check for cracking of the electrode insulator. Do not over tighten the electrode.
16. Use a soft, clean cloth to remove accumulated contaminants from the UV detector/scanner glass envelope.
17. Use a soft, clean cloth to remove accumulated contaminants from the sight glass.
18. Before re-installing the burner, check the cleanliness of the heat exchanger and the condition of the combustion chamber. If corrosion or leaks are noticed, contact Fulton Heating Solutions.
19. Reverse removal steps for reinstallation of the burner assembly.
20. Reinstall side and top jacket panels.
21. Test fire the boiler and use a combustion analyzer to ensure that the fuel/air ratio is set correctly throughout the range. Refer to the Fulton Heating Solutions factory test fire report for combustion settings.

After All Repairs and Maintenance

1. Follow "Pre-Start Check List" provided with the unit, and all Safety Checks.
2. Fire the Boiler and perform combustion check. Analyze combustion throughout the range and verify proper operation of safety devices.
3. Make any necessary adjustments.

Troubleshooting

Use the following table as a guide to troubleshooting your boiler.

PROBLEM	CAUSE	CHECK/SOLUTION
Manual Reset limit device trips	Manual Reset Limits include: Flame safeguard, high or low gas pressure, high temperature limit	DO NOT reset without determining and correcting the cause.
Power outage to the boiler room	Entire boiler system is disabled and de-energized.	When power has returned, the boiler will restart unless it was in lockout position at time of outage.
Gas Pressure alarm is annunciated	Either insufficient gas pressure or the gas pressure to the manifold is too high for safe and proper operation of the boiler. This shuts down the burner. When gas pressure is restored, the annunciated alarm will remain on and the boiler will remain locked out until the gas pressure switch is manually reset.	Locate cause and correct. In the event of a high gas manifold pressure condition, qualified service personnel must correct the problem before restarting the boiler.
High water temp alarm is annunciated	Boiler water has exceeded both the operating and high-limit temperature. When the water temperature falls below the high-limit temperature, the boiler will remain locked out until the controller is manually reset.	Locate cause and correct. Once the SOLA control is reset, the sequence returns to normal operation provided that the other limits are satisfied.
Insufficient flow of heat transfer medium causes lock out	Boiler requires minimum flow; when required flow is resumed, boiler will resume operation.	Identify and correct.
Low Air Flow Supply	Low Air is annunciated if the airflow switch detects low airflow through the boiler.	The air switch has been factory set and should not be adjusted in the field. An extended low air indication does not mean that the low air switch is defective. Check that blower is powered and feedback plugs are clipped into the blower. Check that the burner is clean by observing through the venturi. Check the blower purge speed and low fire speed is correctly displayed on the touch screen. Check for obstructions in the vent. Check for obstructions in the air inlet.
High Back Pressure Switch trip/boiler shutdown	Excessive Vent Pressure	This condition will automatically recycle, so the boiler will try to relight. The vent and heat exchanger should be checked for obstructions and cleaned.
Main flame failure during firing period	Main gas control valve is de-energized and the control goes into “lockout” mode. Flame failure occurs and the indicator is illuminated.	The programmer must be manually reset.
Ignition Failure	If UV scanner does not detect the flame during the 4-second trial-for-ignition period, the gas valve and spark ignition are de-energized. At this time a safety lockout occurs.	Identify and correct; reset via the SOLA Control.

Standard Warranty for Fulton Reliance Boilers

Warranty Valid for Models RLN

Ten (10) Year Thermal Shock Warranty

Fulton Heating Solutions guarantees the Reliance heat exchanger against thermal shock for a period of ten (10) years when the boiler is installed as a closed loop hot water boiler and is operated per the Installation and Operation Manual. This guarantee will cover damage due to thermal shock, such as leaks in the heat exchanger. This guarantee does not cover damage due to corrosion, scaling, sooting or improper installation or operation. The flow rate through the boiler must be consistent with the requirements in the equipment manual.

The guarantee is limited solely to the repair or replacement of the components listed above. An inspection must be performed by Fulton or their Representative to determine the cause of the damage. The warranty does not cover labor or freight.

Five (5) Year (60 Month) Material and Workmanship Warranty

The pressure vessel is covered against defective material or workmanship for a period of five (5) years from the date of shipment from the factory. Fulton will repair or replace F.O.B. factory any part of the equipment, as defined above, provided this equipment has been installed, operated and maintained by the buyer in accordance with approved practices and recommendations made by Fulton. The commissioning agency must also successfully complete and return the equipment Installation and Operation Checklists to Fulton's Quality Assurance department. This warranty covers any failure caused defective material or workmanship; however, waterside corrosion or scaling is not covered. Therefore, it is imperative that the boiler be installed in a closed loop as outlined in the Installation and Operation Manual.

Parts Warranty

Fulton will repair or replace F.O.B. factory any part of the equipment of our manufacture that is found to be defective in workmanship or material within one (1) year of shipment from the factory provided this equipment has been installed, operated and maintained by the buyer in accordance with approved practices and recommendations made by both Fulton and the component manufacturers and the commissioning agency has successfully completed and returned the equipment Installation and Operation Checklists to Fulton's Quality Assurance department.

General

Fulton shall be notified in writing as soon as any defect becomes apparent. This warranty does not include freight, handling or labor charges of any kind.

These warranties are contingent upon the proper sizing, installation, operation and maintenance of the boiler and peripheral components and equipment. Warranties valid only if installed, operated, and maintained as outlined in the Fulton Installation and Operation Manual.

No Sales Manager or other representative of Fulton other than the Quality Manager or an officer of the company has warranty authority. Fulton will not pay any charges unless they were pre-approved, in writing, by the Fulton Quality Manager.

This warranty is exclusive and in lieu of all other warranties, expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Fulton shall in no event be liable for any consequential or incidental damages arising in any way, including but not limited to any loss of profits or business, even if the Fulton Companies has been advised of the possibility of such damages. Fulton's liability shall never exceed the amount paid for the original equipment found to be defective.

Excessive cycling will reduce the life of ANY boiler. Verify that your system is properly designed and check cycling rate according to maintenance procedures listed in this manual.

To activate the warranty for this product, the appropriate commissioning sheets must be completed and returned to the Fulton Quality Assurance department for review and approval.

Fulton®

9/25/2009

Parts

Spare and replacement parts may be ordered from your local representative or through the Fulton Companies. When ordering replacement parts, please have the model number and serial number of your Fulton boiler ready. Factory-direct replacement parts must be used to ensure proper equipment operation and adherence with warranty requirements. Contact Fulton Companies at (315) 298-5121 for further information.

⚠ WARNING

Use of non-factory authorized replacement parts is not recommended for this equipment. Use of non-factory authorized parts may jeopardize safety and system performance, and voids the product warranty.

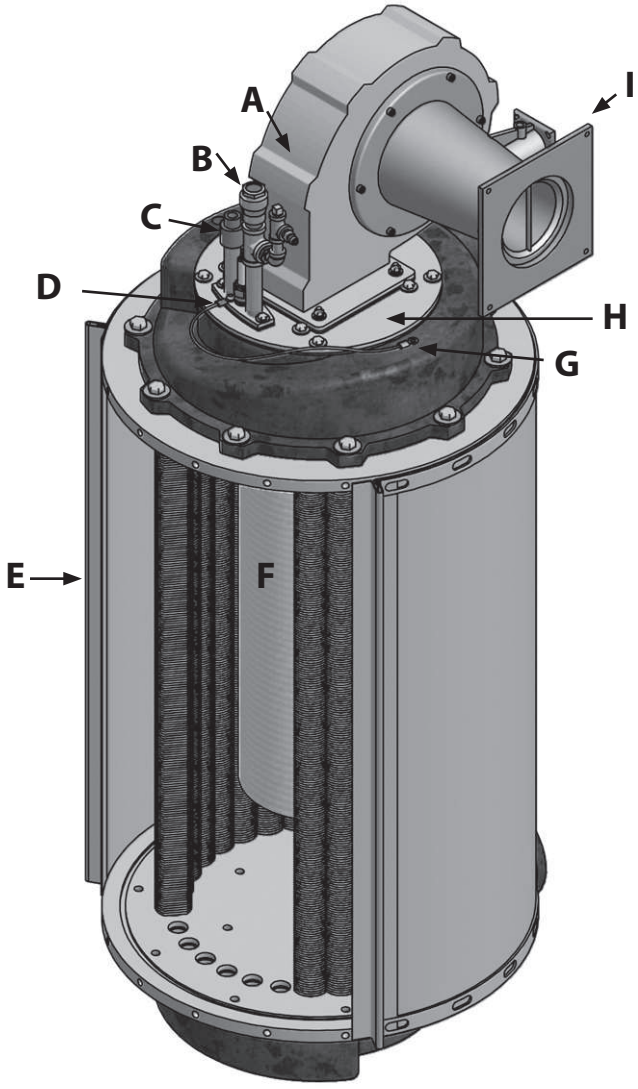

FIGURE 21 - GENERAL PARTS DESCRIPTION OF THE RELIANCE BOILER

Figure 21 Legend

A. Premix Blower Assembly
B. Sight Glass & High Back Pressure Switch Connection Assembly
C. UV Scanner Assembly
D. Ignition Assembly (includes spark plug, flame rod, mounting plate, ground)
E. Heat Exchangers (Cast Headers, Copper Finned Tubes, Tube Sheets, Stainless Steel Outer Jacket)
F. Fiber Mesh Burner
G. Ignition Ground Wire
H. Burner/Blower Mounting Plate
I. Venturi Air Gas Mixing Unit

■ Parts Listing

Part Number	Description	RLN-750	RLN-1000	RLN-1500	RLN-2000
7-57-CHR102	Heat Exchanger			X	X
	Heat Exchanger	X	X		
2-20-000014	Ignition Assemblies			X	
2-20-000015	Ignition Assemblies				X
	Ignition Assemblies	X	X		
2-30-001639	Bekaert Burner			X	
2-30-001614	Bekaert Burner				X
2-30-001642	Bekaert Burner	X	X		
2-30-001637	EBM Blower			X	X
2-30-001641	EBM Blower	X	X		
2-30-000949	Venturi Gas / Air Mixing			X	X
2-30-000974	Venturi Gas / Air Mixing	X	X		
2-30-000975	Gas / Air Servo Regulator Gas Valve Nat Gas	X	X		
2-30-000939	Gas / Air Servo Regulator Gas Valve Nat Gas			X	X
	Gas / Air Servo Regulator Gas Valve Propane	X	X		
2-30-000975	Gas / Air Servo Regulator Gas Valve Propane			X	X
2-30-000114	1 ¼" Ball Valve lever handle			X	X
2-30-000113	1" Ball Valve lever handle	X	X		
2-30-000957	1 ¼" Ball Valve Tee handle			X	X
	1" Ball Valve Tee handle	X	X		
2-40-000907	Sola Control	X	X	X	X
2-40-000917	Sola Display	X	X	X	X
2-45-000915	12VDC Power Supply (comes with display)	X	X	X	X
2-45-000914	Sola Wire Plug Sets	X	X	X	X
2-30-000765	Clips (set of 12)	X	X	X	X
2-30-000799	Door Latch, Large, for Heat Exchanger Door	X	X	X	X
2-30-000798	Door Latch, Small, for electrical door	X	X	X	X
4-12-002000	Gasket Kit for Heat Exchanger / Burner (no o-rings) includes below 8 items			X	X
2-12-000702	Burner Plate to Header Gasket			X	X
2-12-000703	Ignition Plate to Burner Plate Gasket			X	X
2-12-000704	Blower to Burner Plate Gasket			X	X
2-12-000210	Fiberglass Rope Gasket for Rails			X	X
2-12-000559	Tadpole Gasket (Head to Outside Chamber)	X	X	X	X
2-12-000049	Fiberglass gasket for Inner S.S. jacket			X	X

Part Number	Description	RLN-750	RLN-1000	RLN-1500	RLN-2000
2-12-001031	Venturi Flange Gasket			X	X
2-12-000565	Burner to mounting plate Gasket			X	X
	Burner Plate to Header Gasket	X	X		
	Ignition Plate to Burner Plate Gasket	X	X		
	Blower to Burner Plate Gasket	X	X		
2-40-000906	Low Gas Pressure Switch	X	X	X	X
2-30-001139	High Gas Pressure Switch	X	X	X	X
2-40-000908	Honeywell Sensor w/ 42" Lead	X	X	X	X
2-40-000161	UV Scanner	X	X	X	X
2-30-000270	Fan Switch, Dwyer	X	X	X	X
2-30-000498	McDonnell Miller Flow Switch	X	X	X	X
2-30-001009	Temp / Pressure Gauge	X	X	X	X
2-30-000120	Safety Relief Valve 30psi ¾"	X			
2-30-000121	Safety Relief Valve 60psi ¾"	X	X	X	
2-30-000145	Safety Relief Valve 100psi ¾"	X	X	X	X
2-30-000166	Safety Relief Valve 160psi ¾"	X	X	X	X
2-30-000851	Safety Relief Valve 30psi 1"		X	X	
2-30-000951	Safety Relief Valve 60psi 1"			X	X
2-30-000221	Safety Relief Valve 30psi 1 ¼"				X
2-22-001013	Bonding Screws	X	X	X	X
2-45-001015	Terminal Block	X	X	X	X
2-45-000916	Tyco Connector for EBM blower power connection	X	X	X	X
2-45-001029	Tyco Female terminal - EBM blower power connection	X	X	X	X
2-45-000917	Molex connector for EBM blower PWM connection	X	X	X	X
2-45-001012	Molex female terminal - EBM blower PWM connection	X	X	X	X
2-35-001953	1/8" npt female x 1/4" tubing fitting Polytite	X	X	X	X
2-45-001025	Honeywell Ignition cable 500Ω per foot / 24" long	X	X	X	X
2-45-001026	Ignition cap terminal, washer for transformer	X	X	X	X
2-30-000739	Air Inlet Filter Kit			X	X
	Air Inlet Filter Kit	X	X		
2-30-000973	Seismic Anchor Kit	X	X	X	X
2-30-000797	Dedicated Circulator Pump 15 ft/hd, 130 GPM, single phase			X	X
2-30-000834	Dedicated Circulator Pump at 16 ft/hd, 65gpm, single phase	X	X		
2-30-000972	Thermostatic 3-way Mixing Valve, 2 ½", 125 psi, FF flange, 180F			X	X
2-30-000983	Thermostatic 3-way Mixing Valve, 150psi, 2" NPT, 180F	X	X		
	High Exhaust Temp Switch (H.E.T.)	X	X	X	X

Part Number	Description	RLN-750	RLN-1000	RLN-1500	RLN-2000
2-60-000118	Adhesive Spray	X	X	X	X
2-40-000625	24VAC Power Supply	X	X	X	X
2-45-000339	3-position switch	X	X	X	X
2-45-000411	Red Alarm Light	X	X	X	X
2-40-000795	Black Push Button	X	X	X	X
2-45-000412	Green Call For Heat Light	X	X	X	X

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