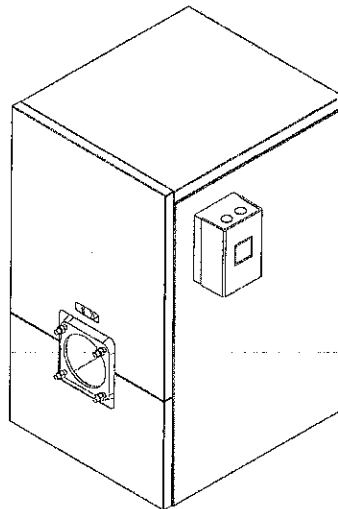




Installation, Operation and Service Manual

Cast Iron Boiler SERIES

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



**Designates Brand Name*



*B*C, 3 sections illustrated*

INSTALLATIONS MUST MEET ALL LOCAL AND FEDERAL CODES THAT MAY DIFFER FROM THIS MANUAL

***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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TABLE OF CONTENTS
B*C – Oil

1.0	IMPORTANT SAFETY ADVICE	2
2.0	PRODUCT INFORMATION	3
3.0	UNIT INSTALLATION	4
	3.1 PLACEMENT & LEVELING OF THE UNIT	4
	3.2 JACKET ASSEMBLY & CONTROL INSTALLATION	4
4.0	PIPING	8
5.0	ELECTRIC WIRING	11
6.0	CHIMNEY INFORMATION	13
7.0	FUEL SYSTEM	14
8.0	ACCESSORY INSTALLATION	15
9.0	BURNER INSTALLATION & SETTING	16
10.0	TECHNICAL INFORMATION	20
11.0	BOILER START UP & OPERATION	21
	11.1 START-UP PROCEDURE	21
	11.2 L7248 HONEYWELL AQUASTAT	22
	11.3 FUEL SMART HYDROSTAT 3250 BOILER CONTROL	23
12.0	MAINTENANCE AND SERVICE	26
	12.1 CLEANING THE BOILER	27
	12.2 BURNER NOTES	27
	12.3 PERFORMING COMBUSTION TEST	27
13.0	EXPLODED PARTS VIEW	28
14.0	START UP TEST RESULTS	30

1.0 IMPORTANT SAFETY ADVICE

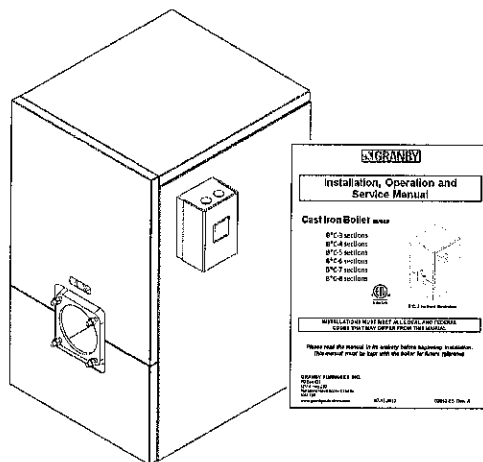
Please read and understand this manual before installing, operating or servicing the boiler. To ensure you have a clear understanding of the operating procedures of the appliance please take the time to read section **IMPORTANT SAFETY ADVICE** of this manual.

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.

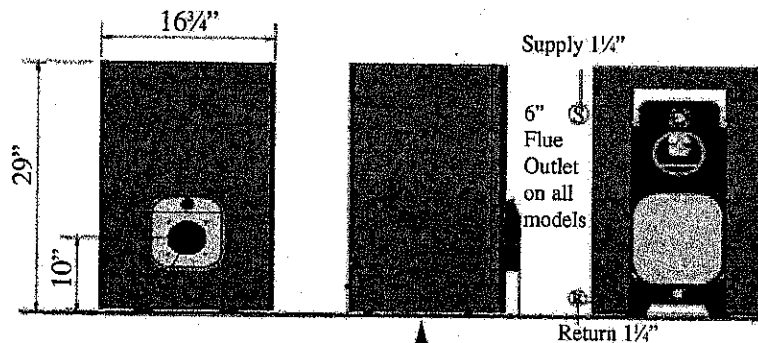
IMPORTANT

This manual contains instructional and operational information for the B*C OIL-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 1/4 ")
 (6 sections 31 1/8 ") (7 sections 35 1/2 ") (8 sections 39 1/4 ")

CLEARANCE

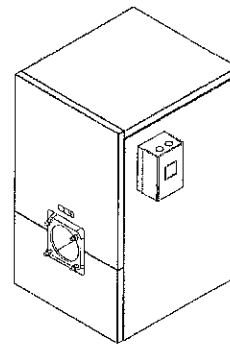
Proper clearances must be maintained not only from combustible materials but also to provide adequate access for servicing. All installations must comply with local codes and CSA B139. Consult local fire codes for required clearances. Connections to chimney must be made with the proper gauge thickness and diameter of fluepipe as required by CSA B139.

CLEARANCE (minimum) FOR SERVICING

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

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)



DRAFT PRESSURE

Breach draft pressure 0.03" w.c. draft required

FLUE PIPE CONNECTION

CHIMNEY or Direct Vent System DVS Granby kit (3, 4, 5 sections)

CLEANOUTS

Rear removable smoke hood cover & Combustion Front Door Opening

FUEL

Not heavier than No.2 fuel oil

ELECTRICAL

CANADA: 120 Volts, 60Hz, 15 amps. fuse or breaker

USA: 13.3A, circuit protection 20A,

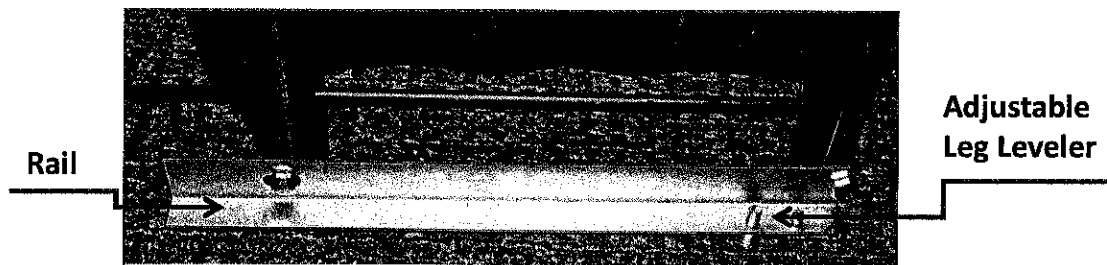
AIR SUPPLY

CAUTION: Adequate air supply for both combustion and ventilation must be available. See page 14 for details.

3.0 Unit installation

3.1 PLACEMENT & LEVELING OF THE UNIT

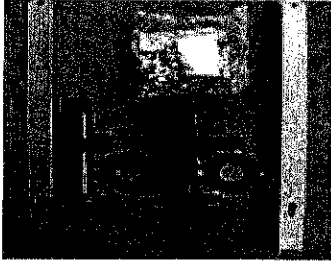
The boiler should be located on firm foundation in an easily accessible area that meets the previously discussed clearances and air requirements. In situations where the floor may be uneven the G*C may be level by using the leg levelers provided on the boiler or through the insertion of shims under the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



3.2 JACKET ASSEMBLY AND CONTROL INSTALLATION

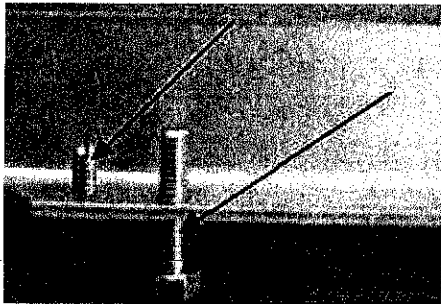
The boiler jacket has been designed for ease of assembly and removal. The following step by step process will ease installation. A screw driver, 17mm socket and ratchet or a 17mm wrench or adjustable wrench are needed.

STEP 1: VERIFY CONTENTS OF JACKET ASSEMBLY PACKAGE.



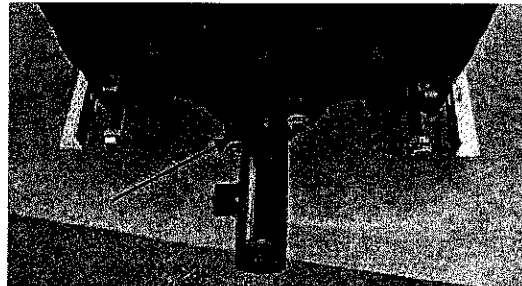
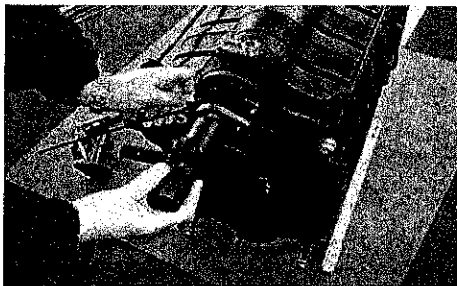
Your jacket assembly will contain two (2) manifolds with gaskets, a fastening package which includes all necessary bolts, screws, nuts and washers for assembly along with burner studs, nuts and washers, block insulation, rear of block insulation, aluminum faced tape, leveling frame rails, two (2) side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

STEP 2: FRAME RAIL CONNECTION



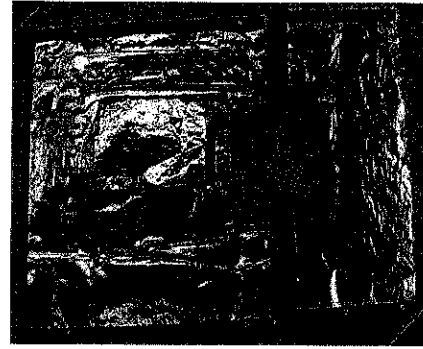
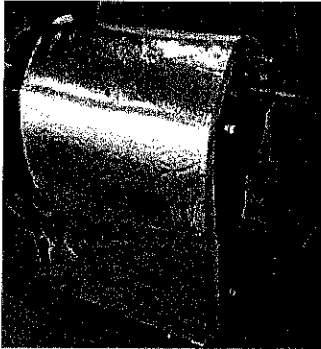
Attach 10 mm bolts to the underside of the frame rails. These will be used to level the boiler. Screw the 4 mm jacket affixing screw to the frame rail from the top down. Both the bolt and affixing screw will be located on the same end of the frame rail. The frame rail will then be bolted to the legs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



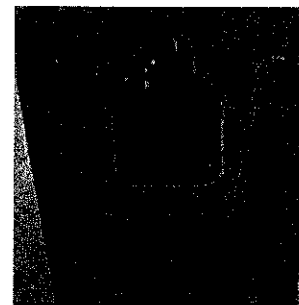
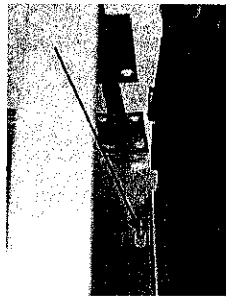
Using the gaskets and bolts supplied connect the manifolds directly to the boiler block. The top supply manifold will have a 3/4" npt tapping for a relief valve and 1/4" npt tapping for a gauge. The bottom return manifold has 3/4" npt tapping for a drain valve. Both manifolds have 1-1/4" male npt threads for system 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 insulation to the block insulation. The process is simply taping the two pieces together. The front panels come pre-insulated.

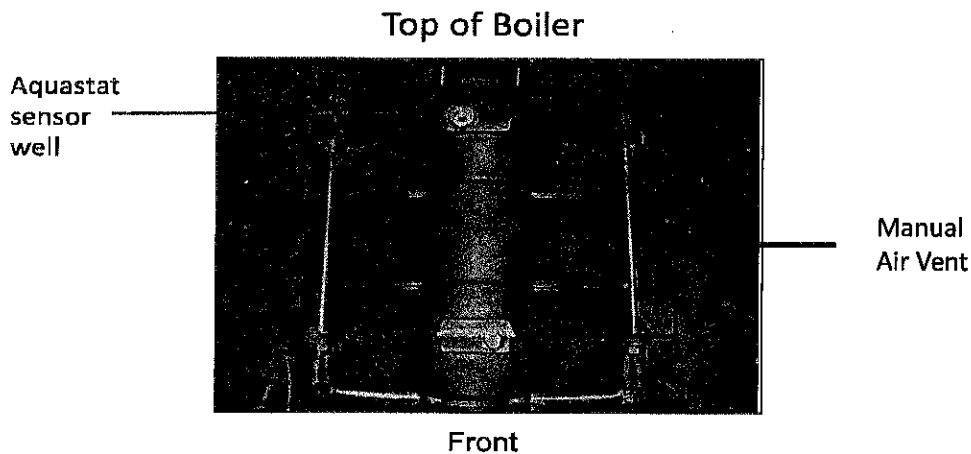
STEP 5: SIDE AND BACK PANEL ATTACHMENT



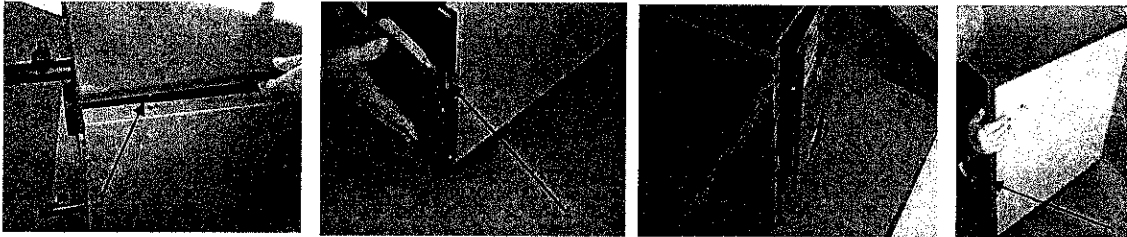
Affix panel mounting nuts to the rear of the tie rods. Mount the side panels by placing the panel over the frame rail so that the hole in the bottom lip of the panel fits directly over the jacket affixing screw on the rail. You can then lock the panel in place by sliding it slightly forward. The slot 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.

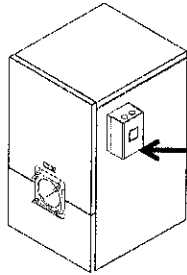


STEP 7: TOP AND FRONT PANEL ATTACHMENT



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 control unit can be mounted on the side of the boiler.



Honeywell L7248 Aquastat or Fuel Smart HydroStat 3250 boiler control.

*B*C-3 sections boiler illustrated*

The boiler is now ready for piping and connection to the fuel system, heating and domestic hot water, thermostat and 110 Volt 60 cycle AC current.

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 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 B*C 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 12 psi 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.

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 Hydronic 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.

Circulation 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 200°F 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 circulator, 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.

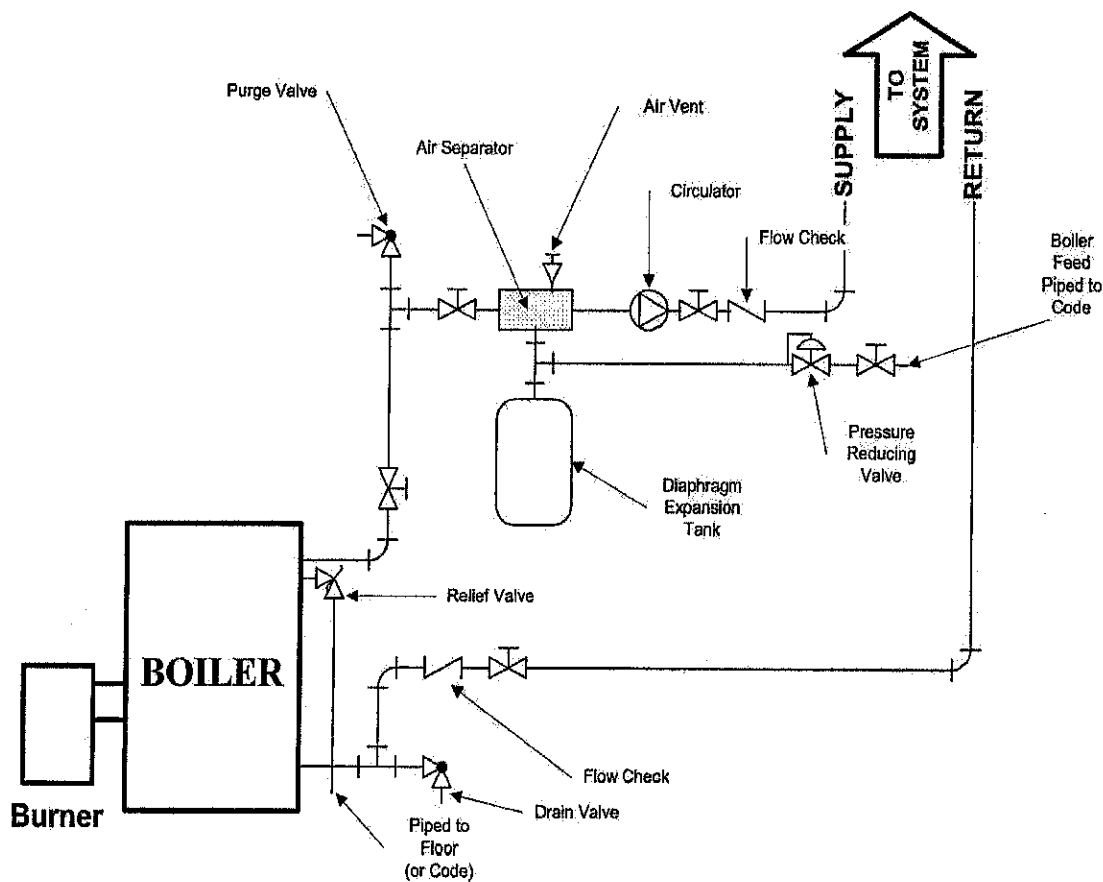


Figure 2

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

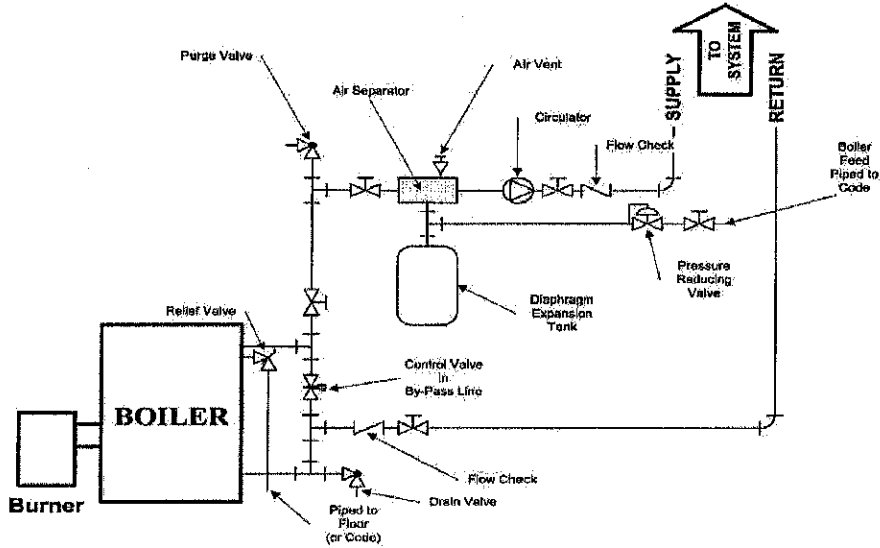


Figure 3

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

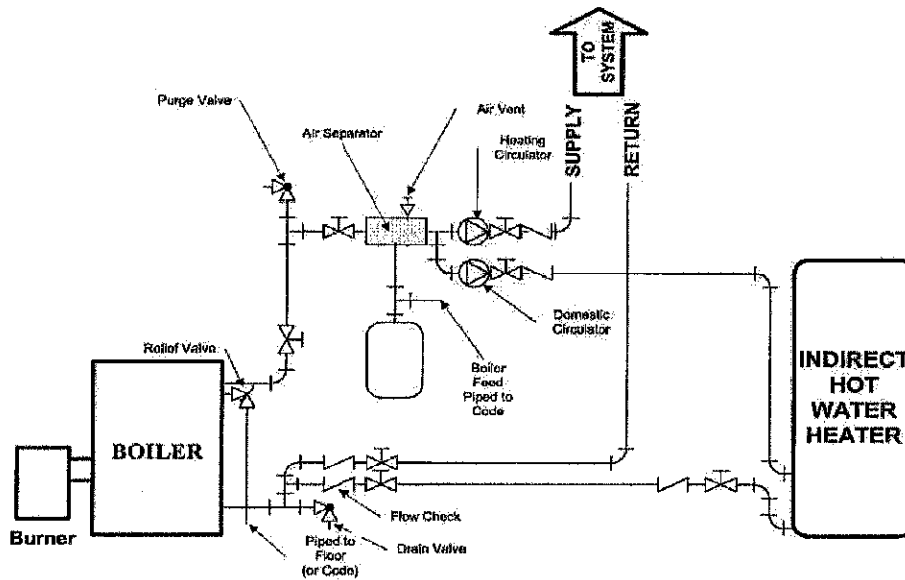
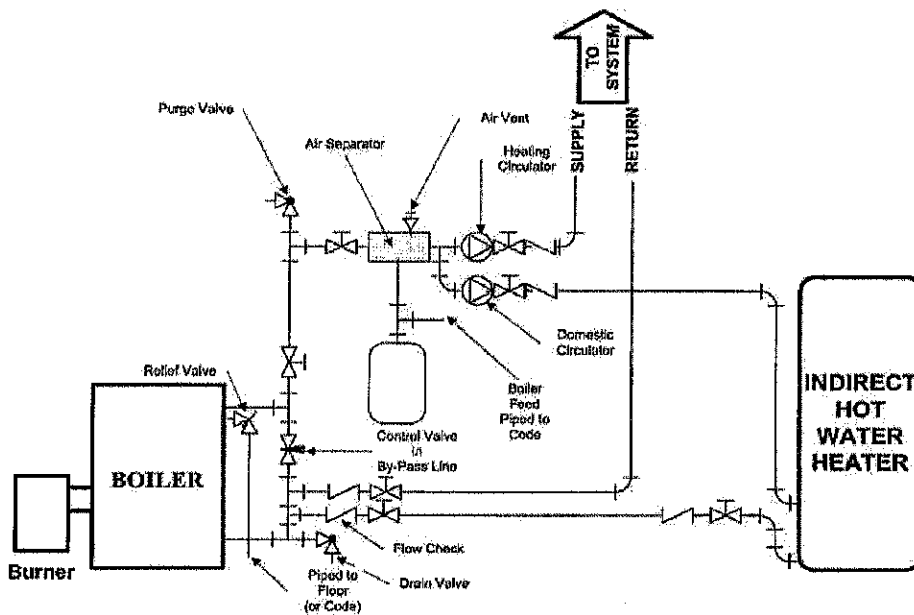


Figure 4

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



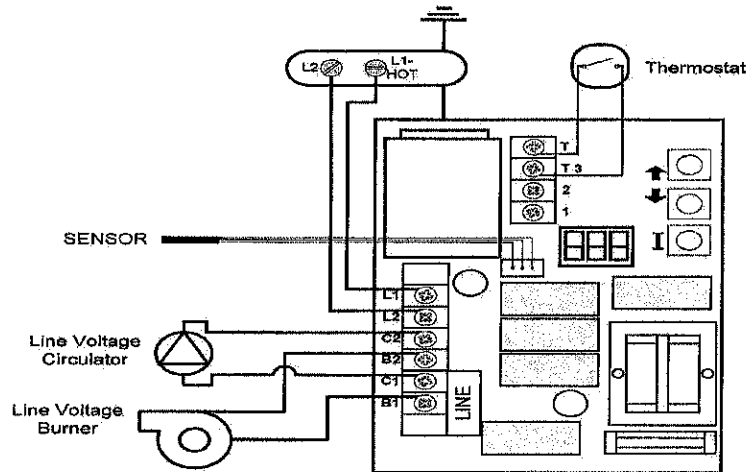
5.0 ELECTRICAL WIRING

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. Connections should be carried out in accordance with this manual and only by qualified individuals.

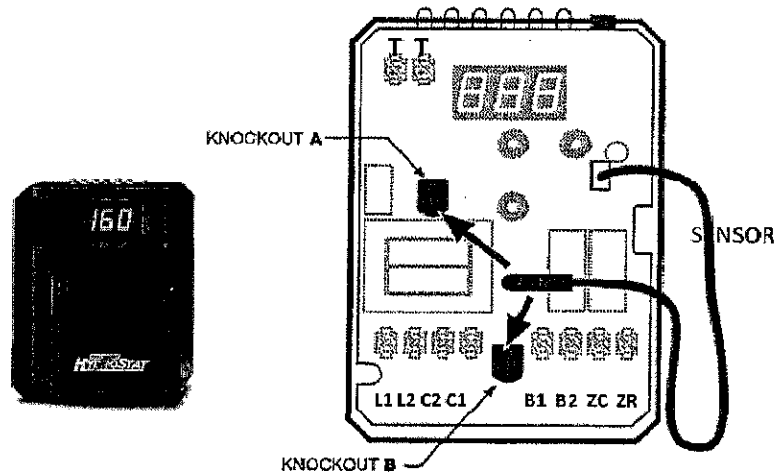
- The boiler and burner should only be operated on 120 Vac.
- Field connections should be properly sized and protected with a minimum **15A** fuse or circuit breaker.
- A separate fused disconnect must be installed as required by code so that power can be shut off for servicing.
- The boiler must be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

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

Typical wiring for line voltage oil burner with Honeywell L7248 and one heating zone.



Typical wiring for line voltage oil burner with Fuel Smart HydroStat 3250 and one heating zone



Insert sensor ALL THE WAY into well through the knockout (A or B) you have chosen

WARNING

For Canadian application, see page 15 & 16 for proper wiring with a Block Vent Shut-Off

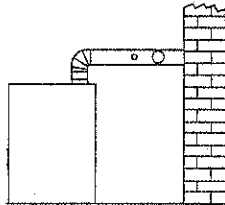
6.0 CHIMNEY INFORMATION

Natural Draft Applications

CAUTION: Oil 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 B139. 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 same holds true for 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.

Condensation

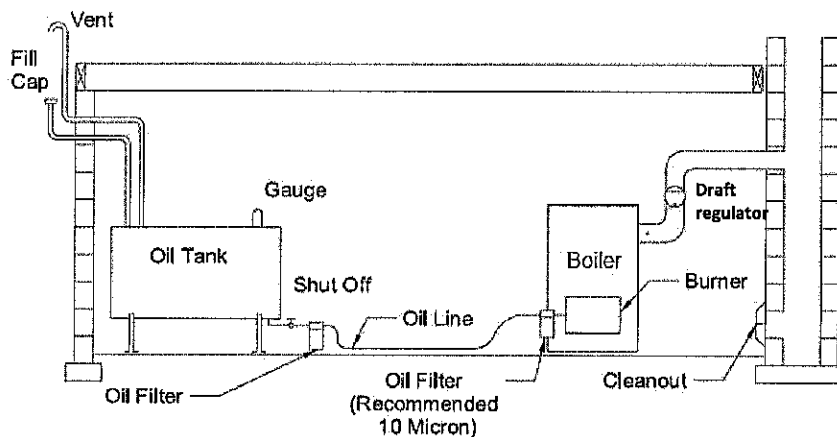
The B*C Series boiler is a high efficiency boiler and as a result improper venting can lead to condensing temperatures in the chimney connector and the venting system. If condensing temperatures of below 250°F NET are reached in the chimney connector, then additional steps to insure proper draft must be taken. 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 Industries.

7.0 FUEL SYSTEM

The fuel system piping must comply with the pump manufacturers' specifications which are included with the burner. In addition, all fuel system piping must comply with local codes and ordinances.

- The quality of your fuel oil is of **great importance**. For most instances your burner is designed to burn clean water free #2 fuel oil.
- The oil supply line should be constructed of seamless heavy wall copper tubing with flared fittings. Only oil resistant pipe dope should be used on threaded connections. The use of **Teflon Tape** will void manufacturers' warranty. Lines must be airtight, clean and free of kinks. All joints and threaded fittings must be checked for leaks. A vacuum gauge should be employed when testing the installation. It is recommended that older fuel lines be replaced.
- A two pipe system should only be used when the oil supply is well below the pump. A return fuel line may be used on inside installations where the tank level is below the level of the burner. The return line must be equal in diameter to the suction line. The minimum size for the oil line is 3/8" copper tubing.
- A **oil de-aerator** is recommended when the oil supply line is located 5' below the burner.
- Shut off valves must be installed in the supply line at or near the oil storage tank and at the burner in compliance with all codes. Inspect the shut off valve spindle packing for tightness to insure that there are no air leaks. The valve must always be shut off if the burner is shut down for an extended period of time. The burner should be tagged to indicate that the fuel supply has been closed off. The electrical circuit to the burner must be cut off by removing the fuse or circuit breaker to insure that no operation of the burner will occur while the fuel supply is shut off.
- Only fuel storage tanks bearing the Underwriters Laboratories label and accessories approved as prescribed by local code may be used.

REAR FLUE BOILER ILLUSTRATION



OIL TANK AND PIPING

COMBUSTION & VENTILATION AIR

Install openings and ductwork to the boiler room providing fresh out-side combustion and circulating air, as installation code require by Canada CSA B139. 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 ceiling and floor. Oil burners must have sufficient air to allow vent system to operate properly.

8.0 ACCESSORY INSTALLATION

BLOCKED VENT SWITCH (BVS0) FOR CANADIAN APPLICATION ONLY

Oil-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.

NEVER reset the switch unless the cause of the blockage has been corrected.

Installation (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.

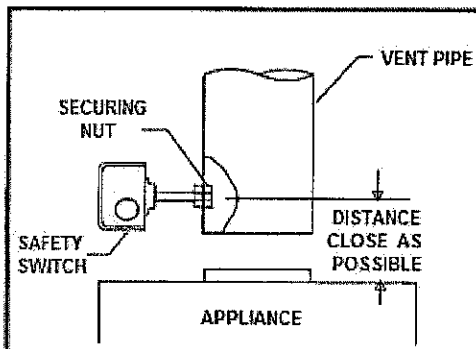


Figure 1- Illustration Granby Industries

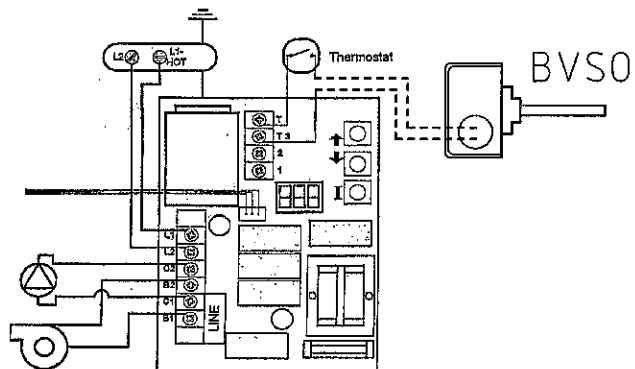


Figure 2- BVS0 wiring diagram with L7248 Aquastat

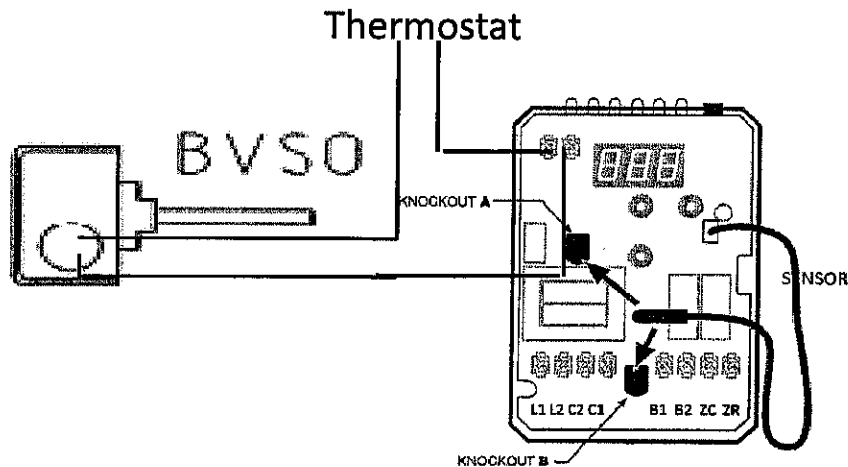


Figure 3- BVSO wiring diagram with Fuel Smart HydroStat 3250 control

Wiring BVSO (Figure 2 or figure 3)

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 safety switch (BVSO) in series with the thermostat and the boiler control 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.

9.0 BURNER INSTALLATION AND SETTING

ASSEMBLY & INSTALLATION OF BURNER

ASSEMBLY

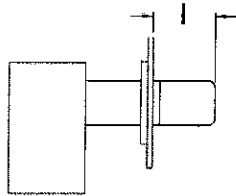
Check that the burner model is correct for boiler rating required. Assemble as per burner manufacturer's instructions.

SELECT NOZZLE Select oil input, nozzle and burner configuration as shown on boiler operating decal.

INSTALL NOZZLE Install selected nozzle, check for clean seating and tighten in nozzle adaptor.

ELECTRODES See burner manufacturer's instructions for correct setting

INSERTION



BURNER INSERTION (I)		
	in	mm
RIELLO	3	76

MOUNT BURNER Tighten top nut first so burner tips down slightly. The burner is always installed in an upright position by four (4) nuts.

PUMP BY-PASS PLUG For one pipe system factory setting (no plug).

SET BURNER FOR EFFICIENT OPERATION

BURNER SETTING Use burner settings in the table on page 20 or operating decal as a guide to set burner, particularly for nozzle changes. **Those settings are only starting points for the adjustments and are not meant as final settings.**

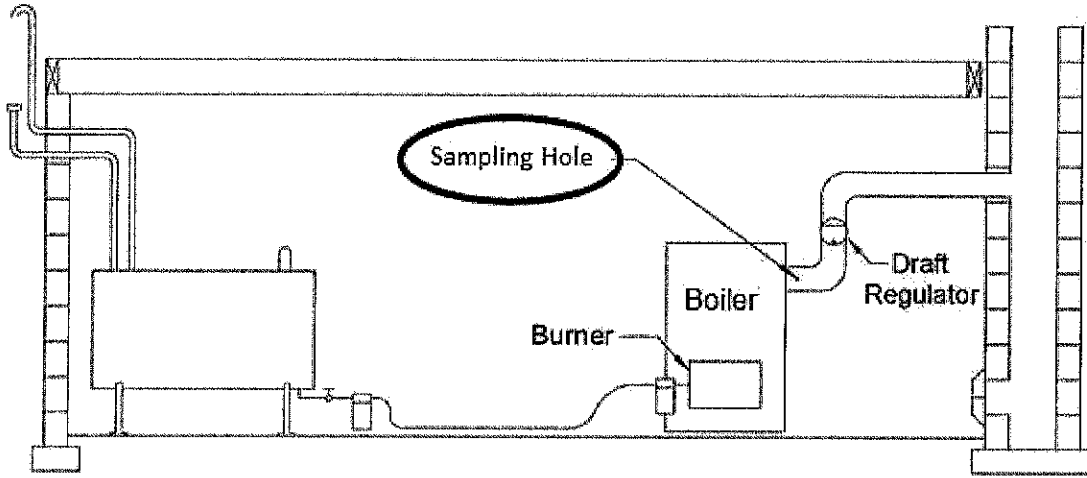
PUMP PRESSURE Refer to the table on page 20 or operating decal.

AIR SETTING Use air settings on page 20 as a guide to set air adjustment. **Those settings are only starting points for the adjustments and are not meant as final settings.**

DRAFT REGULATOR The draft regulator should be installed at least 3 flue pipe diameter from breeching or elbow of the furnace.

SAMPLING HOLE

On smoke/vent pipe, drill a 3/8" round opening. The hole should be at least 2 flue pipe diameter from breeching or elbow of the boiler.

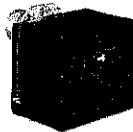


REAR FLUE BOILER ILLUSTRATION

DRAFT PRESSURE

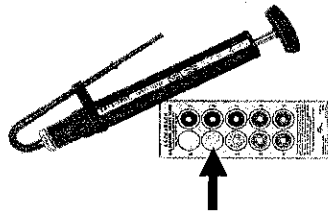
Using an accurate draft meter; adjust the draft control to obtain -0.03" w.c. draft pressure at the breech sampling hole. The draft regulator's adjustments should be made after boiler has been running under heating mode for at least 5 minutes

All your tests must be done with the burner cover on



**COMBUSTION
SETTING/
EFFICIENCY**

After 10 minutes of normal operation, **take a smoke test** and adjust the burner to obtain a reading of "1" on the smoke scale.

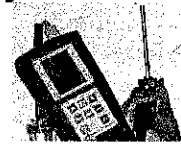


To reach the maximum smoke test value, a 10 full slow steady pump action is required.

1. Take a CO₂ test and note the result

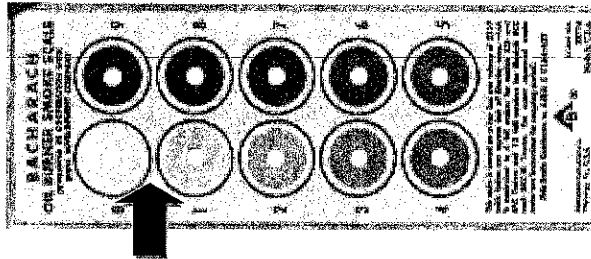
CO₂ test can be done mechanically or electronically

18 full slow
steady pump action



2. Open the air band adjustment on the burner
to reduce your CO₂ reading by 1%

You now have a perfect "slight trace" of smoke.



Relation between % of CO₂ and O₂

CO ₂ (%)	O ₂ (%)	Excess Air (%)
13.5	2.6	15.0
13.0	3.3	20.0
12.5	4.0	25.0
12.0	4.6	30.0
11.5	5.3	35.0
11.0	6.0	40.0

10.0 TECHNICAL INFORMATION

B*C Cast Iron Boiler specifications

Riello Burner

Unit Model
 Number of sections
 Firing Rate (USGPH)
 Input (BTU/h)
 Output (BTU/h)
 Nozzle
 Pump Pressure (psi)
 Turbulator Setting
 Air Gate Adjustment
 Energy Star Approved
 AFUE (%)
 CO2 (%)

	40 F3		40 F5		40 F10	
	B*C – E6-0085-**	B*C – E7-0121-**	B*C –E7-0152-**	B*C – E7-0174-**	B*C – E8-0194-**	B*C – E8-0224-**
	3 SECTIONS	4 SECTIONS	5 SECTIONS	6 SECTIONS	7 SECTIONS	8 SECTIONS
Firing Rate (USGPH)	0.60	0.80	1.25	1.39	1.60	1.80
Input (BTU/h)	84,000	112,000	175,000	194,000	224,000	252,000
Output (BTU/h)	73,000	98,000	152,000	167,000	195,000	222,000
Nozzle	0.50 70B	0.65 60B	1.00 60W	1.10 60W	1.35 45B	1.50 45B
Pump Pressure (psi)	160	145	160	160	145	145
Turbulator Setting	0	1	3	2	1	2
Air Gate Adjustment	3.2	2.8	3.0	4.8	3.0	3.0
Energy Star Approved	YES	YES	YES	YES	YES	YES
AFUE (%)	87.4	87.4	87.3	87.1	87.4	87.5
CO2 (%)	13	13	13	13	13	13

(*) In the Unit Model number, is specific information of the product for administration only.

** = 3H for Honeywell control L7248 (high limit only, cold start application)

** = 3L for Fuel Smart HydroStat 3250 (high limit cold start operation or low limit operation)

GRANBY B*C CAST IRON SERIES

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

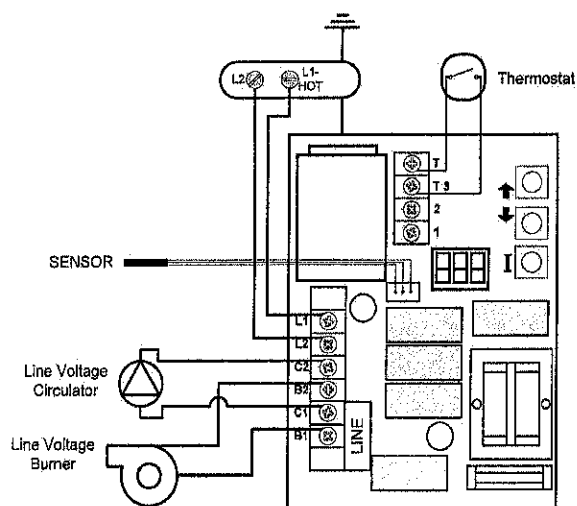
WARNING: Do not operate if any controls have been submerged. Contact a qualified technician for inspection prior to use.

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.
- Check to insure that clean quality #2 heating oil has been used to fill your storage tank.
- Open all manual shutoffs throughout the system.
- Set operating controls to the recommended settings.
- Follow the 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 and lowest fuel costs.
- 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 L7248 Aquastat



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

TROUBLE SHOOTING THE HONEYWELL L7248 AQUASTAT

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.

Error Codes

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	Check 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*

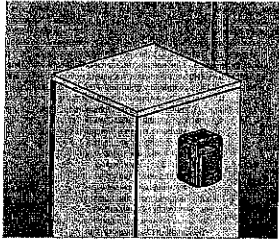
System Condition	Diagnostic Condition	Check	Action
Boiler is cold, house is cold.	Display is OFF	120 V a/c System power.	Turn system power on
	Display is ON	24 V a/c T-T	No 24 V; replace control
		24V present; disconnect thermostat, short T-T 120 V a/c at B1-B2	Boiler starts, check wiring and thermostat. . If no, replace control. . If yes, check burner and wiring.
Boiler is not, 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:

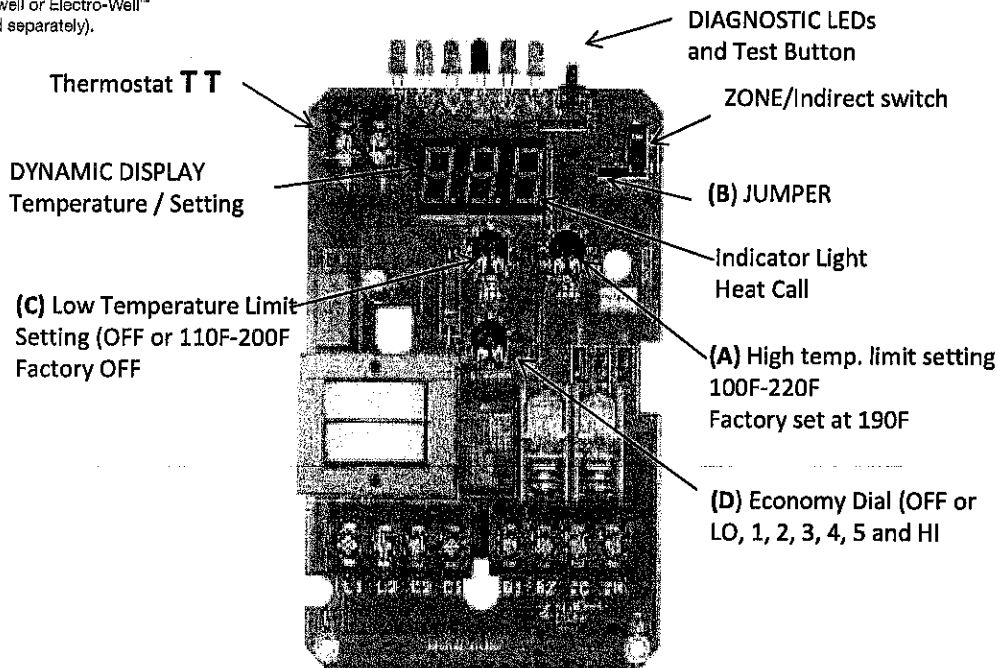
- Set room thermostat at least 10°F above room temperature.
- With burner operating, drain boiler slowly until the burner shuts off. This shut off should occur when the water level falls below the low water cut off probe.
- Check to be sure the burner shut off is not due to an open limit or flame safety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

11.3 HydroStat 3250 Control



Standard Mounting
Control attaches directly to
Immersion well or Electro-Well™
(sold separately).

Setting the control



Setting the High Limit

The high limit is factory set at 190°F. To adjust, turn the HI TEMP Dial **(A)** until the desired setting is displayed. (Setting range: 100°-220°F)

Setting the Low Limit

The low limit is designed to maintain temperature in boilers equipped with tankless coils used for domestic hot water. The low limit is factory set to OFF. Prior to adjusting, remove the jumper (not equipped on all units) **(B)**. Then turn the LO TEMP Dial **(C)** clockwise until the desired temperature is displayed. For proper operation, the low temperature limit setting should be at least 10° below the high limit setting. **NOTE:** For cold start operation, the low limit must be turned OFF. **IMPORTANT:** If low limit temperature cannot be set above 140°F, remove jumper **(B)**. (Setting range: OFF or 110°-200°F).

Setting the Economy Feature

The Economy Feature is factory set for a 1 zone heating system. To adjust, turn the ECONOMY Dial **(D)** until the number displayed equals the number of heating zones. **Do not include indirect water heaters in the number of heating zones.** The Economy Feature conserves fuel by reducing boiler temperature (see "How Thermal Targeting Works" below). If the heating system is unable to supply needed heat to the house, the ECONOMY Dial should be turned to a lower setting (example: In a three zone house, turn the dial to 2 or 1). Conversely, if the boiler provides adequate heat, added fuel savings can be achieved by selecting a higher setting

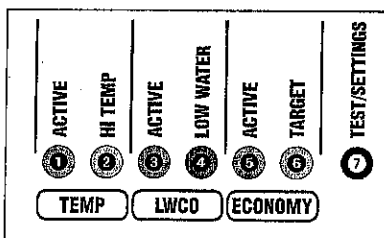
LED LEGEND and TEST / SETTING BUTTON

SYSTEM START-UP

At initial start up, with the Economy Feature active, the control establishes a 145°F target temperature. To test the high limit shut-off function, the Economy Dial must be turned to OFF. Once tested, restore the Economy setting. If the heating demand is high, the target will increase over time to satisfy the heat load. **NOTE:** To reduce the potential for condensing, the control will allow the boiler to heat to 120°F prior to energizing the circulator.

HOW THERMAL TARGETING WORKS

Thermal Targeting technology analyzes thermostat activity and continually evaluate how much heat the house requires. When it is very cold outside, the heat demand is high and the Fuel Smart HydroStat will raise the boiler's Target temperature to provide needed heat to the home. When the outside temperature is milder, the heat demand is lower. During these periods, the Fuel Smart HydroStat will lower the boiler's Target temperature – saving fuel – while continuing to provide comfort to the house.



1 TEMP ACTIVE Indicates that the Fuel Smart HydroStat control is powered and that the temperature function is active.

2 TEMP HI TEMP Illuminates when the boiler water temperature reaches the high limit setting. It will remain lit until the water temperature falls 10°. The Fuel Smart HydroStat prevents burner operation while this LED is on. See Differential explanation on page 7.

3 LWCO ACTIVE Indicates that the low water cut-off (LWCO) function of the Fuel Smart HydroStat is active. When the control is installed with a Hydrolevel Electro-Well, this LED will be on at all times when the control is powered. **IMPORTANT:** If the control is installed with a well other than the Electro-Well, this LED will not illuminate indicating that the control is not providing low water cut-off functionality.

4 LWCO LOW WATER Illuminates if the boiler is in a low water condition. The Fuel Smart HydroStat will prevent burner operation during this condition. **IMPORTANT:** The system must be checked by a qualified heating professional prior to resuming operation.

WARNING: DO NOT ADD WATER UNTIL THE BOILER HAS FULLY COOLED.

5 ECONOMY ACTIVE Indicates that the Thermal Targeting function is active and the Fuel Smart HydroStat will reduce boiler temperature to conserve fuel. The Economy feature is activated using the ECONOMY dial. (See "How Thermal Targeting Works" on page 7 for more information).

6 ECONOMY TARGET When the Economy feature is active, the Fuel Smart HydroStat continually sets target temperatures below the high limit setting to maximize fuel efficiency. When the boiler water reaches the target temperature, the LED illuminates and the burner will shut

down. The boiler water will continue to circulate and heat the house as long as the thermostat call continues. The LED will stay lit until the boiler temperature drops below the differential set point at which point the boiler will be allowed to fire again. See Differential explanation on page 7.

NOTE: This LED illuminates regularly during normal boiler operation.

7 TEST/SETTINGS Button

To Test Low Water Cut-Off: Press and hold the Test/Settings button for 5 seconds. The display will read LCO.

LWCO TEST LCO

The red Low Water light should illuminate and the burner circuit (B1 and B2) should de-energize. **NOTE:** The control must be installed with a Hydrolevel Electro-Well for low water cut-off functionality. ---See page 25 for more details

To View Current Settings: Press and release the Test/Settings Button in short intervals to sequentially display the following settings:

HIGH LIMIT SETTING HL
 ▼
 LOW LIMIT SETTING LL
 ▼
 ECONOMY SETTING ECO
 ▼
 CURRENT TARGET TEMPERATURE 000
 ▼
 PRE-PURGE SETTING Pur

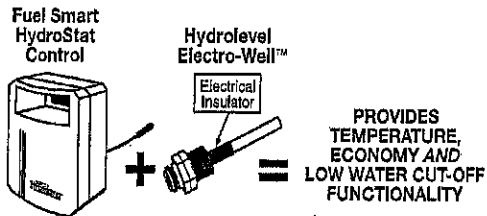
The display will return to boiler temperature (default) if Test/Settings Button is not pressed for 5 seconds.

(sold separately). The low water cut-off function is automatically activated when installed on an Electro-Well™.

IMPORTANT: The control will not provide low water cut-off protection when installed on a standard immersion well.

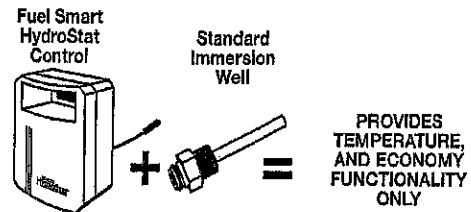
NOTE: Do not use heat-conducting grease.

Fuel Smart HydroStat installed with Hydrolevel Electro-Well™



IMPORTANT: For proper operation of the low water cut-off function, there must be a minimum of 1/2" clearance between the copper well tube and any surface within the boiler.

Fuel Smart HydroStat installed with standard immersion well



NOTE: When installed on a standard immersion well, the "LWCO Active" LED will not illuminate.

SPECIFICATIONS FUEL SMART HYDROSTAT MODEL 3250

Input voltage	120 VAC, 60 HZ
Burner contacts	7.4 FLA, 44.4 LRA@120 VAC
Circulator contacts	5.8 FLA, 34.8 LRA@120 VAC
Operating range – low limit	Off or 110°F - 200°F (43°C - 93°C)
Operating range – high limit	100°F - 220°F (38°C - 104°C)

Trouble Shouting the HydroStat 3250



Temperature Display Exceeds High Limit Setting	Under normal operation, boiler temperature will continue to rise after the control shuts off the burner. This condition, known as "thermal stacking", results from hot boiler surfaces continuing to release heat into the boiler water.
Boiler Will Not Maintain Low Limit Temperature	Check for overlapping high temperature setting. If the high limit setting is set below the low limit setting, the control will default to the high limit setting and the corresponding high limit differential setting.
House Will Not Get or Stay Warm	1. Check for air-bound radiators. 2. Check thermostat settings including heat anticipator settings (common on non-digital thermostats). 3. Check the Economy setting. The Economy feature, much like outdoor reset controls, lowers average boiler temperature and can slow or, in some cases, prevent the house from coming up to temperature. Move to a lower setting (see "Setting the Economy Feature" on page 7).
Circulator Contacts C1 and C2 Not Energized on Call for Heat	Check to see that boiler water is at or above 120°F. On a call for heat, the control will not permit the circulator to operate if the boiler water temperature is below 120°F.

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.

- In addition to higher efficiencies the B*C Boiler feature removable baffles

Model	# Of Baffles	nd 2 Pass	rd 3 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. The temperature at the entrance of the chimney can be increased by insulating the flue-pipe between the furnace and the chimney base. 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

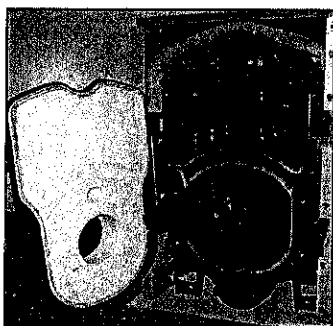
In the event of a problem with the heating system the homeowner should perform the following limited activities.

- 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:

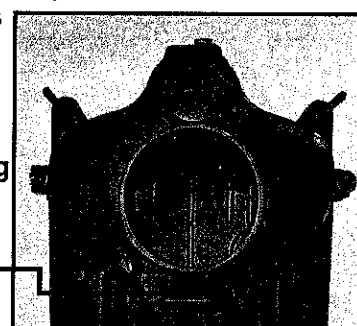
- Remove the 2 front panels by sliding it upwards to release and then pull to remove.
- Open the front swing door by removing the four bolts; this will expose the chamber area as well as the second and third passes. **(A)**
- Remove the stainless steel baffles. With a cleaning brush clean the boiler 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.

12.2 BURNER NOTES

Your burner manufacturer has supplied instructions for servicing and maintenance should be performed as instructed. In addition, the following fuel and related items should be serviced on a regular basis:

- Service fuel filters and fuel unit.
- Service burner housing and fan.
- **Replace nozzle** using only the size and type recommended by the boiler manufacturer.
- Service ignition system.
- Perform testing and check for proper operation of the primary control.

12.3 PERFORM COMBUSTION TEST

The burner must be adjusted to insure proper CO₂ levels with no more than a slight trace of Smoke. Continue adjustments until the proper level is achieved. **See page 18, 19 and 20.**

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	ÚST SAC	Y	SETSCREW M8 x 16
58	BOILER DATA PLATE	Z	SETSCREW M8 x 30

PARTS NOT ILLUSTRATED

AA-1	HONEYWELL L7248 – AQUASTAT	CC	PRESSURE VALVE (30 lbs)
AA-2	HYDROSTAT 3250 -- AQUASTAT		
BB	PRESSURE – TEMPERATURE GAGE	DD	DRAIN VALVE

14.0 START-UP TEST RESULTS

Model: _____ Serial Number: _____

Boiler, # sections

Date of installation: _____

Installer (name & address): _____

TEST RESULTS

Size of unit (Btu/h): _____

Nozzle: _____ Oil Pressure (psi): _____

Chimney size _____

Direct vent system (DVS) _____

Burner adjustments: RIELLO F3 ___ BF3 ___ RIELLO F5 ___ BF5 ___ RIELLO F10 ___

Turbulator: _____

Air Gate: _____

Smoke result: #0 _____ TRACE _____

Combustion Results: _____ CO₂ %

Chimney draft: _____ " W.C.

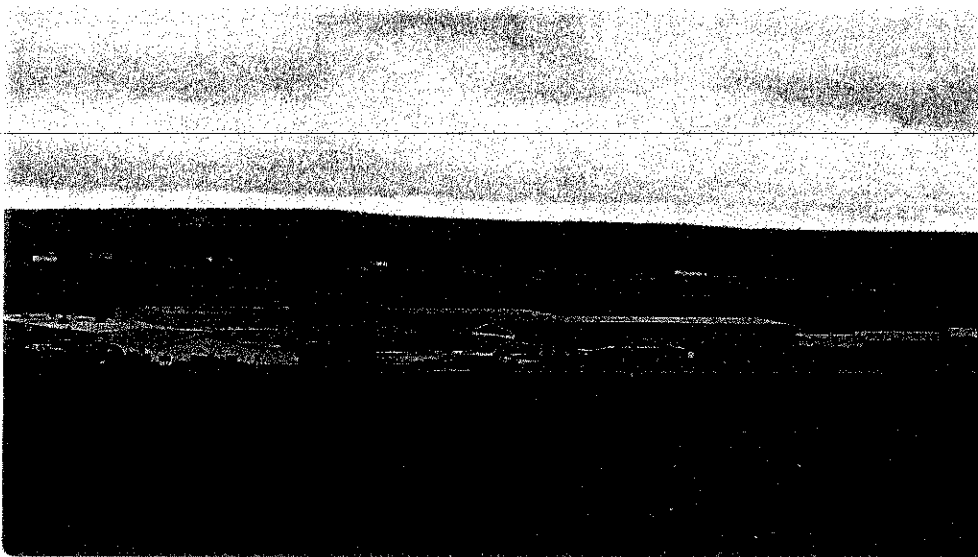
Ambient temperature: _____ °F

Gross flue temperature: _____ °F



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.