GRANBY

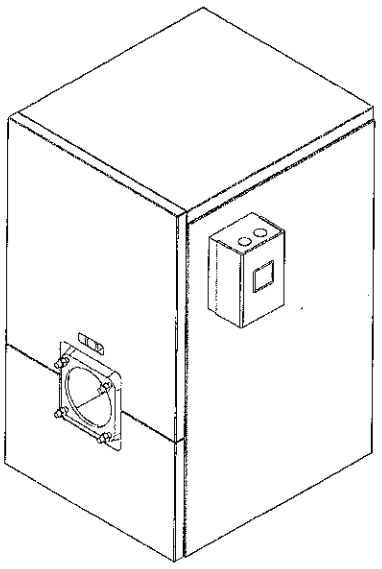
Installation, Operation and Service Manual

Cast Iron Boiler SERIES

Gas-Fire

B*G-3 sections
B*G-4 sections
B*G-5 sections
B*G-6 sections
B*G-7 sections
B*G-8 sections

* = Brand name, G=Gas



B*G, 3 sections illustration

C ETL US LISTED
Intertek

INSTALLATIONS MUST MEET ALL LOCAL AND FEDERAL CODES THAT MAY DIFFER FROM THIS MANUAL
THE FOLLOWING PAGES INCLUDES WARNINGS, INSTALLATION AND MAINTENANCE INSTRUCTIONS SPECIFIC TO GAS-FIRED UNITS. PLEASE REVIEW THIS MANUAL CAREFULLY IF YOUR BOILER IS NATURAL GAS-FIRED OR PROPANE GAS-FIRED

Please read the manual in its entirety before beginning installation.
This manual must be kept with the boiler for future reference.

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G2014-E5G Rev. D

WARNING: If the information in this manual is not followed exactly, a fire or explosion may result, causing property damage, personal injury or death.

- Do not store or use gasoline or other flammable vapors or liquid in the vicinity of this or any other appliance.
- 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 your building,
  - Immediately call your gas supplier from an outside phone. Follow the gas supplier's instructions,
  - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

NOTE:
THE BURNER INSTRUCTION MANUAL AND THE BURNER USER'S INFORMATION MANUAL ARE CONSIDERED PART OF THIS MANUAL AND THEIR INSTRUCTIONS MUST BE FOLLOWED EXCEPT WHEN SPECIFICALLY MENTIONNED IN THIS MANUAL.

TABLE OF CONTENTS
B*C - Gas

1.0 IMPORTANT SAFETY ADVICE

Please read and understand this manual before installing, operating or servicing the furnace. To ensure you have a clear understanding of the operating procedures of the appliance please take the time to read section **IMPORTANT SAFETY ADVICE** of this manual.

THE INSTALLATION OF YOUR GAS-FIRED BOILER MUST CONFORM TO THE REQUIREMENT OF THE AUTHORITY HAVING JURISDICTION OR IN THE ABSENCE OF SUCH REQUIREMENTS, TO THE NATIONAL FUEL GAS CODE ANDSI Z223.1/NFPA 54 AND/OR NATIONAL GAS AND PROPANE INSTALLATION CODE CAN/CSA B149.1. WHERE REQUIRED BY THE AUTHORITY HAVING JURISDICTION, THE INSTALLATION MUST CONFORM TO THE STANDARD FOR CONTROLS AND SAFETY DEVICES FOR AUTOMATICALLY FIRED BOILERS ANSI/ASME CSD1.

SHOULD OVERHEATING OCCUR OF THE GAS SUPPLY FAILS TO SHUT DOWN, DO NOT TURN OFF OR DISCONNECT THE POWER SUPPLY TO THE CIRCULATOR, INSTEAD SHUT OFF THE GAS SUPPLY AT A LOCATION EXTERNAL TO THE APPLIANCE.

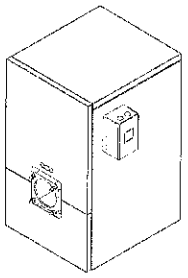
DO NOT USE THIS BOILER IF ANY PART HAS BEEN UNDER WATER. IMMEDIATELY CALL A QUALIFIED SERVICE TECHNICIAN TO INSPECT THE BOILER AND TO REPLACE ANY PART OF THE CONTROL SYSTEM AND ANY GAS CONTROL, WHICH HAS BEEN UNDER WATER.

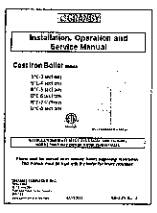
CAUTION

DO NOT START THE BURNER UNTIL ALL FITTINGS, COVERS AND DOORS ARE IN PLACE. **DO NOT** TAMPER WITH THE BOILER OR CONTROLS, CALL A QUALIFIED BURNER TECHNICIAN. **DO NOT** STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPOURS AND LIQUIDS IN THE VICINITY OF THIS UNIT OR ANY OTHER APPLIANCE.

IMPORTANT

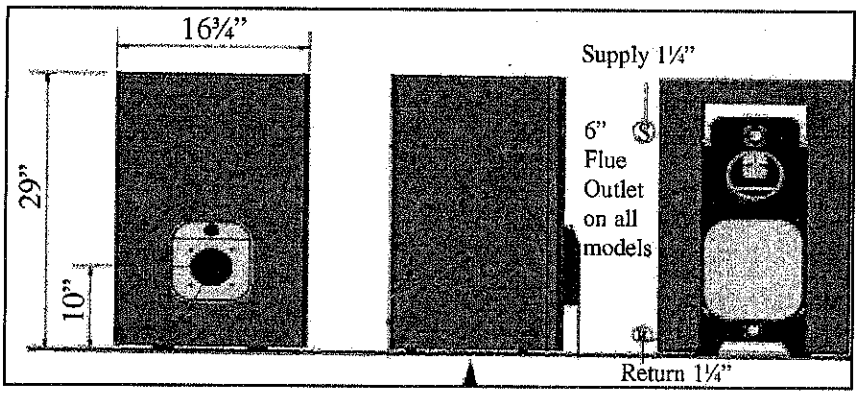
This manual contains instructional and operational information for the B*G GAS-FIRED boiler . Read the instructions thoroughly before installing boiler or starting the burner. Consult local authorities about your local FIRE SAFETY REGULATIONS. All installations must be in accordance with local state or provincial codes. Improper installation will result in voiding of warranty.





2.0 PRODUCT INFORMATION

PHYSICAL DIMENSIONS



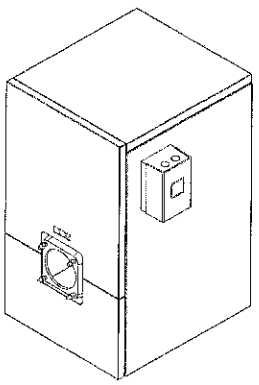
Length : (3 sections 18 7/8 ") (4 sections 22 1/2") (5 sections 26 ¼")
(6 sections 31 1/8") (7 sections 35 ½") (8 sections 39 ¼")

CLEARANCE

Proper clearances must be maintained not only from combustible materials but also to provide adequate access for servicing. All installations must comply with local codes and CSA B149.1 (gas) in Canada and NFPA 54 (gas) in the United States. Consult local fire codes for required clearances. Connections to chimney must be made with the proper gauge thickness and diameter of fluepipe as required by CSAB149.1,NFPA 54, whichever is applicable.

CLEARANCE (minimum) FOR SERVICING – *Gas*

Front	24"	(609 mm)
Rear	24"	(609 mm)
Left Side	24"	(609 mm)
Right Side	2"	(50.8 mm)
Top	10"	(254 mm)



CLEARANCE (minimum) TO COMBUSTIBLES – *Gas*

Top	10"	(254 mm)
Front	24"	(609 mm)
Rear	24"	(609 mm)
Left Side	24"	(609 mm)
Right Side	2"	(50.8 mm)
Chimney Connector	9"	(229 mm)

SPECIFIC TO GAS-FIRED BOILERS

**** A gas-fired boiler must NOT be installed on carpeting.*

DRAFT PRESSURE

Breech draft pressure -0.02" w.c. – Gas-Fired Boiler

FLUE PIPE CONNECTION

*Gas-Fired boilers (**CHIMNEY ONLY applications**)*

CLEANOUTS

Rear removable smoke hood cover & Combustion Front Door Opening

FUEL

Gas-Fired - Natural Gas or Liquefied Petroleum Gas - LPG

ELECTRICAL

CANADA : 120 Volts, 60Hz,15 amps fuse or breaker
USA : 13.3 amps, circuit protection 20 amps.

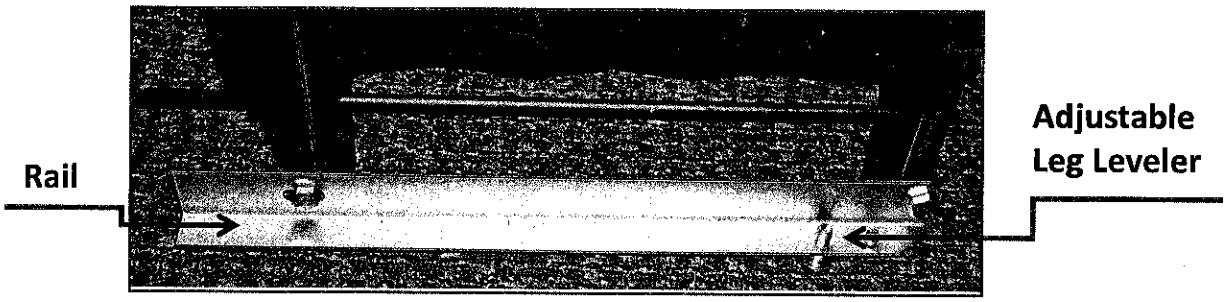
AIR SUPPLY

CAUTION: Adequate air supply for both combustion and ventilation must be available. See page 17 for details.

3.0 Unit installation

3.1 PLACEMENT & LEVELING OF THE UNIT

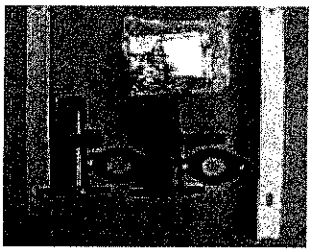
The boiler should be located on firm foundation in an easily accessible area that meets the previously discussed clearances and air requirements. In situations where the floor may be uneven the unit may be levelled by using the leg levellers provided on the boiler or through the insertion of shims under the legs.



3.2 JACKET ASSEMBLY AND CONTROL INSTALLATION

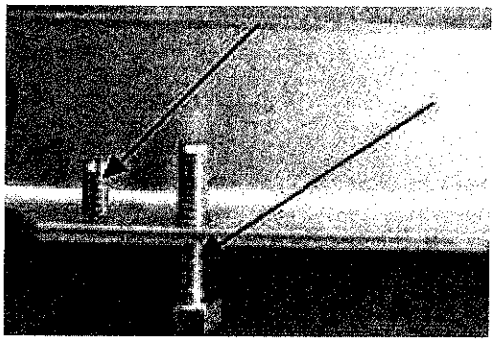
The boiler jacket has been designed for ease of assembly and removal. The following step-by-step process will ease installation. A screwdriver, 17 mm socket and ratchet or a 17 mm wrench or adjustable wrench are needed.

STEP 1 VERIFY CONTENTS OF JACKET ASSEMBLY PACKAGE.



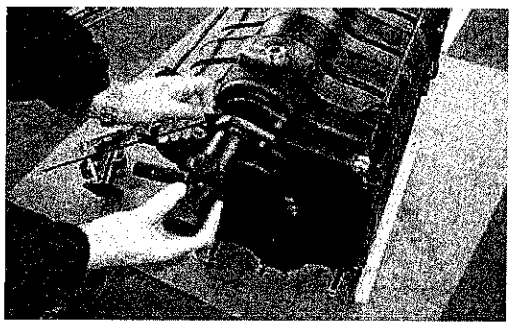
Your jacket assembly will contain two (2) manifolds with gaskets, a fastening package which includes all necessary bolts, screws, nuts and washers for assembly along with burner studs, nuts and washers, block insulation, rear of block insulation, aluminum faced tape, levelling frame rails, two (2) side panels, a rear panel top panel and re-insulated top and bottom front panels

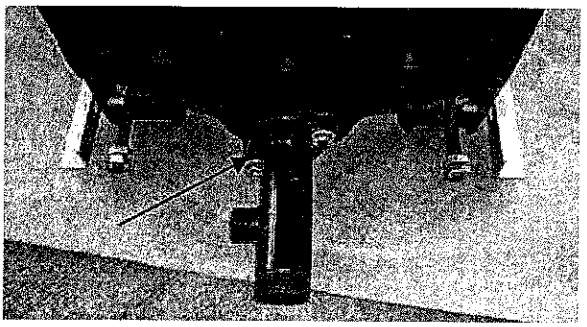
STEP 2 FRAME RAIL CONNECTION



Attach 10 mm bolts to the underside of the frame rails. These will be used to level the boiler. Screw the 4 mm jacket affixing screw to the frame rail from the top down. Both the bolt and affixing screw will be located on the same end of the frame rail. The frame rail will then be bolted to the legs of the boiler with the frame rail and containing the affixing screw facing in the direction of the front end of the boiler.

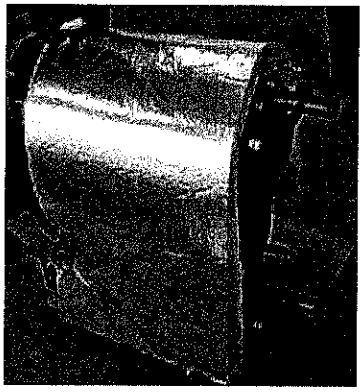
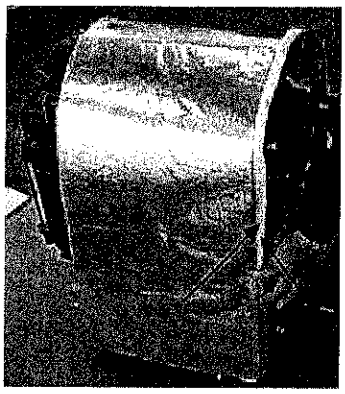
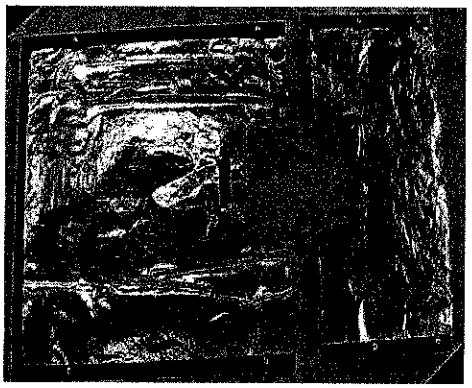
STEP 3 MANIFOLD INSTALLATION





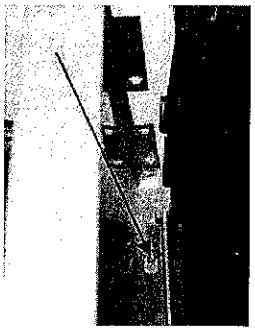
Using the gaskets and bolts supplied connect the manifolds directly to the boiler block. The top supply manifold will have a 3/4" npt tapping for a relief valve and 1/4" npt tapping for a gauge. The bottom return manifold has 3/4" npt tapping for a drain vlave. Both manifolds have 1-1/4" male npt threads for sytem connection.

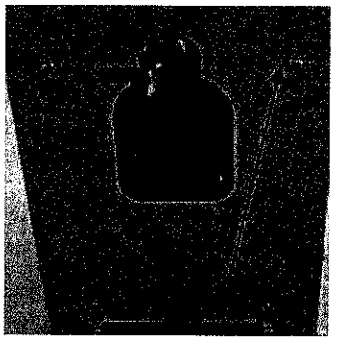
STEP 4 INSULATION INSTALLATION

Drape the large piece of block insulation directly over the block taking care to provide adequate clearance from frame rails. Using the aluminum faced tape attach the preshaped rear inslulation to the block insulation. The process is simply taping the two pieces together. The front panels come pre-insulated.

STEP 5 SIDE AND BACK PANEL ATTACHMENT

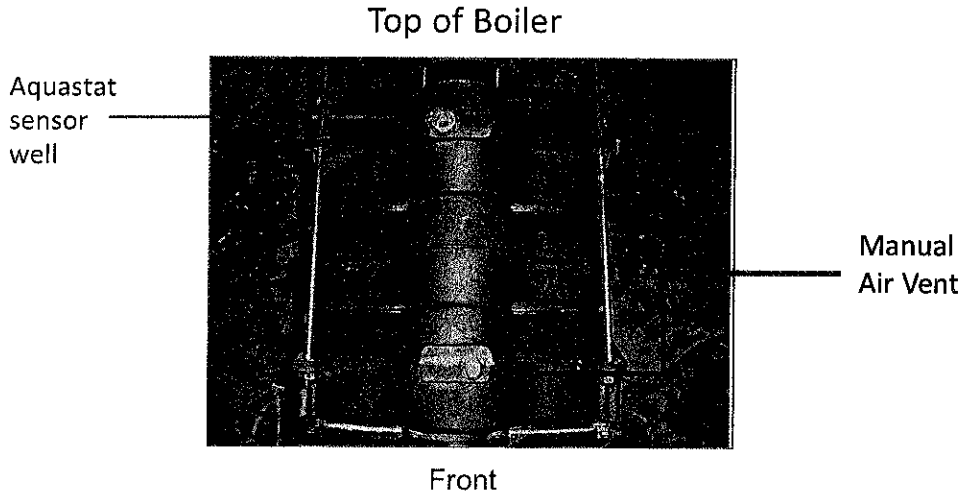





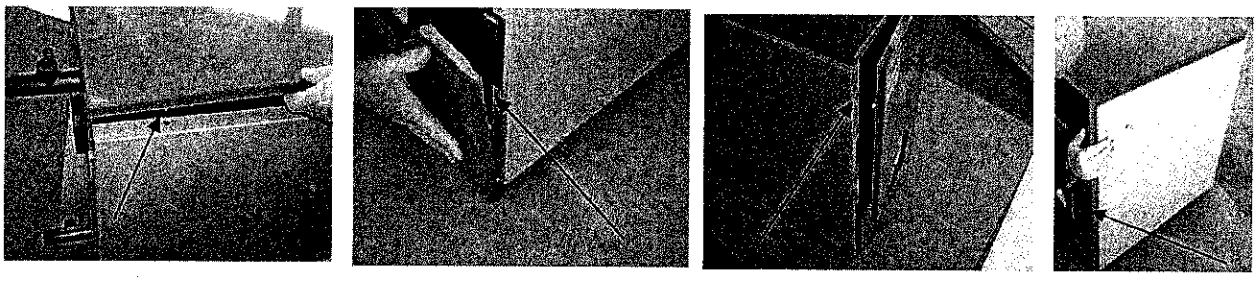
Affix panel mounting nuts to the rear of the tie rods. Mount the side panels by placing the panel over the frame rail so that the hole in the bottom lip of the panel fits directly over the jacket affixing screw on the rail. You can then lock the panel in place by sliding it slightly forward. The slot on the rear of the panel will now be in position to slide over the tie rod at the rear of the boiler. Tighten the nuts on the tie rod end to firmly secure the panel. Repeat on the other side. Screw the back panel to the side panels.

STEP 6 CONTROL SENSOR ATTACHMENT

Prior to jacket top and front panel installation the control sensor must be inserted into the brass well located on the top of the boiler and secured by a clip. Feed the sensor through the hole on the front of the right side panel from the outside. Penetrate the block insulation to insert the sensor. The sensor must be fully inserted to the bottom of the well.

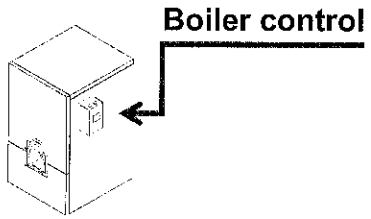


STEP 7 TOP AND FRONT PANEL ATTACHMENT



Affix the top panel by placing the holes located on the underside of the panel over the jacket affixing pins. Press down on the top panel and it will snap in place. Affix the lower front panel by placing the openings on the lips of the panel over the jacket affixing screws and pushing downward on the panel. The panel will lock in place. Repeat the process for the top front panel.

Upon completion of the jacket assembly the Honeywell control can be mounted on the side of the boiler. (Left or right)



The boiler is now ready for piping and connection to the fuel system, heating and domestic hot water, thermostat and 110 Volt - 60Hz power source.

CAUTION: Safety or relief valve discharge should be piped downward to within 6" of the floor or to a drain. The valve must be mounted in a vertical position.

4.0 PIPING

Prior to connecting the B*C/G boiler to an existing piping system, certain procedures must be followed. The system should be flushed to insure that scale and sludge will not be introduced to the boiler. This is a must when replacing a gravity open system.

The boiler is a low mass boiler requiring low water content and steps must be taken to insure that the boiler is not flooded from an existing high volume standing cast iron system. If the conversion is from a high volume system a bypass loop must be installed.

Manual shut off valves must be installed on both the supply line and on the boiler bypass loop. ASME Boiler Code requires that feed or make up water be introduced to the piping system and not directly to the boiler. Pressure reducing valves should be installed and adjusted to 12psi cold water. The pressure relief valve must be piped from the boiler and downward to within 6" of the floor or to a height to meet existing code. An expansion tank, circulating pump and automatic air eliminators must be part of the system. The relief valve, backflow preventer and drain valve should be piped according to code to a drain with piping that is the same size as the relief valve. The installation of the relief valve must be consistent with ANSI/ASME Boiler and pressure vessel code Section IV or Boiler, Pressure vessel and Pressure piping code CSA B51 as applicable.

All piping, including heating, domestic hot water and fuel lines must be done in accordance with all local codes. It is suggested that you refer to the Water Installation Survey and Hydronics Institute Residential Hydronic Heating Installation/Design Guide. All piping must be properly sized, free from defect and be made of copper, steel, brass, aluminum or PEX.

Circulating Pump

A calculation for proper pump selection must be performed for all installations. The pump(s) should not be operated at maximum working pressures above 30 psi or maximum working temperatures above 185℉ and within limits advised by the manufacturer. The pump must not be operated unless the system has been bled of all air and completely filled with water.

Recommended locations for the circulating pump, expansion tank, relief valve and other trim are shown in Figure 1, Figure 2, Figure 3 and Figure 4.

Figure 1

A typical installation with no domestic hot water and no by-pass loop installed.

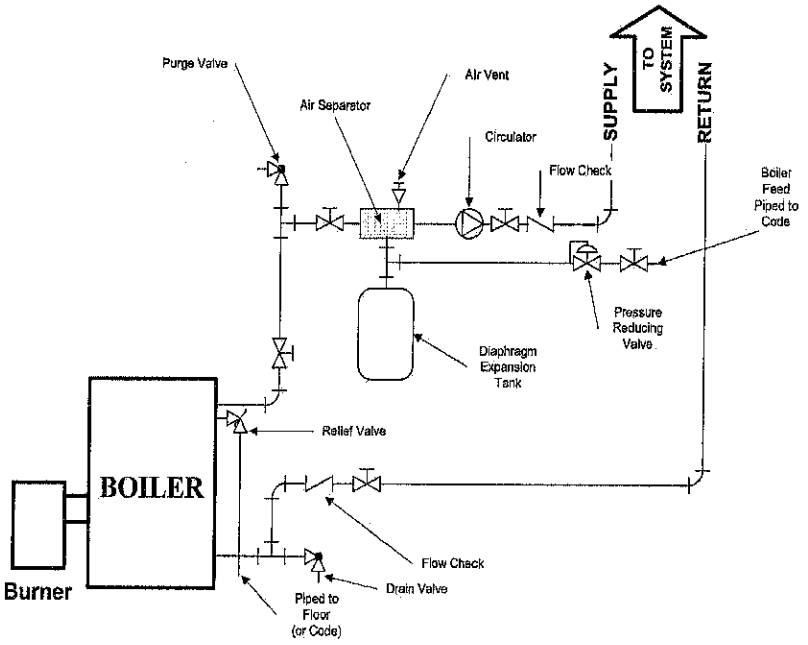


Figure 2

A typical installation with no domestic hot water and with a by-pass loop installed.

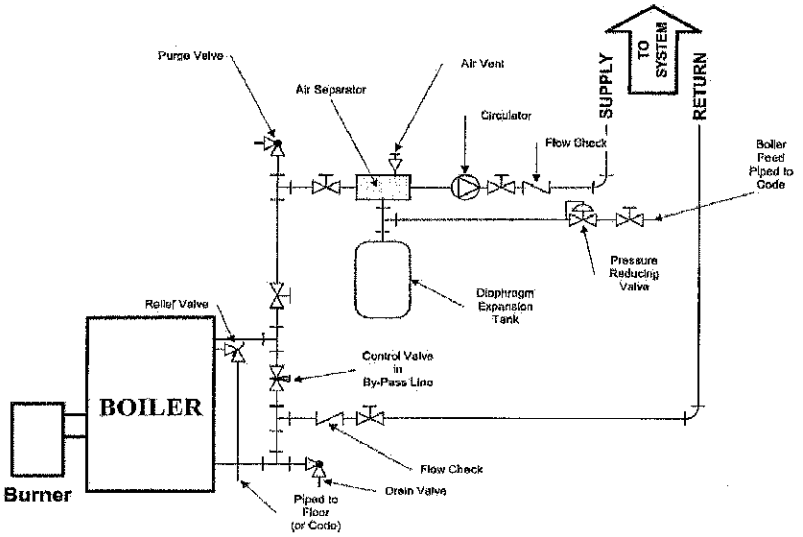


Figure 3

A typical installation with domestic hot water supplied by an indirect heater and with no by-pass loop installed.

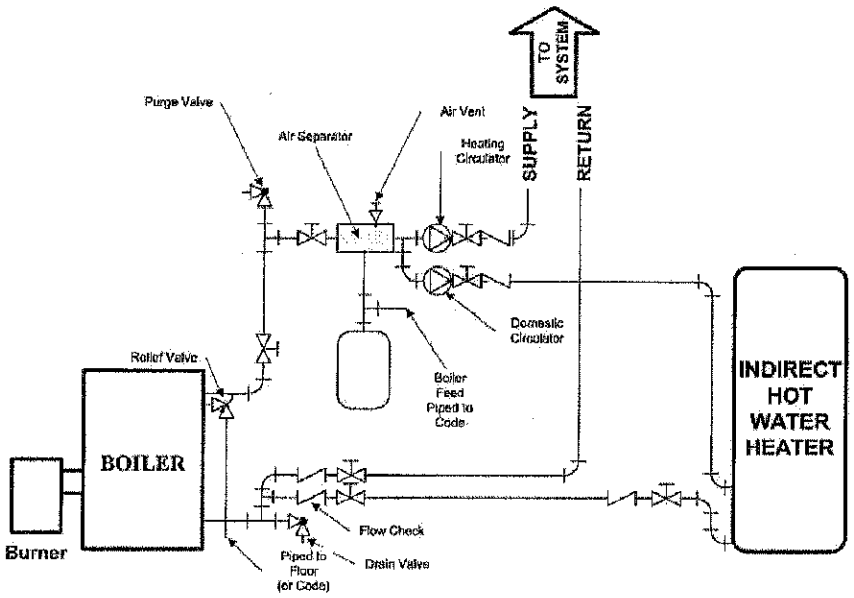
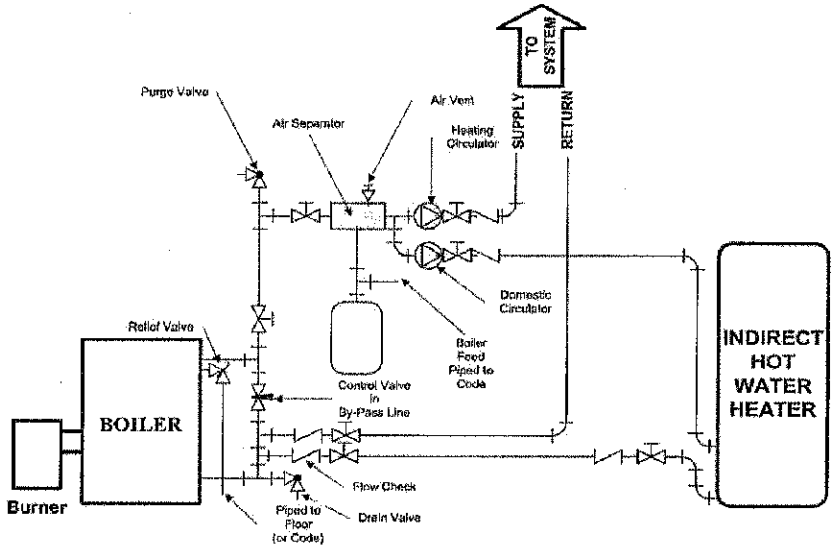


Figure 4

A typical installation with domestic hot water supplied by an indirect heater and with a by-pass loop installed.



PIPING INSTRUCTIONS SPECIFIC TO GAS-FIRED BOILERS

- A hot water boiler installed above radiation level or as required by the authority having jurisdiction, must be provided with a low water cut off device either as part of the boiler or at the time of boiler installation.
- The boiler shall be installed in such a way that the gas ignition system components are protected from water (dripping, spraying, etc.) during appliance operation and service (circulator replacement, condensate trap, control replacement, etc.).
- 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.
- The boiler piping system of a hot water boiler connected to the heating coils located in air handling units where they may be exposed to refrigerated air circulation must be equipped with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

5.0 ELECTRICAL WIRING

All external wiring must be performed in compliance with existing electrical codes within the local jurisdiction. In Canada the CSA, STANDARD C22-1 and the Canadian Electrical Code. Only qualified individuals should carry out electrical connections in accordance with this manual and;

- The boiler and burner should only be operated on 120 Vac – 60Hz.
- Field connections should be properly sized and protected with a minimum **15-amp** fuse or circuit breaker.
- A separate fused disconnect must be installed as required by code so that power can be shut off for servicing.
- The boiler must be bounded to the water piping or the main service ground.

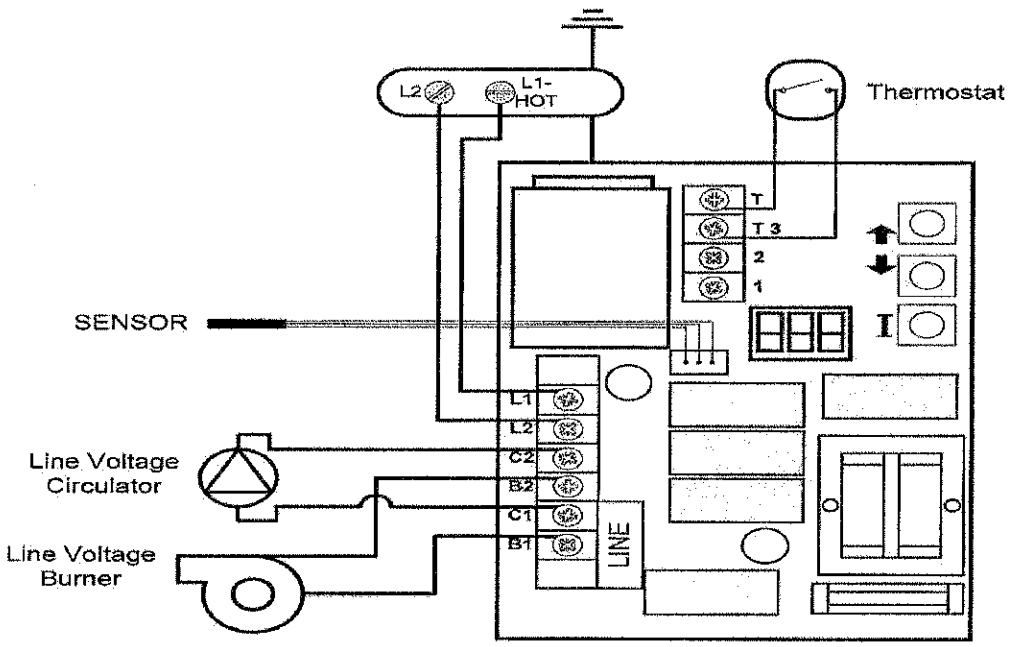
- If an external electrical source is utilized, the boiler, when installed, must be electrically bounded to ground in accordance with the requirement of the authority having jurisdiction, or in the absence of such requirement, with the

National electrical code ANSI/NFPA 70 and/or the Canadian electrical code Part 1, CSA 22.1, electrical code as applicable.

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

The connections must be made in a manner to insure that there is no crossing of the neutral with the phase, a proper ground shall be provided and all three wires shall be connected to the operating control.

Typical line voltage wiring for oil or gas burner with Honeywell L7248 boiler control and one heating zone.



Note:

- For Canadian application, see page 21 for proper wiring with a Block Vent Shut-Off - BVSO safety device.
- With the Carlin EZ Gas burner, the Red/White lead on the burner relay must be connected with L1 on the boiler control, the black lead to B1 and the white lead to B2 on the boiler control.
- With the Riello Gas burner, B1 must be connected to L on the burner control and B2 with N on the burner control.

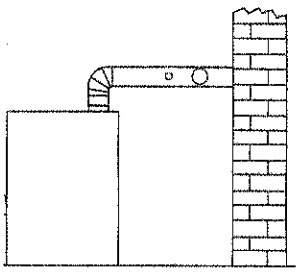
6.0 CHIMNEY INFORMATION

Natural Draft Applications

CAUTION: Gas fired units must always be connected to flues with proper draft.

Specific guidelines should be followed to prevent the occurrence of the following conditions:

- Reverse flow of flue gas during or after burner shutdown.
- Positive outlet draft conditions.
- Condensation of flue gasses



Chimney Connection

To insure safe and efficient boiler operation flue gasses must be released through a clean, properly sized chimney with adequate draft that meets all local codes and regulations and be in accordance with CSA B149.1 or NFPA 54 whichever applicable. Always inspect and clean the chimney to insure that it is free from obstructions. Never connect the boiler to a chimney or liner serving an open fireplace.

A 6" diameter flue pipe must be used for connection of the boiler flue outlet to the chimney for the entire length of the connection. An exception can be made for the three, four and five section boilers where the flue pipe may be reduced to 5" for the length of the connection. The chimney connector should be at least **24 gauge metal**, be properly supported and be free of as many 90 degree turns as possible. The distance between the boiler and the chimney depends on whether or not elbows are used. The distance should be at least 24" if no elbows are used and 12" if elbows are used. The maximum length of the flue pipe. It must be no longer than 10' if no elbows are used and 6' if elbows are used.

Draft Regulator

Gas-Fired units: A <u>double acting</u> draft regulator must be installed on the flue pipe.

Condensation

The B*G Series boiler is a high efficiency boiler and as a result improper venting can lead to condensing temperatures in the chimney connector and the venting system. If condensing temperatures of below 250℉ NET are reached in the chimney connector then additional steps shall be taken to insure proper draft. Make sure that all joints are properly sealed with a high temperature silicone or mastic. If after sealing the joints the condition still exists then inspect the chimney for suitability. If the masonry, brick, block chimney or tile chimney liner is in poor condition, a new chimney liner rated for oil may have to be installed. In the event the condition still exists after installation of a new liner consult Granby Furnaces Inc.

SPECIFIC TO GAS-FIRED BOILERS

When an existing boiler is removed from a common venting system, the common venting system is likely to be too large for proper venting of the appliances connected to it. At the time of removal of the existing boiler, the following steps shall be followed with EACH appliance remaining connected to the common venting system, while the other appliances remaining connected to the common venting system are not in operation:

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

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

For boilers connected to gas vent or chimneys, vent installation must be in accordance with the "Venting of equipment" section of the National fuel gas code ANSI Z223.1/NFPA 54 or the "Venting systems and air supply for appliances" section of the Natural gas and propane installation code CAN/CSA B149.1, or applicable provisions of the local building codes.

Vent connectors serving appliances vented by natural draft shall not be connected into any portion of mechanical draft system operating under positive pressure.

Use of cellular core PVC (ASTM F*891), cellular core CPVC or Radel (Polyphenolsulfone) in venting systems shall be prohibited.

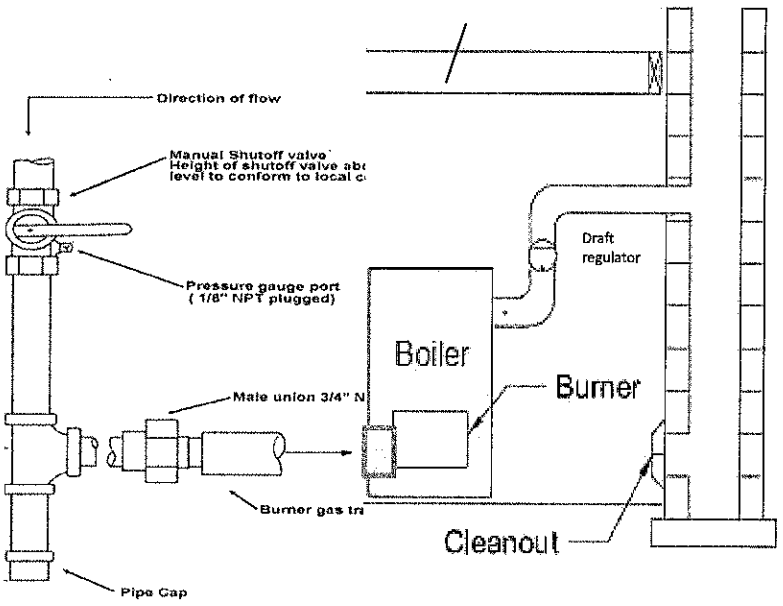
Connecting non-metallic vent pipe and fittings with thermal insulation shall be prohibited.

Horizontal portions of the venting system shall be supported to prevent sagging by installing support every 36 inches. The horizontal runs must be sloping upwards not less than ¼ inch per foot from the boiler to the chimney connector.

7.0 FUEL SYSTEM

(COMBUSTION & VENTILATION OPENINGS)

Install openings and ductwork to the boiler room providing fresh out-side combustion and circulating air, as installation code require by Canada CSA B139 or NFPA 31 whichever applicable. If installed in a closed room, provide two free air ventilation openings of at least 8'' x 12'' (96 sq in.) free flow areas near celling and floor. Oil burners must have sufficient air to allow vent system to operate properly.



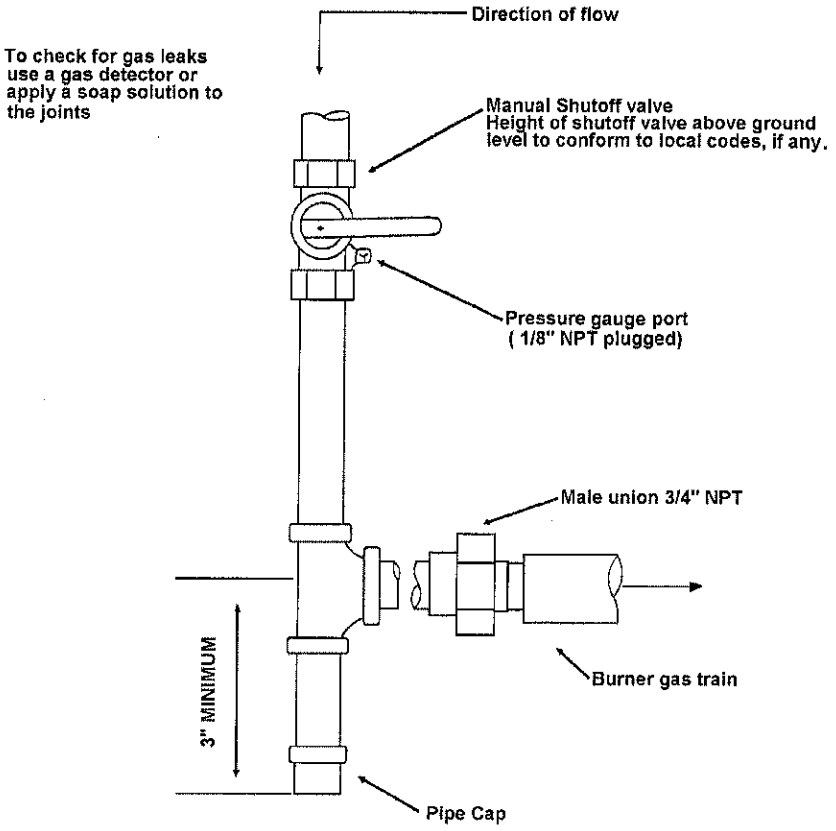
7.1 Gas-Fired boilers

The gas piping must be installed between the gas meter and the combination gas valve on the boiler.

WARNING:

- Connect from the gas supply to the burner combination gas valve inlet using new, clean black iron pipe and malleable iron fittings only. Do not use copper, brass, cast iron or galvanized pipe or fittings.
- Provide support for gas piping. Do not rest weight of piping on burner gas valve.
- Apply pipe dope sparingly at all joints. Use only pipe dope listed for use with propane gas. Do not use pipe sealing tape. In doubt consult CSA B149.1 or NFPA 54 or the authorities having jurisdiction.
- Do not hold gas valve with a pipe wrench. Use crescent wrench or other smooth jawed device. Do not over-tighten.
- Failure to comply with above could result in severe personal injury, death or substantial property damage.

1. If possible, install a new gas line directly from the gas meter. If you are using an existing gas line, verify it is clean and in good condition and verify it is large enough to handle the load of all connected appliances. See the table below for guidance on pipe sizes.
2. When branching from a common gas line, do not tap from the bottom or horizontal sections, only from the side or top.
3. Install a main manual shutoff valve, sediment trap and ground joint union near the burner combination gas valve connection as shown below.



4. GAS SUPPLY PRESSURE

- Maximum supply pressure: 14 inches W.C.
- Minimum supply pressure: 5" inches W.C.

WARNING:

- Do not expose the combination gas valve to gas pressures in excess of 14" W.C. The valve has a safety mechanism that interrupt the flow of gas over 14" W.C. In any event higher pressure could damage the valve seat, resulting in potentially hazardous conditions. When pressure testing at higher pressures, disconnect burner from gas line before testing.

- If the gas supply pressure can exceed 14 inches of water column at any time, you must install a lockup type gas pressure regulator in the gas supply piping, ahead of the main manual gas valve on the burner.
- The boiler and its gas connections must be leak tested before placing the boiler in operation.
- Enough combustion air should be provided to the gas-fired boiler in accordance with the section "Air for combustion and ventilation" of the National Fuel Gas Code ANSI Z223.1/NFPA 54 or clause 8,2, 8,3 or 8.4 of Natural gas and Propane installation code CAN/CSA B149.1, or applicable provisions of the local building codes.

TEST AND PURGE GAS LINE

1. Read warning above.
2. Pressure test and purge the line. The gas supplier or utility, following all applicable codes, should do pressure testing.

Capacities thousand BTU/Hour for pipe carrying natural gas or propane					
Pipe size (Inches)	Total length of gas piping from meter to burner connection (feet)				
	20	40	60	80	100
Natural gas @ 0.60 specific gravity with a pressure drop of 0.3" W.C.					
0.50	92	63	50	43	38
0.75	190	130	105	90	79
1.00	350	245	195	170	150
1.25	730	500	400	350	305
Natural gas @ 0.60 specific gravity with a pressure drop of 0.5" W.C.					
0.50	120	82	66	57	50
0.75	250	170	138	118	103
1.00	465	320	260	220	195
1.25	950	660	530	460	400
Propane gas @ 1.55 specific gravity with a pressure drop of 0.3" W.C.					
0.50	142.5	97.5	77.5	67.5	60
0.75	295	202.5	162.5	140	122.5
1.00	542.5	380	302.5	262.5	232.5
Propane gas @ 1.55 specific gravity with a pressure drop of 0.5" W.C.					
0.50	185	127.5	102.5	87.5	77.5
0.75	387.5	262.5	215	182.5	160
1.00	720	495	402.5	340	302.5

8.0 ACCESSORY INSTALLATION

BLOCKED VENT SWITCH (BVSO) FOR CANADIAN APPLICATION ONLY

Gas-fired appliances installed in Canada require a blocked vent switch system when installed on a chimney. A safety switch is included with the boiler to perform this function. It is the installer's responsibility to install the switch in accordance with the instructions provided. Not applicable for Direct Vent systems. **Field Controls Model: WMO-1 (Manual Reset)**

Switch Operation

Blocked vent switches are flue gas safety devices for detecting spillage of flue gases due to a blocked flue or inadequate draft. After detecting a problem, the switch de-energizes the system's burner control. On gas-fired Boilers, the BVSO acts as a spill switch on the outlet of the double acting draft-regulator.
NEVER reset the switch unless the cause of the blockage has been corrected.

Installation on Gas-Fired Boilers (Figure 1)

1) Drill a 5/8" hole in to the flue vent pipe near the appliance breech connection.
2) This hole must be before the draft regulator, vertically or horizontally.
3) Remove one of the securing nuts from the threaded tube of the safety switch.
4) Tighten the other securing nut onto the pipe as far as possible.
5) Insert the threaded tube end into the pierced hole of the flue vent pipe.
6) Install the securing nut on the safety switch tube, which protrudes into the flue vent pipe. Tighten the nut securely.

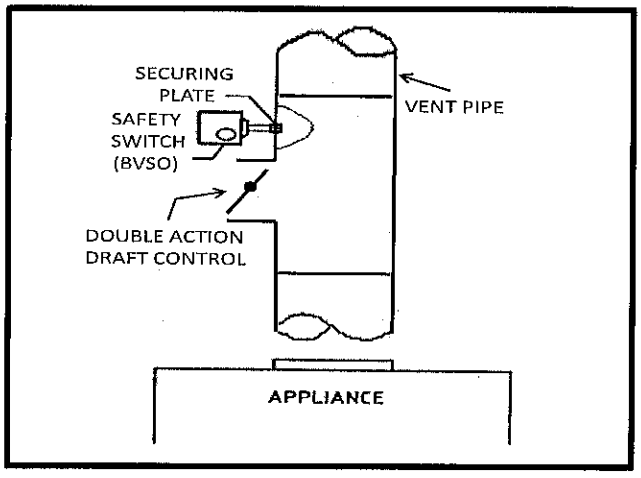


Figure 1- Illustration Granby Industries

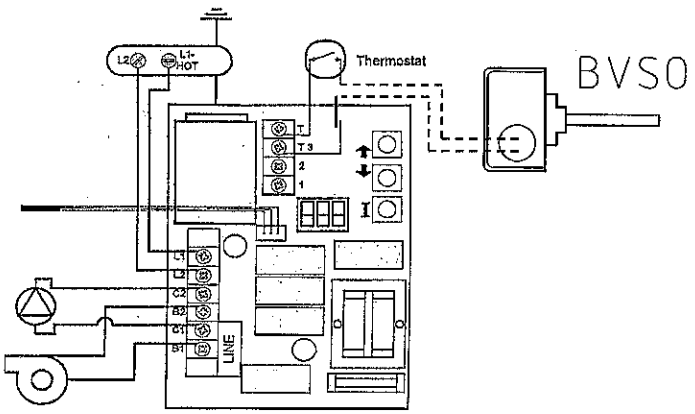


Figure 2- BVSO wiring diagram

Installation on Gas-Fired Heating Units (Figure 1)

Wiring BVSO (Figure2)

The BVSO is connected in series with the call for heat device (24Vac), typically a room thermostat or a zone valve end switch

Caution: Disconnect the electrical power when wiring the unit.

Wire the blocked vent switch in accordance with The National Electrical Code and applicable local codes. Wire the blocked vent shut off switch (BVSO) in series with the thermostat and the aquastat control (Figure 2).

System Test Procedure (BVSO)

1) With the power re-established, block the chimney or vent pipe downstream of the switch.
2) Adjust the thermostat to call for heat.
3) Once the heating system has started the blocked vent switch should shut down the burner within 10 minutes or sooner.
4) Once the system has cooled, the blocked vent switch can manually be reset.
5) This procedure should be tested a second time.
6) After testing the blocked vent switch the chimney should be cleared of obstruction and the heating system should be tested over a long run cycle.

If the block vent switch shuts down the system, check to ensure there is enough draft in the chimney and venting pipes.

IN THE EVENT OF YOUR SYSTEM SHUTTING DOWN BECAUSE OF A BVSO DEVICE OPERATION, THE LIKELY CAUSE IS FLUE VENT OR CHIMNEY BLOCKAGE. DO NOT ATTEMPT TO RESTART THE SYSTEM. CONTACT A QUALIFIED SERVICE TECHNICIAN WHO WILL ADDRESS THE ROOT CAUSE OF THE BVSO SHUTTING DOWN YOUR BOILER

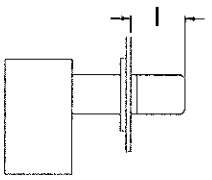
9.0 BURNER INSTALLATION AND SETTING

ASSEMBLY & INSTALLATION OF BURNER

ASSEMBLY Check that the burner model is correct for boiler rating required. Assemble as per burner manufacturer's instructions.

See burner manufacturer's instructions for correct setting

INSERTION



BURNER INSERTION (I)	in	mm
RIELLO	3	76

9.1 Gas-Fired Boilers

CONSULT THE BURNER INSTRUCTION MANUAL THAT IS INCLUDED IN THE BURNER BOX. In case of differences between the instructions on the burner instruction manual and this manual, the boiler instruction manual (this manual) must be followed. The instructions in the gas burner instruction manuals are detailed mounting, wiring, adjusting, testing and maintenance instructions that are specific to the burner used (Riello or Carlin). The specific adjustments specific the boiler are detailed in section 10 below. As a general guideline:

1) Use the burner instruction manual for general instructions.
2) Use this manual for specific instructions (such as for example, the initial air gate adjustment for a specific size of boiler with a specific burner).

- RIELLO GAS BURNERS
    - In the Section "Setting the burner", disregard the table and use the initial adjustments detailed for the appropriate boiler with Riello burner in the section 10 of this manual below.
    - In the section "Air gate adjustment", disregard the table and use the information in section 10 below.
    - In the section "Combustion head settings", disregard the table and use the information in section 10 below.
    - In the section "Manifold pressures", disregard the table and use the information in section 10 below.
    - Disregard the "Pressure working chart" and the "Combustion chamber size" sections as those sections apply only for conversion burners.
- CARLIN GAS BURNERS
    - Disregard Table 1 on page 7; use the information in section 10 instead.

COMBUSTION CHECKS

All combustion checks must be performed with an instrument capable of reading at least CO2, CO and temperature.

- RIELLO GAS BURNERS
    - Natural Gas Maximum CO2 is 10%
    - Propane Gas Maximum CO2 is 12%
    - Maximum Air free PPM reading of CO is 200.
    - If any of these readings exceed the values above, adjust the air gate to increase the air intake to the burner.

- CARLIN GAS BURNERS
    - Natural Gas Maximum CO2 is 10.4%
    - Propane Gas Maximum CO2 is 11.8%
    - Maximum Air free PPM reading of CO is 50.
    - If any of these readings exceed the values above, adjust the air gate to increase the air intake to the burner.

AFTER PLACING THE BOILER IN OPERATION, THE IGNITION SYSTEM MUST BE TESTED.

THE METHOD OF TESTING IS AS FOLLOWS:

- Place the boiler in operation, by raising the thermostat, and observe a normal ignition of the burner.
- Lower the thermostat. This should shut off the burner.
- Close the manual shut-off gas valve that is upstream of the gas control.
- Place the boiler in operation again, by raising the thermostat.
- After a trial for ignition period, the burner control should go in lockout mode. A light on the red button on the burner ignition control will indicate this.
- To restart the boiler, open again the manual gas shut-off valve that you closed a few steps back, press the red button on the ignition control, the burner then should retry its ignition. If this sequence is not respected, consult the burner manual.

9.2 GAS-FIRED BOILER LIGHTING INSTRUCTIONS

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

B. **BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

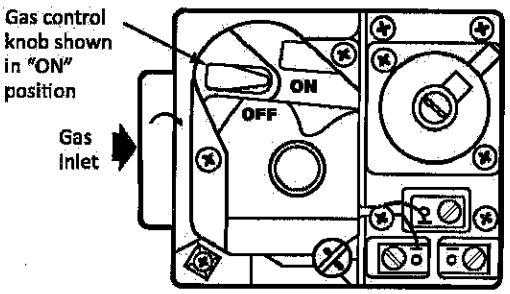
WHAT TO DO IF YOU SMELL GAS
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
5. Remove control access panel.



6. Push in gas control knob slightly and turn clockwise ↷ to "OFF."

   NOTE: Knob cannot be turned to "OFF" unless knob is pushed in slightly. Do not force.
7. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
8. Turn gas control knob counterclockwise ↶ to "ON."
9. Replace control access panel.
10. Turn on all electric power to the appliance.
11. Set thermostat to desired setting.
12. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

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

10.0 TECHNICAL INFORMATION

- ** Honeywell control L7248 (high limit only, cool start application)

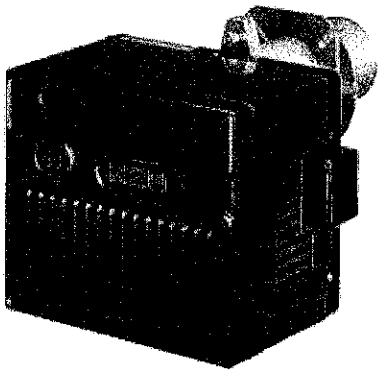
10.1 Gas-Fired Boilers

Riello Burner

Model	Type of Gas	Burner Model	Max. Inlet Press. ("wc)	Min. Inlet Press. ("wc)	Manifold Pressure ("wc)	Input Rating (BTU/H)	Input Rating (KW)	Output Rating (BTU/H)	Output Rating (KW)	Min. Relief Valve Cap. (lbs/hour)
B*G-R1-0082-**	Nat.	Riello G-120SBT	11.0	7.0	3.5	98000	28.7	82320	24.1	82.4
	Prop.		14.0	7.0	3.9	98000	28.7	82320	24.1	82.4
B*G-R2-0119-**	Nat.	Riello G-200SBT	11.0	7.0	3.8	140000	41.0	119000	34.9	119.0
	Prop.		14.0	7.0	5.3	140000	41.0	119000	34.9	119.0
B*G-R3-0147-**	Nat.	Riello G-400SBT	11.0	7.0	4.5	175000	51.3	147000	43.1	147.0
	Prop.		14.0	7.0	4.6	175000	51.3	147000	43.1	147.0
B*G-R3-0164-**	Nat.	Riello G-400SBT	11.0	7.0	3.8	194000	56.9	164900	48.3	164.9
	Prop.		14.0	7.0	3.9	194000	56.9	164900	48.3	164.9
B*G-R3-0190-**	Nat.	Riello G-400SBT	11.0	7.0	4.3	224000	65.7	190400	55.8	190.4
	Prop.		14.0	7.0	3.6	224000	65.7	190400	55.8	190.4
B*G-R3-0214-**	Nat.	Riello G-400SBT	11.0	7.0	3.6	252000	73.9	214200	62.8	214.2
	Prop.		14.0	7.0	3.9	252000	73.9	214200	62.8	214.2

Model	Type of Gas	Burner Model	Head Setting	Air Setting	Gas Orifice (mm)	Orifice
B*G-R1-0082-**	Nat.	Riello G-120SBT	2.0	2.75	1.7	A6
	Prop.		2.0	2.75	1.3	A16
B*G-R2-0119-**	Nat.	Riello G-200SBT	0.0	3.50	2.0	B5
	Prop.		1.0	3.00	1.3	B15
B*G-R3-0147-**	Nat.	Riello G-400SBT	0.0	1.60	2.2	C2
	Prop.		0.0	1.80	1.5	C12
B*G-R3-0164-**	Nat.	Riello G-400SBT	0.0	1.90	2.2	C2
	Prop.		0.0	1.90	1.5	C13
B*G-R3-0190-**	Nat.	Riello G-400SBT	1.0	2.00	2.2	C3
	Prop.		1.0	2.00	1.5	C13
B*G-R3-0214-**	Nat.	Riello G-400SBT	2.0	2.20	2.2	C4
	Prop.		2.0	2.30	1.5	C14

Riello Gas Burner

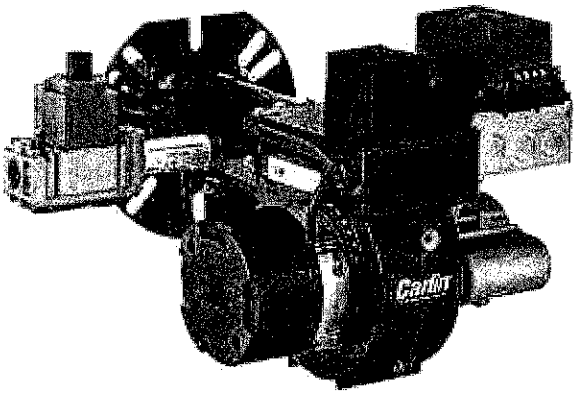


Carlin Burner

Model	Type of Gas	Burner Model	Max. Inlet Press. ("wc)	Min. Inlet Press. ("wc)	Manifold Pressure ("wc)	Input Rating (BTU/H)	Input Rating (KW)	Output Rating (BTU/H)	Output Rating (KW)	Min. Relief Valve Cap. (lbs/hour)
B*G-C1-0082-**	Nat.	Carlin EZ-Gas 9S	11.0	7.0	3.5	98000	28.7	82320	24.1	82.4
	Prop.		14.0	7.0	3.0	98000	28.7	82320	24.1	82.4
B*G-C1-0119-**	Nat.	Carlin EZ-Gas 9S	11.0	7.0	3.5	140000	41.0	119000	34.9	119.0
	Prop.		14.0	7.0	3.5	140000	41.0	119000	34.9	119.0
B*G-C1-0147-**	Nat.	Carlin EZ-Gas 9S	11.0	7.0	3.5	175000	51.3	147000	43.1	147.0
	Prop.		14.0	7.0	3.5	175000	51.3	147000	43.1	147.0
B*G-C2-0164-**	Nat.	Carlin EZ-Gas A	11.0	7.0	3.5	194000	56.9	164900	48.3	164.9
	Prop.		14.0	7.0	3.5	194000	56.9	164900	48.3	164.9
B*G-C2-0190-**	Nat.	Carlin EZ-Gas A	11.0	7.0	3.5	224000	65.7	190400	55.8	190.4
	Prop.		14.0	7.0	3.5	224000	65.7	190400	55.8	190.4
B*G-C3-0214-**	Nat.	Carlin EZ-Gas A*	11.0	7.0	3.5	252000	73.9	214200	62.8	214.2
	Prop.		14.0	7.0	3.5	252000	73.9	214200	62.8	214.2

Model	Type of Gas	Burner Model	Diffuser / Head	Air Tube	Air Band	Air Shutter	Orifice
B*G-C1-0082-**	Nat.	Carlin EZ-Gas 9S	9S	10" S	1 Slot	Blank	#3
	Prop.		9S	10" S	1 Slot	Blank	#18
B*G-C1-0119-**	Nat.	Carlin EZ-Gas 9S	9S	10" S	1 Slot	Blank	G
	Prop.		9S	10" S	1 Slot	Blank	#3
B*G-C1-0147-**	Nat.	Carlin EZ-Gas 9S	9S	10" S	1 Slot	Blank	O
	Prop.		9S	10" S	1 Slot	Blank	C
B*G-C2-0164-**	Nat.	Carlin EZ-Gas A	A	10" S	2 Slots	Blank	21/64
	Prop.		A	10" S	2 Slots	Blank	17/64
B*G-C2-0190-**	Nat.	Carlin EZ-Gas A	A	10" S	2 Slots	Blank	U
	Prop.		A	10" S	2 Slots	Blank	19/64
B*G-C3-0214-**	Nat.	Carlin EZ-Gas A*	A	10" S	2 Slots	Blk & spacer	29/64
	Prop.		A	10" S	2 Slots	Blk & spacer	R

Carlin Gas Burner



10.2 Boiler Info

GRANBY B*G CAST IRON SERIES

Appliance Model	No. de section	Length (inches)	Shipping weight (lbs)	Water Content (gal.)	Supply Outlet (inches)	Return Outlet (inches)
B*G – E6-0085-**	3	18-7/8"	370	5.5	1-1/4"	1-1/4"
B*G – E7-0121-**	4	22-1/2"	437	6.9	1-1/4"	1-1/4"
B*G –E7-0152-**	5	26-3/4"	503	8.2	1-1/4"	1-1/4"
B*G – E7-0174-**	6	31-1/8"	569	9.5	1-1/4"	1-1/4"
B*G – E8-0194-**	7	35-1/2"	639	10.8	1-1/4"	1-1/4"
B*G – E8-0224-**	8	39-3/4"	705	12.2	1-1/4"	1-1/4"

WARNING: Do not operate if any controls have been submerged. Contact a qualified technician for inspection prior to use.

11.0 BOILER START UP AND OPERATION

11.1 START UP PROCEDURE

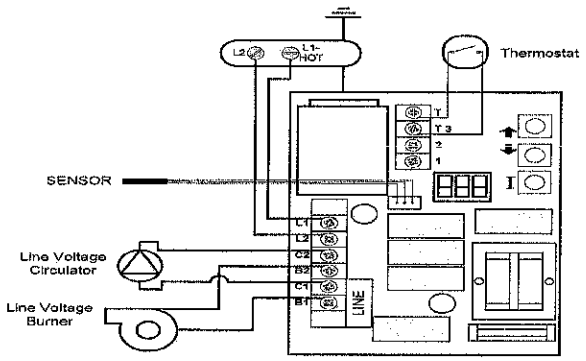
- Prior to start up make sure the service switch is in the OFF position.
- Check all fittings and wiring.
- Insure that the boiler and the entire heating system are completely filled with water and that all air has been purged from the system resulting that proper system pressure is achieved. The minimum PSIG is 12.
- Open all manual shutoffs throughout the system.
- Set operating controls to the recommended settings.
- Follow the burner manufacturer's instructions for proper light off and setting. Using accurate combustion test equipment set the burner for proper "steady state" operation. The use of accurate instruments is necessary to achieve maximum efficiency.
- Adjust the thermostat to manufacturer's instruction

- Place this manual, the control manual and the burner manual along with related consumer information in an easily accessible location. Installers should make the consumer aware of the content and location of this information.

11.2 Honeywell control L7248 - Adjusting Settings

- To discourage unauthorized changing of **Aquastat** settings, a procedure to enter the **ADJUSTMENT** mode is required.
- To enter the **ADJUSTMENT** mode, press the **UP, DOWN** and **I** buttons simultaneously for three seconds.
- Press the **I** button until the feature requiring adjustment is displayed then press the **UP and/or DOWN** buttons to move the set point to the desired value.

Note: After 60 seconds without any button inputs, the control will automatically return to the **RUN** mode and lock the setting.



Error Codes

When attempting to diagnose system performance, reference to the LED display can help to identify specific areas not working properly. The LED display will scroll ERR, followed by a digit (1-8). Refer to the information inside the cover of the control L7248.

Err 1	Sensor fault	Check sensor
Err 2	ECOM fault	Check Optional EnviraCOM wiring
Err 3	Hardware fault	Replace control
Err 4	B1 fault	Check B1 wiring/voltage
Err 5	Low line	Checl L1 - L2 > 110 V a/c
Err 6	Fuse	Check ECOM wires, replace fuse
Err 7	EEPROM	Reset limit values
Err 8	Multiple Err 4	Press/Hold ↓↑ I for 60 sec min*

11.3 Trouble shooting the control

System Condition	Diagnostic Condition	Check	Action
Boiler is cold, house is cold.	Display is OFF	120 V a/c System power.	Turn system power on
	Display is ON	24 V a/c T-T	No 24 V; replace control
		24V present; disconnect thermostat, short T-T	Boiler starts, check wiring and thermostat.
		120 V a/c at B1-B2	. If no, replace control. . If yes, check burner and wiring.
Boiler is hot, house is cold.	Display is ON.	120 V a/c at C1-C2	. 120 V a/c at C1-C2, check wiring to pump. Wiring OK , is pump running ? . If not, replace the pump. . If pump is running, check for trapped air or closed zone valves.

TESTING SAFETY AND CONTROL DEVICES

In the event the boiler is equipped with a **low water cut off,** the cut off should be tested in accordance with the manufacturer's recommendations. When no instructions are available follow the guidelines in ASME CSD-1 or perform the following procedures:

- Set room thermostat at least 10℉ above room tempe rature.
- With Burner operating, drain boiler slowly until the burner shuts off. This shut off should occur when the water level falls below the low water cut off probe.
- Check to be sure the burner shut off is not due to an open limit or flame safety issue.
- Reset the room thermostat to the desired temperature and refill the boiler

12.0 MAINTENANCE / SERVICE

Your heating appliance is designed to be maintained and serviced only by your heating professional. The following sections provide information on maintenance and service related activities. In the event a problem occurs consult your heating professional

Model	# Of Baffles	2nd Pass	3rd Pass
3 Sections	4	X	X
4 Sections	4	X	X
5 Sections	2		X
6 Sections	2		X
7 Sections	2		X
8 Sections	2		X

CONDENSATION

If you have condensation in your chimney, make sure that the chimney size is according to the tables in CSA B139. Insulating the flue pipe between the furnace and the chimney base can increase the temperature at the entrance of the chimney. If this is not sufficient, consider cutting or removing some flue baffles in the furnace. BE AWARE THAT REMOVING BAFFLES REDUCES THE UNIT EFFICIENCY AND A MODIFIED UNIT IS NO LONGER ENERGY STAR APPROVED.

HOMEOWNER SERVICE CAUTION

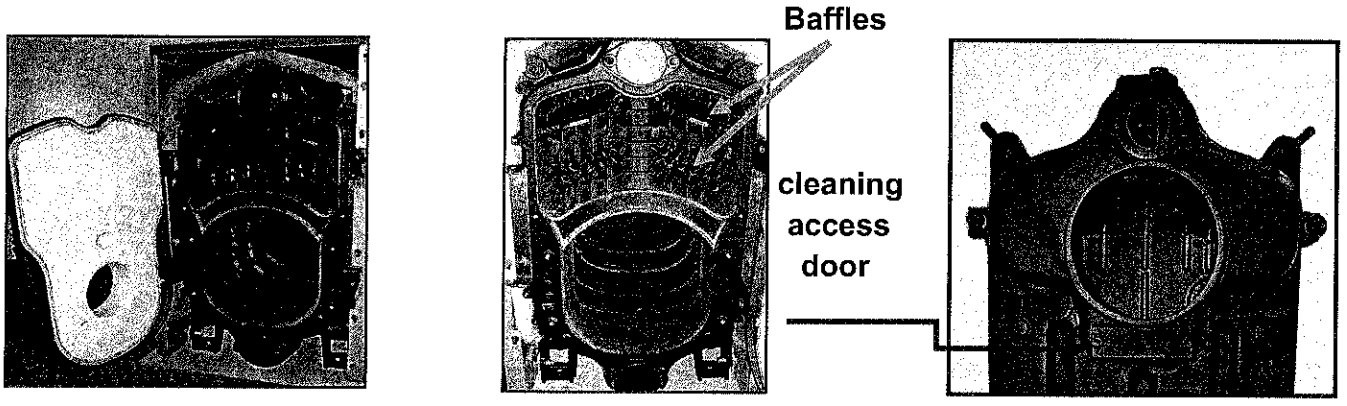
In the event of a problem with the heating system the homeowner should perform the following limited activities.

- Check to make sure that there is fuel in the tank and that oil valves are open.
- Set the thermostat above existing room temperature.
- Check for blown fuses or circuit breakers and make sure power switches are in an on position.
- NEVER TAMPER WITH CONTROLS, WIRING OR PIPING !

12.1 CLEANING THE BOILER

Section cleaning should only be performed by a service technician and must only be performed when the boiler is out of service. The following steps should be followed:

- Remove the 2 front panels by sliding it upwards to release and then pull to remove.
- Open the front swing door by removing the four bolts; this will expose the chamber area as well as the second and third passes. **(A)**
- Remove the stainless steel baffles. With a cleaning brush clean the boiler section, second and third passes. **(B)**
- Remove insulation and the smoke hood cleaning access door from the rear section. Remove any soot that may have collected in the smoke hood. **(C)**



A **B** **C**

- Replace insulation on the rear section and smoke hood.
- Replace swing door and tighten bolts.
- Refit the front casing.

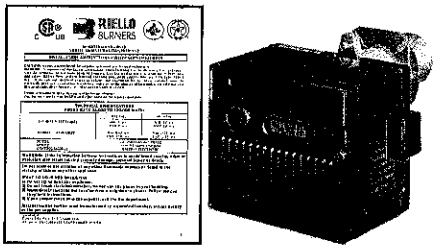
SPECIFIC TO INSPECTION AND SERVICE OF GAS-FIRED BOILERS

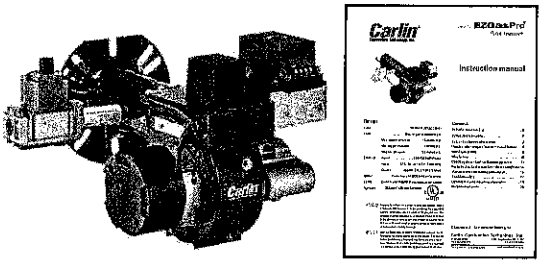
- The vent system must be inspected annually.
- If a low water cut-off is installed in the system, it must be inspected annually.
- The burner flame in operation must be checked regularly. It should be mostly blue with some yellow tipping permitted.
- Check to make sure that the flow of combustion air to the burner is not obstructed.
- Verify proper operation of the boiler after servicing

12.2 BURNER CLEANING NOTES

Your burner manufacturer has supplied instructions for servicing and maintenance should be performed as instructed.

Riello 40 G120 Gas Burner

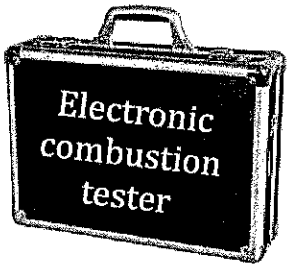




Carlin EZGas PRO Burner Burner

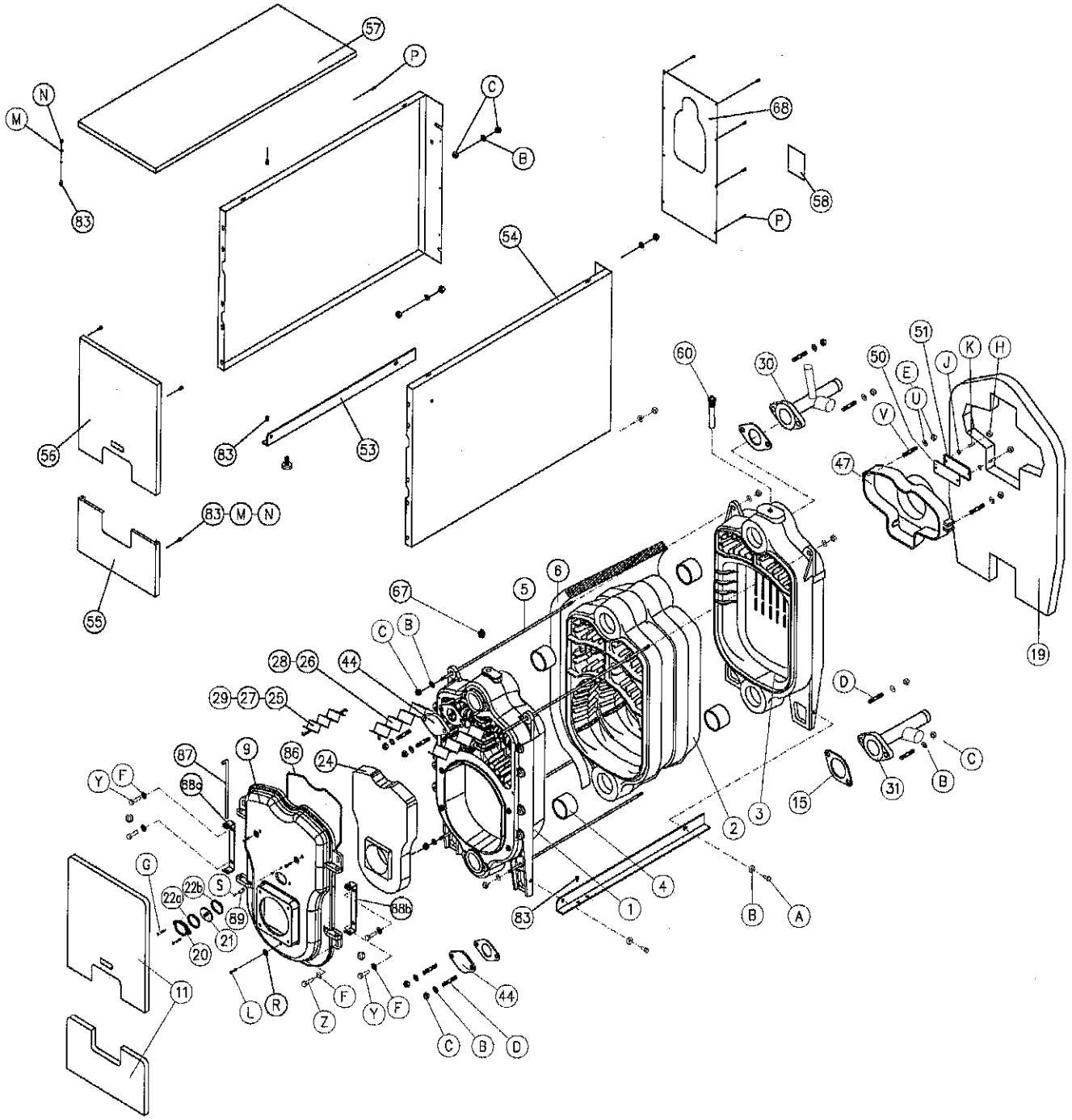
12.3 PERFORM COMBUSTION TEST

Perform an annual combustion check on the gas burner.



13.0 EXPLODED PARTS VIEW

Exploded Parts View



Part List

1	G*C FRONT SECTION	60	GC PNA - POCKET FOR SENSING BULBS
2	G*C INTERMEDIATE SECTION	67	TAPPING WITH AIR RELIEF VALVE
3	G*C REAR SECTION	68	REAR CASING
4	NIPPLE	83	SPECIAL PIN FOR CASING ASSEMBLY
5	STAYBOLTS	86	FIBRE-GLASS ROPE DIA. 10
6	BODY INSULATION	87	HINGE PIN
9	FRONT DOOR (MONOBLOCK)	88a	HINGE - LEFT HAND SIDE
11	FRONT INSULATION	88b	HINGE - RIGHT HAND SIDE
15	RUBBER GASKET	89	OUTLET FOR PRESSURE MEASUREMENT
19	REAR INSULATION	A	SETSCREW M10 x 30
20	SIGHTGLASS FRAME	B	WASHER A10.5
21	SIGHTGLASS	C	NUT M10
22a	SIGHTGLASS FRAME INSULATION	D	STUD M10 x 40
22b	SIGHTGLASS INSULATION	E	NUT M8
24	FRONT DOOR REFRACTORY	F	WASHER A8.4
25 / 27 / 29	2ND PASS RETARDERS	G	SETSCREW M5 x 15
26 / 28	3RD PASS RETARDERS	H	NUT M6
30	DELIVERY STUB PIPE	J	WASHER A6.4
31	RETURN STUB PIPE	K	STUD M6 x 22
44	BLANK FLANGE	L	SELF TAPPING SCREW S6.3 x 30
47	SMOKEHOOD DIA.150 MM	M	SERRATED WASHER A4.3
50	SMOKEHOOD CLEANING COVER INSULATION	N	NUT M4
51	SMOKEHOOD CLEANING COVER	P	SELF TAPPING SCREW S4.8 x 9.5
53	CHASSIS - LEFT/RIGHT HAND SIDE	R	WASHER A6.4
54	SIDE CASINGS - LEFT/RIGHT HAND SIDE	S	SETSCREW M3 x 6
55	FRONT CASING LOWER PART	U	WASHER A9
56	FRONT CASING UPPER PART	V	STUD M8 x 50
57	ÜST SAC	Y	SETSCREW M8 x 16
58	BOILER DATA PLATE	Z	SETSCREW M8 x 30

PARTS NOT ILLUSTRATED

AA	HONEYWELL L7248 - AQUASTAT	CC	PRESSURE VALVE (30 lbs)
BB	PRESSURE – TEMPERATURE GAGE	DD	DRAIN VALVE

GRANBY

Granby Furnaces Inc. manufactures a full line of oil and gas-fired boilers in its 70,000 square feet facility. Granby products are sold across Canada and the United States through a distribution network.

Our team of engineers, designers and technicians continually research and develop products to go beyond the demanding specifications of today's certifications.

Thank you for choosing Granby.