

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK



CITY OF PORTLAND BUILDING PERMIT

PERMIT ISSUED

This is to certify that MICHAEL P & HIGHT

Located At 114 FROST

Job ID: 2011-02-485-HVAC

CBL: 195 - - C - 005 - 001 - - - - - City of Portland

has permission to install Pensotti Blueline Boiler
provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statues of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED.

A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be

Fire Prevention Officer

Code Enforcement Officer / Plan Reviewer

THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY.

PENALTY FOR REMOVING THIS CARD

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, FAX: (207) 8716

PERMIT ISSUED

Job No: 2011-02-485-HVAC	Date Applied: 2/24/2011	CBL: 195 - - C - 005 - 001 - - - - -		
Location of Construction: 114 FROST STREET	Owner Name: MICHAEL P HIGHT	Owner Address: 114 FROST ST PORTLAND, ME - MAINE 04103	Phone:	
Business Name:	Contractor Name: Libby, Daniel C	Contractor Address: 271 Milt Brown RD STANDISHMAINE04084	Phone: 642-4768	
Lessee/Buyer's Name:	Phone:	Permit Type: HVAC - HVAC	Zone: R-3	
Past Use: Single family	Proposed Use: Single family - install an oil burner	Cost of Work: 9000.00	CEO District:	
		Fire Dept: <i>MA</i>	Inspection: Use Group: Type:	
Proposed Project Description: 114 Frost St - install oil burner		Pedestrian Activities District (P.A.D.)		
Permit Taken By:		Zoning Approval		

MAR 1 8
City of Portland

Approved
Denied
N/A
Signature: *[Signature]*

Special Zone or Reviews	Zoning Appeal	Historic Preservation
<input type="checkbox"/> Shoreland	<input type="checkbox"/> Variance	<input checked="" type="checkbox"/> Not in Dist or Landmark
<input type="checkbox"/> Wetlands	<input type="checkbox"/> Miscellaneous	<input type="checkbox"/> Does not Require Review
<input type="checkbox"/> Flood Zone	<input type="checkbox"/> Conditional Use	<input type="checkbox"/> Requires Review
<input type="checkbox"/> Subdivision	<input type="checkbox"/> Interpretation	<input type="checkbox"/> Approved
<input type="checkbox"/> Site Plan	<input type="checkbox"/> Approved	<input type="checkbox"/> Approved w/Conditions
<input type="checkbox"/> Maj <input type="checkbox"/> Min <input type="checkbox"/> MM	<input type="checkbox"/> Denied	<input type="checkbox"/> Denied
Date: <i>OK</i> <i>2/24/11</i> <i>ABM</i>	Date:	Date: <i>ABM</i>

CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT	ADDRESS	DATE	PHONE
RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE		DATE	PHON

PERMIT ISSUED

BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693 (ONLY)

or email: buildinginspections@portlandmaine.gov

City of Portland

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months. If the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.**

1. Final - Residential

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.



PORTLAND MAINE

PERMIT ISSUED

Strengthening a Remarkable City, Building a Community for Life • www.portlandmaine.gov

Director of Planning and Urban Development
Penny St. Louis
City of Portland

Job ID: 2011-02-485-HVAC

Located At: 114 FROST

CBL: 195 - - C - 005 - 001 - - - -

Conditions of Approval:

Building

1. Installation shall comply with 2003 International Mechanical Code and State of Maine Oil and Solid Fuel Board Laws and Rules.
2. This appliance/stove shall be installed, operated and maintained per the manufacturers specifications and the UL listing.

Job Summary Report
Job ID: 2011-02-485-HVAC

115-C-006 R-3
new house 121 Frost St

Report generated on Feb 25, 2011 11:37:14 AM

Page 1

Job Type:	HVAC	Job Description:	114 Frost St	Job Year:	2011
Building Job Status Code:	Initiate Plan Review	Pin Value:	734	Tenant Name:	
Job Application Date:		Public Building Flag:	N	Tenant Number:	
Estimated Value:	9,000	Square Footage:			
Related Parties:		MICHALE P HIGHT		<i>new house - permit # 10-0001</i>	<i>Property Owner</i>
		Dan Libby - Daniel Libby			MECHANICAL CONTRACTOR

Job Charges

Fee Code Description	Charge Amount	Permit Charge Adjustment	Net Charge Amount	Payment Date	Receipt Number	Payment Amount	Payment Adjustment Amount	Net Payment Amount	Outstanding Balance
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Location ID: 28552

Location Details

Alternate Id	Parcel Number	Census Tract	GIS X	GIS Y	GIS Z	GIS Reference	Longitude	Latitude
H30835	195 C 005 001		M				-70.302828	43.660656

Location Type	Subdivision Code	Subdivision Sub Code	Related Persons	Address(es)
1				114 FROST STREET WEST

Location Use Code	Variance Code	Use Zone Code	Fire Zone Code	Inside Outside Code	District Code	General Location Code	Inspection Area Code	Jurisdiction Code
SINGLE FAMILY		NOT APPLICABLE					DISTRICT 6	DEERING-ROSEMONT

Structure Details

Structure: Single Family

Occupancy Type Code:

Structure Type Code	Structure Status Type	Square Footage	Estimated Value	Address
Single Family	0			114 FROST STREET WEST

Longitude	Latitude	GIS X	GIS Y	GIS Z	GIS Reference	User Defined Property	Value
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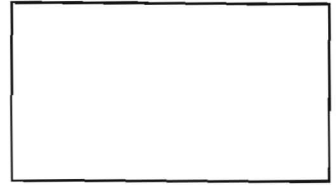
Permit #: 20111543

Permit Data



FILL IN AND SIGN WITH INK

APPLICATION FOR PERMIT HEATING OR POWER EQUIPMENT



To the INSPECTOR OF BUILDINGS, PORTLAND, ME.

The undersigned hereby applies for a permit to install the following heating, cooking or power equipment in accordance with the Laws of Maine, the Building Code of the City of Portland, and the following specifications:

Location / CBL 195-C-5- Use of Building Single Family Date 2-23-11
 Name and address of owner of appliance 114 Frost St Portland Me.
 Installer's name and address Dan Kelly
271 Mill Brown Rd Steadish 04084 Telephone 207-640-4768

Location of appliance:
 Basement Floor
 Attic Roof

Type of Fuel:
 Gas Oil Solid

Appliance Name: _____
 U.L. Approved Yes No

Will appliance be installed in accordance with the manufacture's installation instructions? Yes No

IF NO Explain: _____

The Type of License of Installer:
 Master Plumber # _____
 Solid Fuel # _____
 Oil # MS 2000 5654
 Gas # _____
 Other _____

Type of Chimney:
 Masonry Lined
 Factory built _____

Metal
 Factory Built U.L. Listing # _____

Direct Vent
 Type _____ UL# _____

Type of Fuel Tank
 Oil
 Gas

Size of Tank _____

Number of Tanks _____

Distance from Tank to Center of Flame _____ feet.

Cost of Work: \$ 9000.00

Permit Fee: \$ _____

6541

Approved

Approved with Conditions

Fire: _____
 Ele.: _____
 Bldg.: _____

See attached letter or requirement

Inspector's Signature _____ Date Approved _____

Signature of Installer Dan Kelly

FOR FURTHER TECHNICAL INFORMATION CONTACT:

PNA, Inc.
242 Miller Street
PO Box 8085
Bangor, ME 04402
207-942-3636

RECEIVED

FEB 24 2011

Dept. of Building Inspections
City of Portland Maine

This manual was prepared by
FIREDRAGON ENTERPRISES
132 Lowell Street
Arlington, MA 02474-2756
888-443-2825

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PENSOTTI BLUELINE Series Boiler Specifications

BOILER MODEL	NO. OF SECTIONS	LENGTH (inches)	WEIGHT (pounds)	WATER CONTENT (us/gal)	SUPPLY OUTLET (inches)	RETURN INLET (inches)
BL-3	3	15.6	256	4.22	1-1/4"	1-1/4"
BL-4	4	19.5	322	5.28	1-1/4"	1-1/4"
BL-5	5	23.5	388	6.34	1-1/4"	1-1/4"
BL-6	6	27.4	454	7.40	1-1/4"	1-1/4"
BL-7	7	31.3	524	8.45	1-1/4"	1-1/4"

BOILER MODEL	IBR BURNER CAPACITY Oil Input		DOE HEATING CAPACITY MBH	IBR NET WATER RATING MBH	RATING % CO2	CHIMNEY OR VENT SIZE	AFUE
	GPH	MBH					
BL-3	.70	97	82	71	13.2	5" X 18'	82.6
BL-4	1.00	137	117	102	13.4	6" X 18'	83.1
BL-5	1.25	177	151	131	13.5	6" X 18'	83.6
BL-6	1.55	217	186	162	13.6	7" X 18'	84.0
BL-7	1.85	257	220	191	13.8	7" X 18'	84.5

PENSOTTI BLUELINE Series Burner Specifications

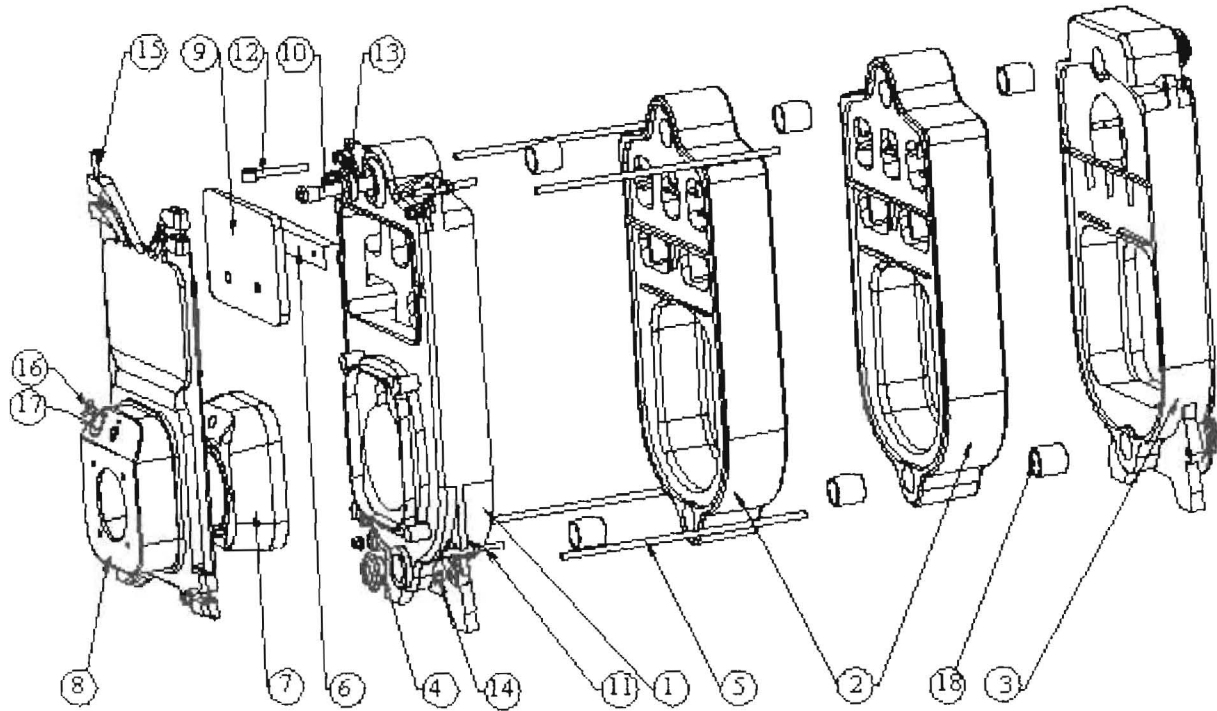
PENSOTTI / RIELLO SPECIFICATIONS

BOILER MODEL	BURNER MODEL	NOZZLE SIZE	PUMP PRESSURE (psi)	INPUT (Us/gph)	OVERFIRE DRAFT	TURBULATOR SETTING	AIR GATE SETTING
BL-3	40 F-3	.50-60-SS or W	180	.70	+0.02	.5	3.0
BL-4	40 F-5	.75-60-SS or W	185	1.00	+0.03	.5	3.0
BL-5	40 F-5	1.00-60-SS or W	160	1.25		2.5	3.3
BL-6	40 F-5	1.20-60-SS or W	160	1.55	+0.04	3.5	5.5
BL-7	40 F-10	1.50-60-SS or W	170	1.85	+0.07	1.0	3.8

PENSOTTI / CARLIN SPECIFICATIONS

BOILER MODEL	BURNER MODEL	NOZZLE SIZE	PUMP PRESSURE (psi)	INPUT (Us/gph)	OVERFIRE DRAFT	HEAD BAR	AIR BAND OPENNING
BL-3	EZ1HP	.60-60-B	150	.70	+0.02	.60-.65	0.60
BL-4	EZ1HP	.85-60-B	150	1.00	+0.03	.85-1.00	0.85
BL-5	EZ1HP	1.00-60-B	150	1.25		.85-1.00	1.00
BL-6	EZ1HP	1.25-60-B	150	1.55	+0.04	1.10-1.25	1.25
BL-7	EZ2	1.75-60-A	100	1.75	+0.07	1.65-1.75	1.75

Pensotti BLUELINE Boilers



	DESCRIPTION	PART #				
		3 Section	4 Section	5 Section	6 Section	7 Section
1	FRONT SECTION			4230060		
2	INTERMEDIATE SECTION			4230560		
3	REAR SECTION			4230960		
4	HEXAGONAL IRON CAP			P410565		
5	TIE ROD	8584068	8584354	8584355	8584356	8584064
6	BAFFLE FOR FLUE INVERSION	P210526	P210527	P210527	P210528	P210528
7	BURNER INSULATION			4266000		
8	SWING DOOR			4231510		
9	UPPER DOOR INSULATION			4266001		
10	INSTRUMENT SUPPORT SHEATH	8564201	8564201	P270203	P270203	8564260
11	DOOR ANCHORING TIE ROD			8584101		
12	DOOR HINGE PLUG			4271703		
13	HEXAGONAL IRON CAP 1 1/4" M - 1 1/2" F			P410560		
14	M10 HEX NUT			P410567		
15	DOOR HINGE PIN			5571702		
16	BUTTERFLY SCREW FOR PEEPHOLE			P912510		
17	PEEPHOLE			P214526		
18	NIPPLE			P210008		

Service Information - Homeowner

Have your PENSOTTI BLUELINE boiler, oil burner, flue and venting system serviced at regular intervals by your PENSOTTI Dealer. Your dealer will recommend how often your PENSOTTI boiler should be serviced.

If a problem occurs, please check the following before calling your PENSOTTI Dealer:

1. Be sure there is oil in the tank and that all oil valves are open.
2. Be sure the thermostat is set above the room temperature.
3. Be sure all switches are on and that fuses are not blown.
4. **DO NOT TAMPER ANY FURTHER WITH THE UNIT, UNIT PIPING, and WIRING OR CONTROLS.**



Maintenance - Serviceman

Clean Boiler:

Boiler must be properly cleaned to maintain correct and efficient operation.

1. Turn off all electrical power to unit.
2. Remove fluepipe, open front door.
3. Remove rear boiler door and insulation.
4. Inspect combustion area and if necessary wire brush firesides and firepot.
5. Reclose all doors.
6. Replace fluepipe and seal all joints.

Clean Fuel System and Burner:

Fuel system and burner must be properly serviced to ensure safe and efficient operation. Check burner manual for proper servicing of burner supplied and that the following items are covered:

1. Service fuel filter(s) and fuel unit.
2. Service burner housing and fan.
3. Replace nozzle with correct type and size.
4. Service ignition system.
5. Service and check for proper operation of primary control.

Perform Combustion Test:

Adjust burner for proper operation ensuring the best CO₂ or O₂ with no more than a Trace of smoke. This may require several adjustments to the burner and additional readings after each adjustment.

9. Use of fuel storage tanks bearing the label of Underwriters Laboratories and approved accessories prescribed by local codes is required.



CRANKCASE OIL, WASTE OIL, OR GASOLINE SHOULD NEVER BE USED!

The danger of explosion and personal injury is VERY HIGH when GASOLINE is present in fuel source!

Never attempt to burn garbage or paper in the heating unit and remove all paper and rags from around the unit.

For your safety, do not store or use gasoline or other flammable vapors or liquids in the vicinity of this or any other heating appliance.

Start Up Procedure

1. Make certain service switch is off.
2. Check all fittings and wiring.
3. Be certain the boiler and heating system are completely filled with water. Purge all air from system and ensure that proper system pressure is obtained. Twelve (12) PSIG-Minimum.
4. Make certain that correct voltages have been applied to all circuits.
5. Check to make sure that oil storage tank is filled with clean #1 or #2 heating oil.
6. Make sure that all manual shutoffs are open in the system.
7. Set operating controls to desired or recommended settings.
8. Following the burner manufacturer's instructions set the oil burner for proper light off and starting. Using accurate combustion test equipment set the burner for proper "steady-state" operation. Use of instruments is necessary to ensure proper operation and to achieve maximum efficiency that will yield the lowest possible fuel and operating costs.
9. Leave all consumer information, the burner manual, the control manual and this manual on the job. Make sure your customer is aware of them.

NOTE: Before locking the adjuster in its final position, make sure that the final firing rate has been set and that all draft settings have been made and are final.

Roof Clearances

Standard roof clearances apply. It is the responsibility of the installer to ensure they are adequate.

Fuel System

Enclosed with each burner are the pump manufacturers' specifications, which the fuel system piping should conform to.

In addition the following suggestions are highly recommended.

1. All fuel system piping must meet local codes and ordinances.
2. The burner is designed to burn clean, water-free #1 or #2 heating oil only. Use of #1 is recommended where outside tanks are exposed to temperatures below zero (0) degrees F.
3. The oil supply line should be clean and free of kinks and restrictions.
An old (i.e. in excess of 15 years) fuel supply line should be replaced with new copper tubing. This will ensure a clean fuel supply.
4. Fuel lines must be airtight and be constructed of seamless heavy wall copper tubing and only flared fittings should be used. The use of Teflon tape is prohibited and will void manufacturers' warranties. Use only oil resistant pipe dope on all threaded connections. Check all joints and threaded fittings for leaks. Use a vacuum gauge to proof the installation.
5. The use of a two-pipe system should only be used when necessary and when the oil supply is well below the pump. A return fuel line may be used on an installation where the fuel level of the tank is below the level of the burner. The return line must be equal to the suction line. The minimum size oil line should be 3/8 in. copper tubing.
6. The use of a two-stage fuel unit or a device like the Tigerloop is recommended when the oil supply is located ten feet (10') below the burner.
7. The use of double filtration is recommended to ensure maximum longevity of the pump and nozzle. The use of a low micron paper filter is also recommended. The filter(s) should be properly sized to the Total Gear Suction Capacity (TGSC) of the pump in use. Leave the existing filter, normally found at the tank, in place. Fit the fuel suction line with a high quality paper throwaway cartridge type filter or line strainer. A rating of 5 micron to 10-micron maximum rating is recommended. The paper filter or strainer should be mounted on the casing of the boiler. This will allow the use of flexible fuel lines to be connected with adequate slack for easy removal of the oil burner or use of the swing door without disconnecting the fuel lines.
8. A shut-off valve must be installed in the fuel supply line located at or near the oil storage tank and at the burner in compliance with local codes. The shut-off valve spindle packing should be checked for tightness to eliminate potential air leaks into the fuel delivery system. Always keep the valve shut off if the burner is shut down for an extended period of time. Tag the burner to indicate that the fuel supply is closed and shut off the circuit breaker or remove the fuse from the electrical circuit to eliminate improper operation due to lack of fuel.

Draft Regulator

The PENSOTTI BLUELINE boiler does not normally require a barometric damper, but, it may be required when the draft in the venting system is stronger than required, and the burner is incapable of operating against a high negative over-fire pressure.

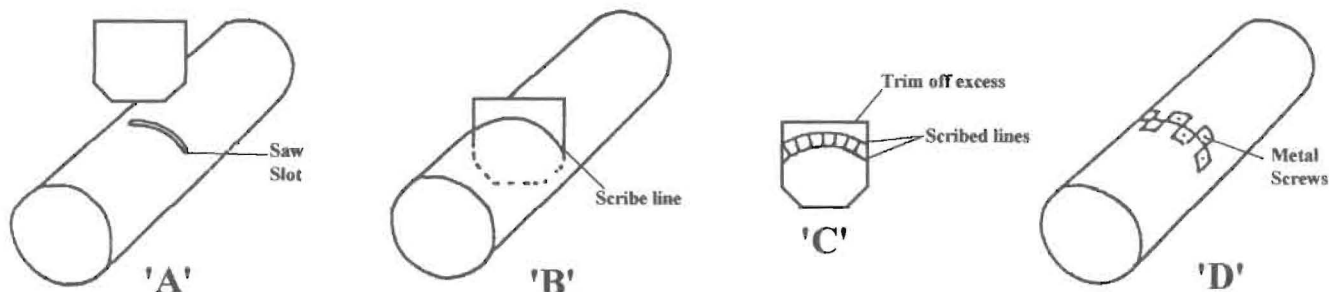


Figure 13

Neutral Point Pressure Adjuster

In some cases the chimney may produce draft that is too excessive and beyond the control of a draft regulator. The burner in use should be a high static or air-box type, and in addition you have a mechanical draft device at or near the outlet, you may get flame detachment, smoky fires, and puffbacks.

The best way to correct this is to insure that you do not have more than $-.02$ " of negative water column draft at the breeching or outlet of the unit.

If you have an excess draft situation, the installation of a "neutral pressure point adjuster", see **Figure 13** will be required.

The adjuster is a device that will reduce excessive draft and draft regulator flow. It is especially helpful with powered draft devices and excessive chimney draft situations. Both situations can cause flame problems, condensation, and chimney connector damage.

- Start by cutting a piece of sheet metal as shown in 'C' to form the adjuster.
- In drawing 'A', start by making a cut about $1/3$ diameter through the fluepipe.
- Insert the adjuster into the fluepipe, start the burner and set breeching draft for $-.02$ " W.C.
- When adjustment is complete, scribe adjuster with line around pipe, 'B'.
- Make a second line about 1" above pipe radius line.
- Trim off the excess stock as shown in 'C' and then slit the stock between the lines vertically. Bend the segments in alternate directions.
- Replace the adjuster, start the burner and verify settings taken earlier.
- If unchanged, bend tabs against fluepipe, drawing 'D', and anchor in place with sheet metal screws. Seal any joints with silicone and the adjuster is completed.

The adjuster will reduce the velocity and strength of the draft currents and allow you to make a permanent and safe adjuster that cannot be adjusted again.

In addition, the design of chimney connectors, chimneys, power-venting systems and direct vent systems should also conform to local and State codes, and good industry practice. In lieu of local codes, NFPA-211 should be used as a reference.

Natural Draft Applications

After placing the boiler within close proximity to the venting system, the following basic guidelines should be observed that would prevent the following conditions from occurring:

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

In addition, the following rules of good industry practice should be followed;

1. Always try to keep chimney connector length to ten feet (10'), or less.
2. The chimney connector must never be smaller than the boiler flue outlet, and should be constructed of at least 24-gauge metal.
3. NEVER connect the appliance into a chimney or liner serving an open fireplace.
4. Inspect and clean chimney, and verify it is free of restrictions and obstructions.
5. The chimney connector must always be properly supported.
6. NEVER install a manual damper in the venting system.
7. Chimney connectors should be free of as many 90° degree turns as possible, and be pitched upwards towards the vent.
8. It is important to note that due to the high efficiency of the PENSOTTI BLUELINE boilers condensing temperatures in the chimney connector and venting system may be reached. If condensing temperatures of below 250° F NET are reached in the chimney connector, the following precautions may have to be taken;
9. Seal all joints in venting system with high temperature silicone or mastic.
10. Verify quality of chimney and liner. If a masonry, brick, or block chimney is used, or the existing tile liner is in poor condition, a chimney liner suitably rated, and listed for oil may have to be installed.

Mechanical Draft Applications

When using the PENSOTTI BLUELINE boilers in a mechanical draft application the following basic guidelines should be observed according to the venting system in use. In addition, it is strongly recommended that the applicable precautions for Natural Draft Applications be used.

Power Venter Applications

When using a power venter, all of the recommendations and instructions of the OEM of the power venter MUST be followed and the entire installation must conform to any and all local, State, and National codes.

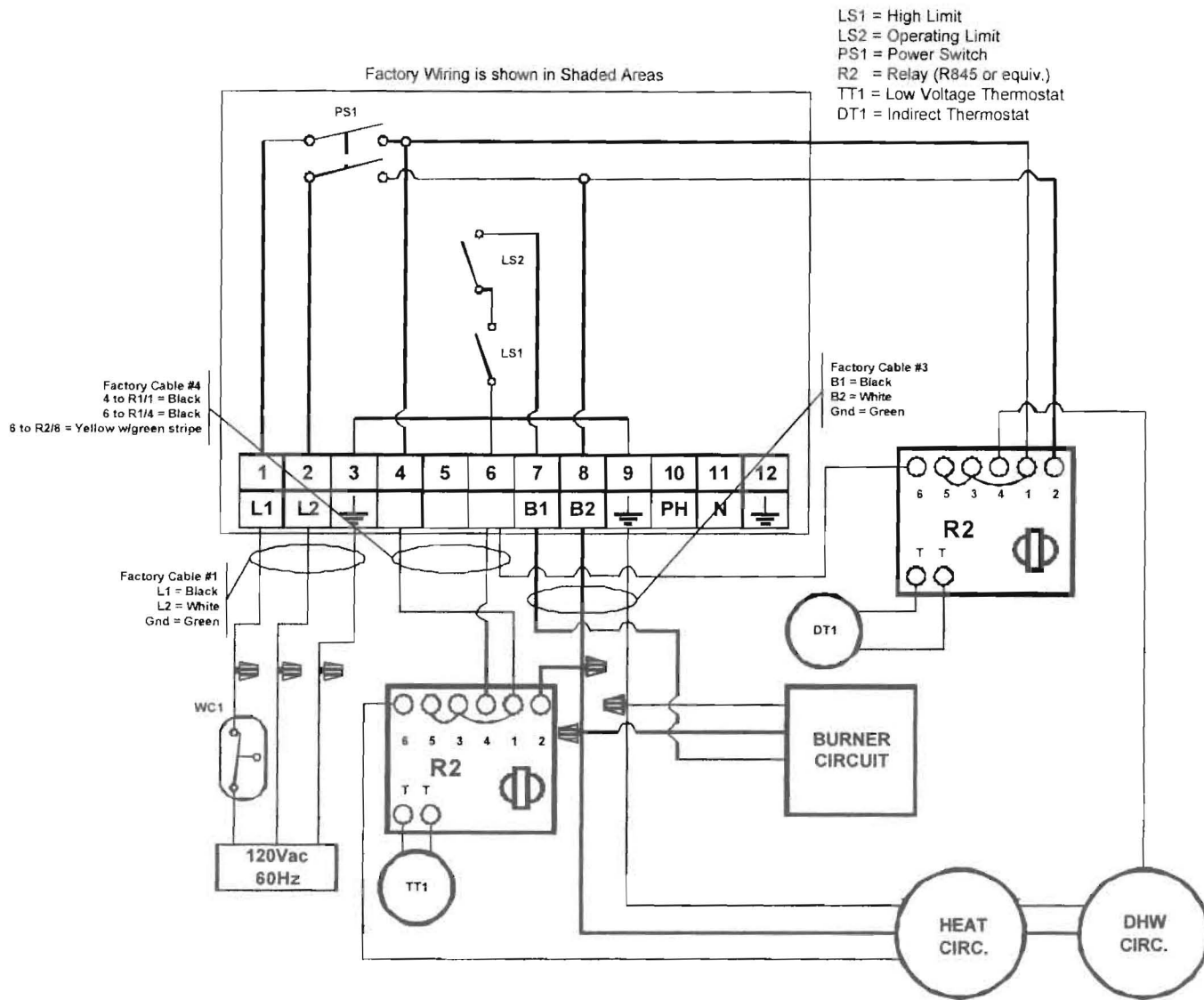


Figure 11

Special Control Systems

For special control systems such as multiple zones, multiple boiler installations, unit heaters, radiant heating, etc. consult the respective control manual or contact PNA, Inc. for further information.

Venting Requirements

Oil fired appliances shall be connected to flues or vents having sufficient draft at all times to ensure safe and proper operation of the appliance.

When venting the PENSOTTI BLUELINE boilers, all installations should conform to all national, local and state codes and authorities having jurisdiction.

When no local code is in effect NFPA-31 should be used as a reference, and baseline document.

Pensotti BLUELINE Boilers

Factory Wiring is shown in Shaded Areas

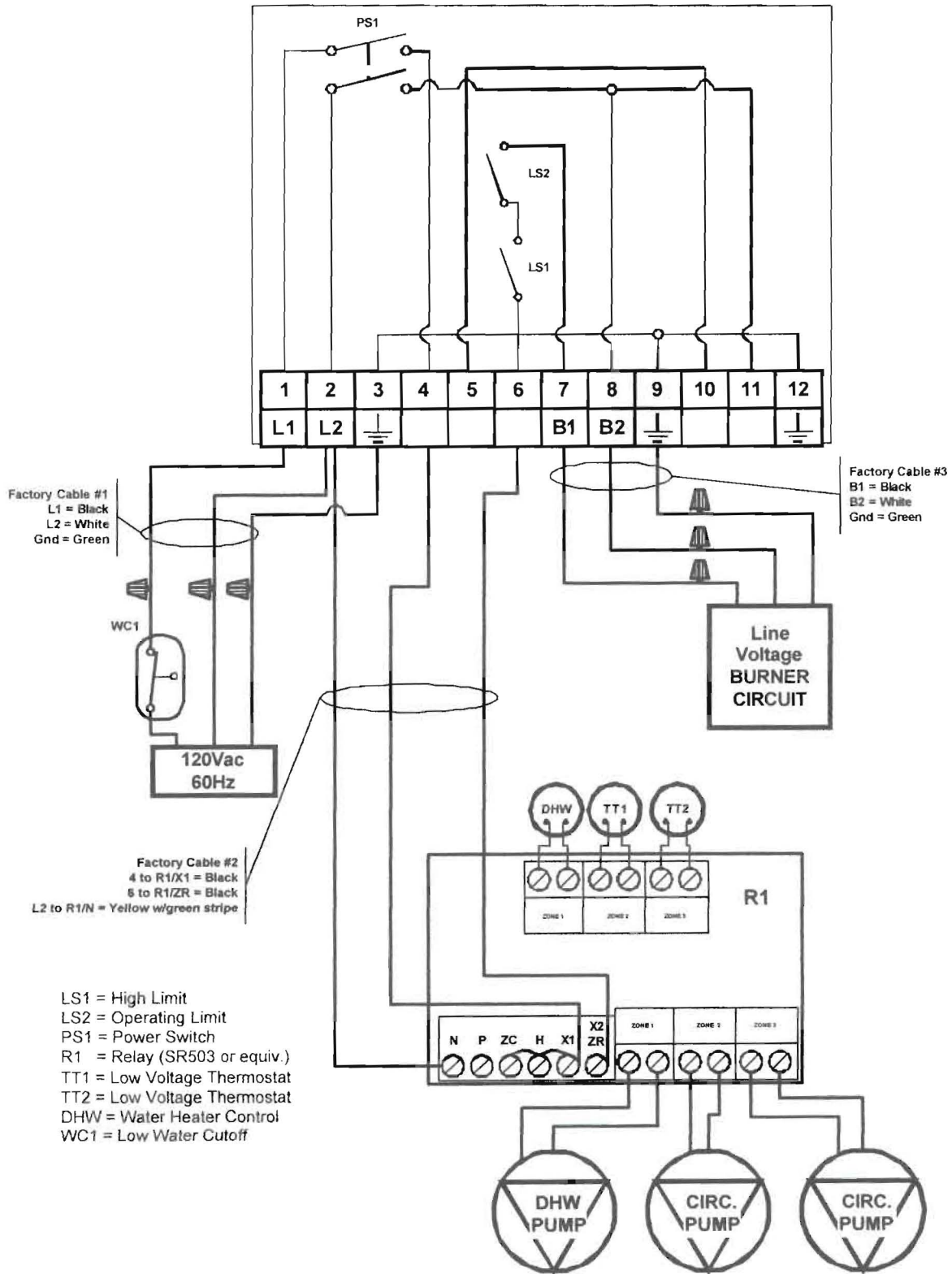


Figure 10

Factory Wiring is shown in Shaded Areas

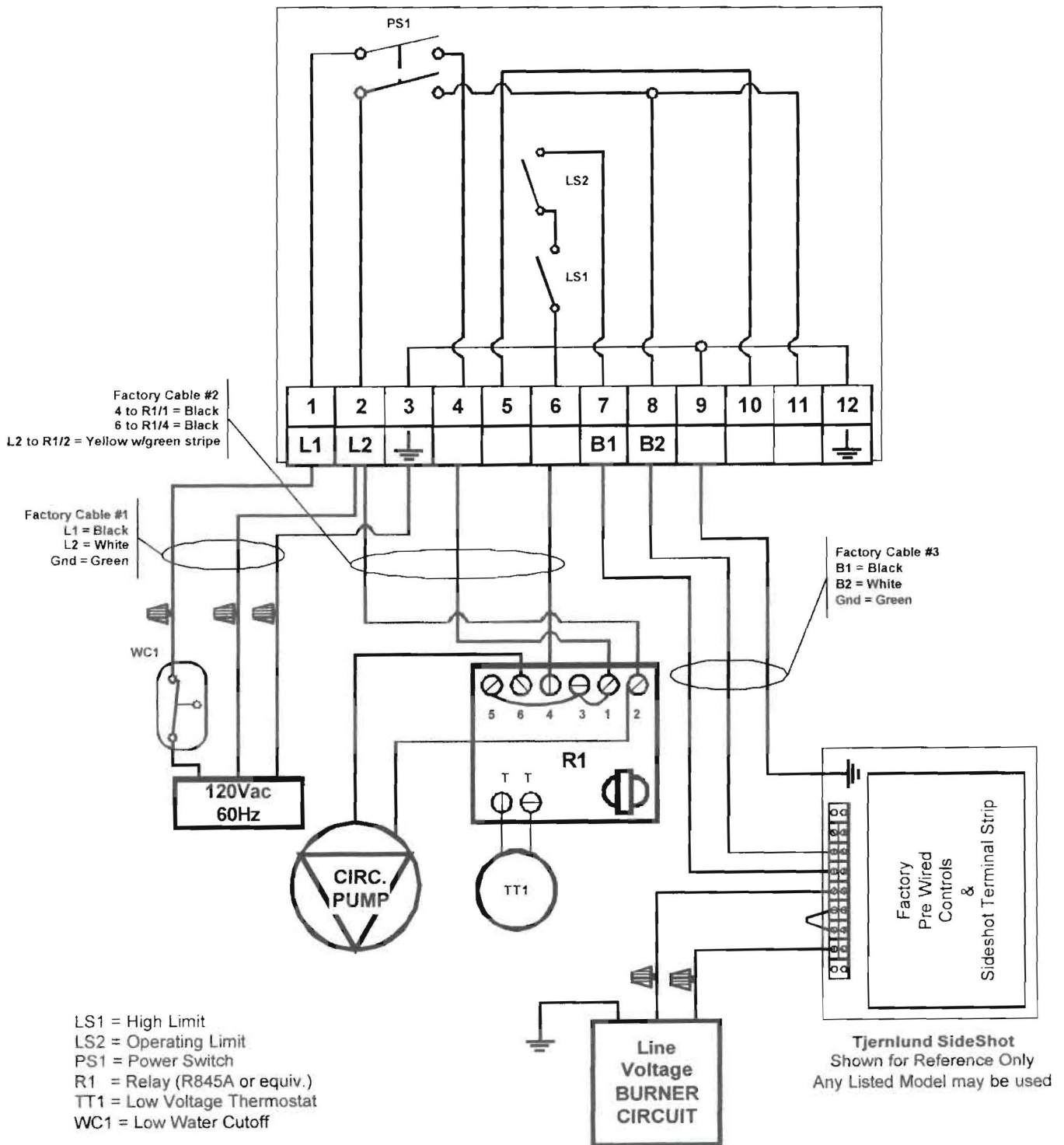


Figure 9

Factory Wiring is shown in Shaded Areas

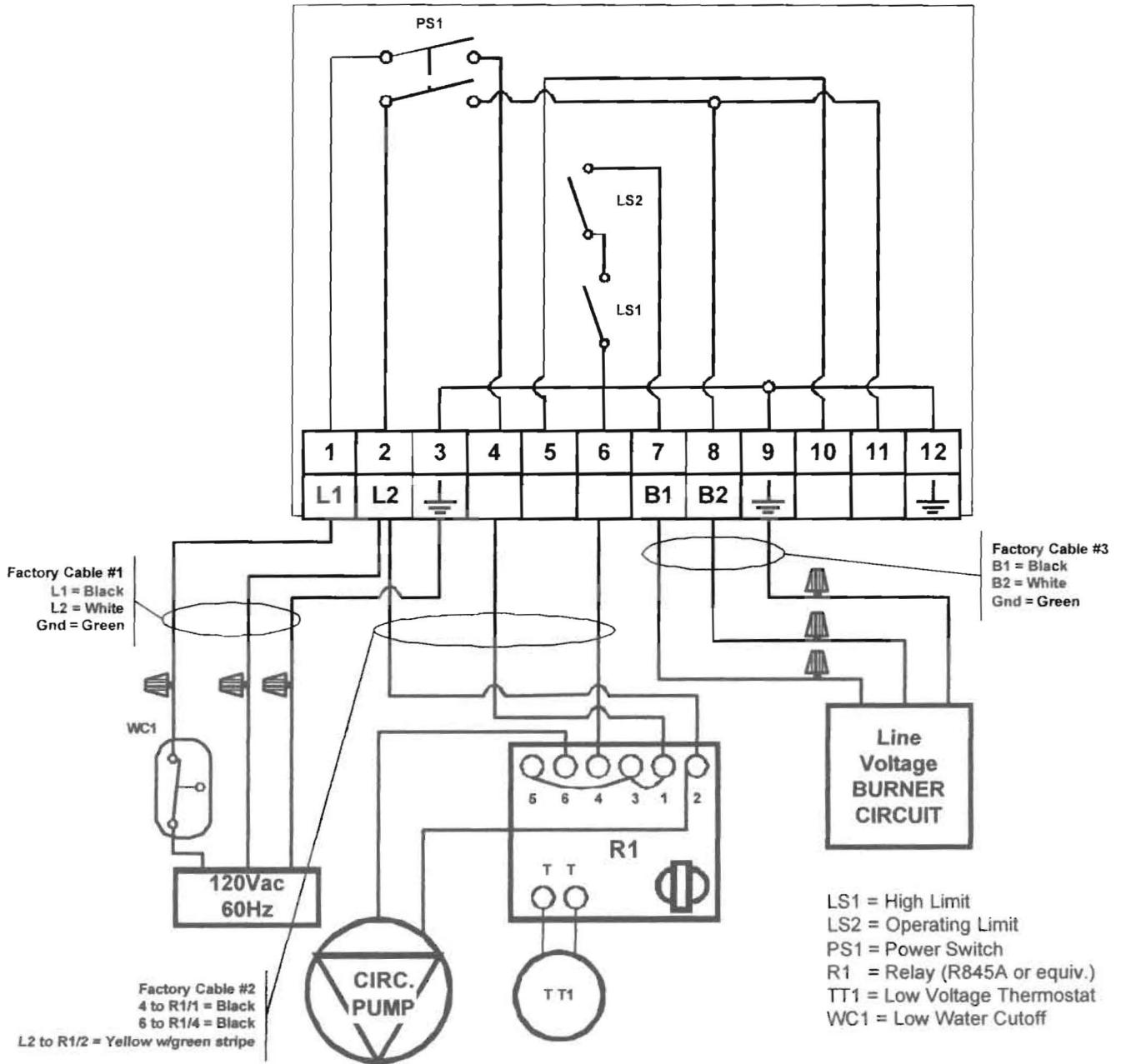


Figure 8

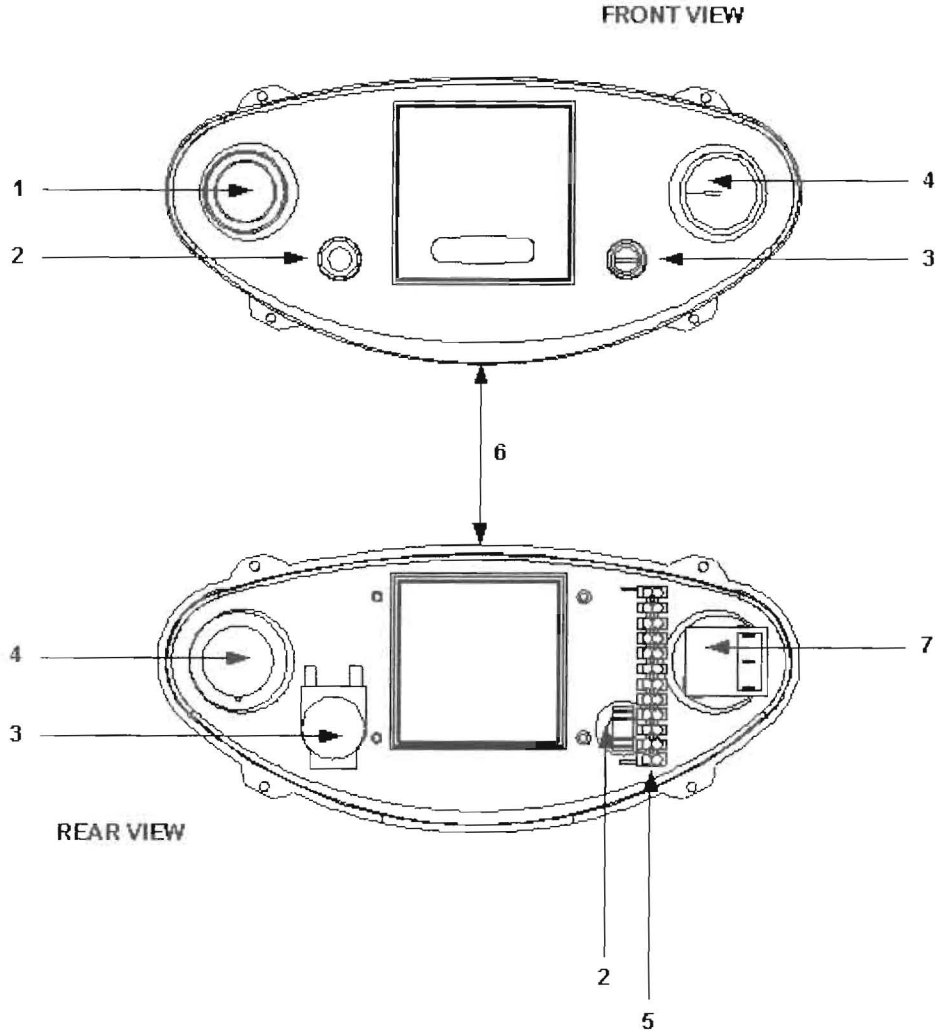


Figure 7

Item No.	PART#	DESCRIPTION	FUNCTION
1	4262800	Boiler control thermostat knob	
2	8572625	Main switch (ON / OFF)	Service switch
3	8562707	Safety thermostat (heating water)	Hi-limit
4	P460097	Boiler thermometer	
5	P450456	Terminal block 12 poles	Electric terminal
6	4245500	Plastic panel	
7	8562799	Boiler control thermostat	Temperature regulator

Wiring

All external wiring must conform to existing electrical codes laid down by the authorities having jurisdiction.

In the United States this is generally the National Electrical Code, NFPA70.

In Canada, they are the C.S.A. Standard C22-1 and the Canadian Electrical Code.

1. Field connections should be properly sized, and protected with a minimum 15-amp fuse or circuit breaker.
2. Install a separate fused disconnect switch as required (or by code) so power can be shut off for servicing.
3. Ground the boiler to the water piping.
4. Install the room thermostat or relocate the room thermostat away from cold drafts, air currents, lamps, televisions or sunlight. Set the heat anticipator on the thermostat to match the operating control. Connect the thermostat leads to the circulation pump operating control or aquastat as applicable.
5. The PENSOTTI BLUELINE boiler should be equipped with a burner that includes a 15 second pre-purge control. This will ensure smooth, quiet starts and proper performance. Although a post-purge period is not required, a one minute post-purge will make for better operation. The use of a post-purge is recommended with mechanical draft systems and poorly designed or antiquated venting systems.
6. The PENSOTTI BLUELINE is supplied with the control package ordered by your dealer. A control panel, **Figure 7** is factory supplied and should be wired as shown in **Figure 8** for low voltage control of a line voltage operation.
7. **Figure 9** shows the identical installation for a powerventer application.
8. The wiring of a priority indirect with a Taco SR503 (or equiv.) is shown in **Figure 10**.
9. The wiring of a non-priority indirect is shown in **Figure 11**.

Control Panel

The following diagram, **Figure 7**, calls out the use, placement and function of the BLUELINE front panel. **Figure 8** calls out the wiring of this panel to the system and mains.

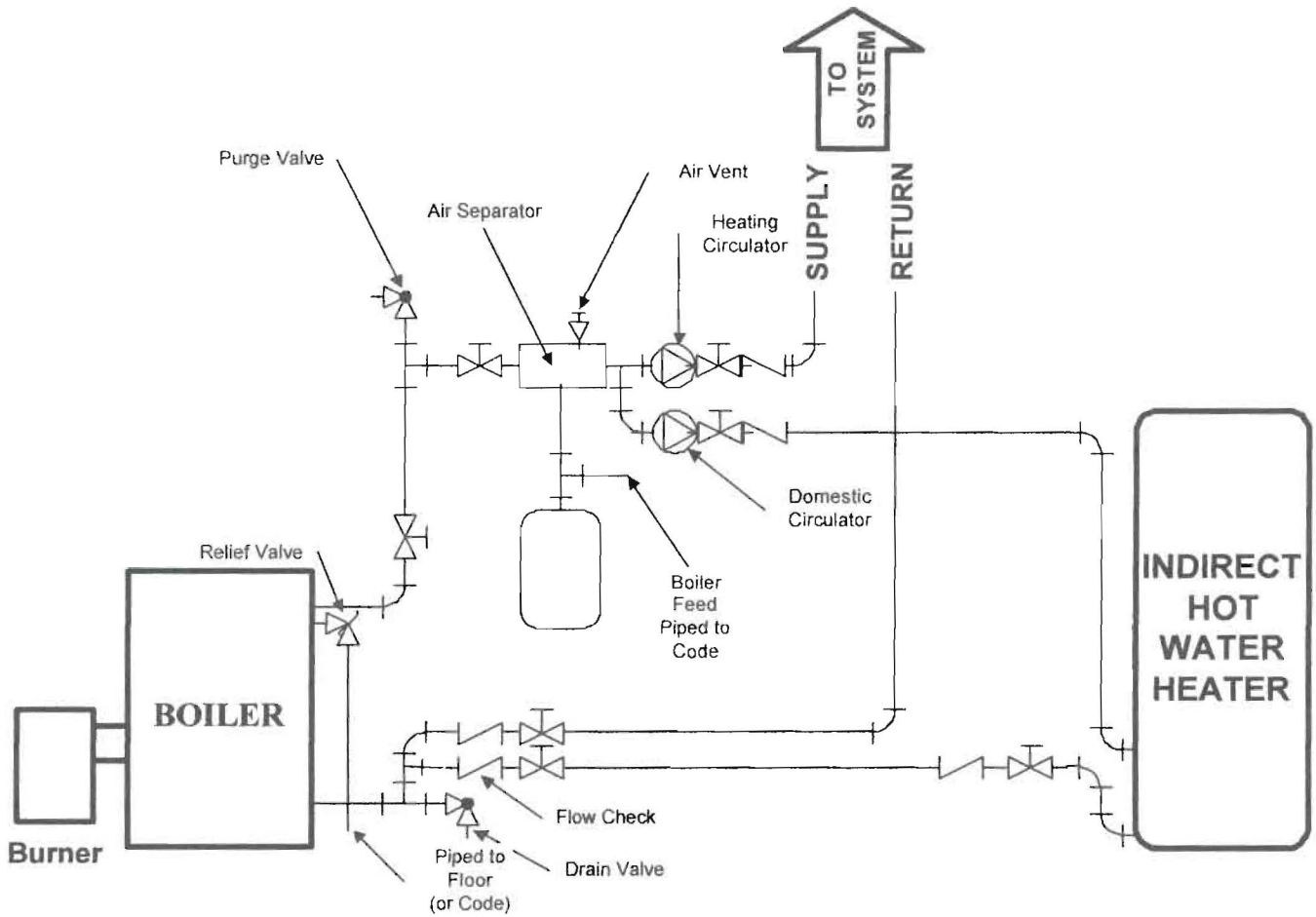


Figure 6

Figure 6 shows a typical installation with domestic hot water supplied by an indirect heater and with no by-pass loop installed.

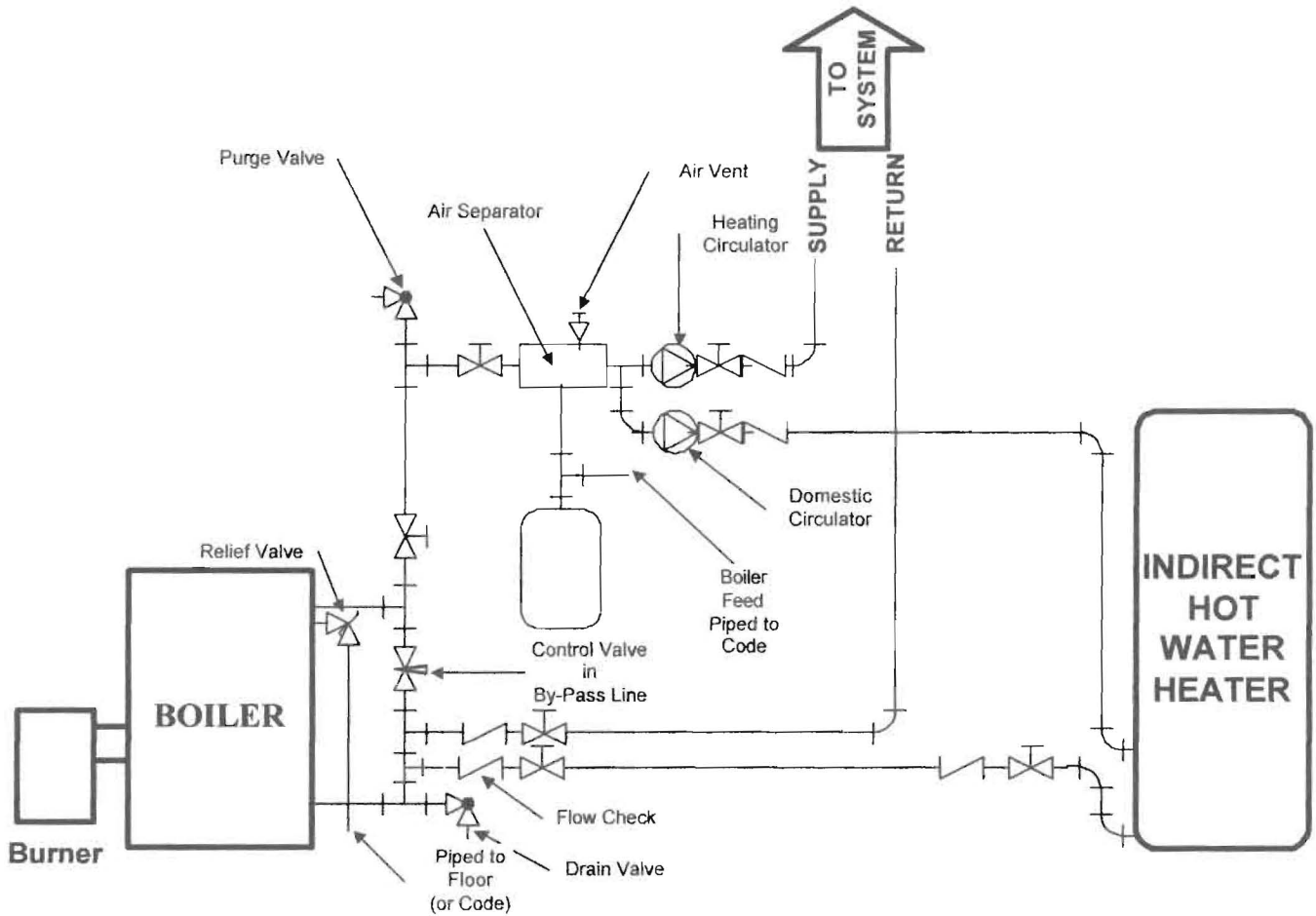


Figure 5

Figure 5 shows a typical installation with domestic hot water supplied by an indirect heater and with a by-pass loop installed.

The control valve should be either a needle or throttling valve.

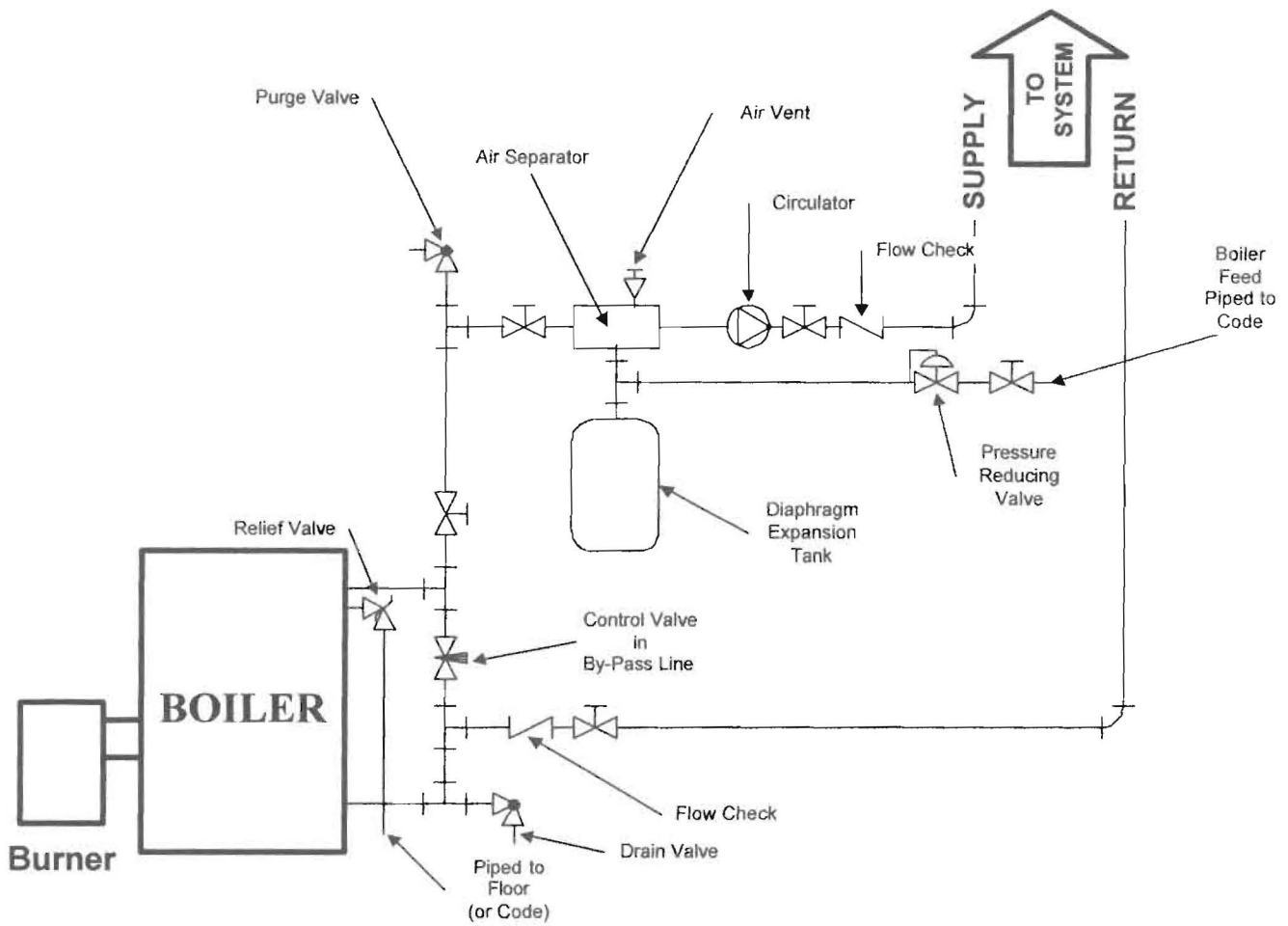


Figure 4

Figure 4 shows a typical installation with no domestic hot water and with a by-pass loop installed. The control valve should be either a needle or throttling valve.

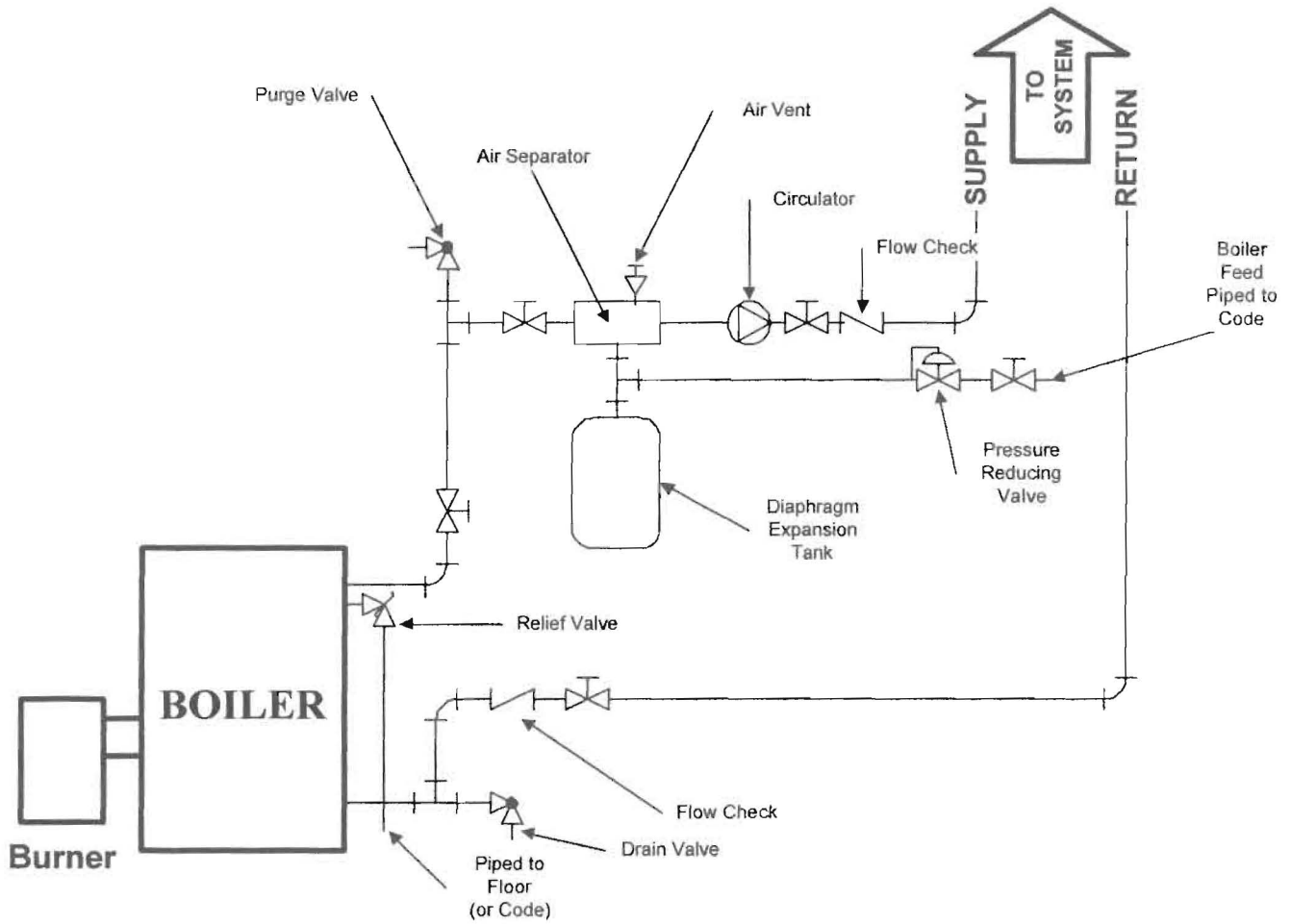


Figure 3

Figure 3 shows a typical installation with no domestic hot water and no by-pass loop installed.

140°F (60°C) for natural gas.

The fuel dictates the amount of acid compound in the combustion process. However, the presence of chlorides in the combustion air greatly increases the rate for the production of mild acid compounds that are very active on cast iron and steel surfaces.

The safest operating temperature range for modern boilers, proven conclusively by tests, is 160°F (71°C) to 210°F (99°C). Allowing the boiler water temperature to drop below 160°F (71°C) for extended periods of time is asking for increased rates of corrosion due to the acid becoming more corrosive due to dilution with water condensate. The rapid production of corrosion and cold flame temperatures can lead to rapid boiler plugging.

The following step-by-step procedure should be followed for connecting the PENSOTTI BLUELINE boiler to the existing heat distribution system:

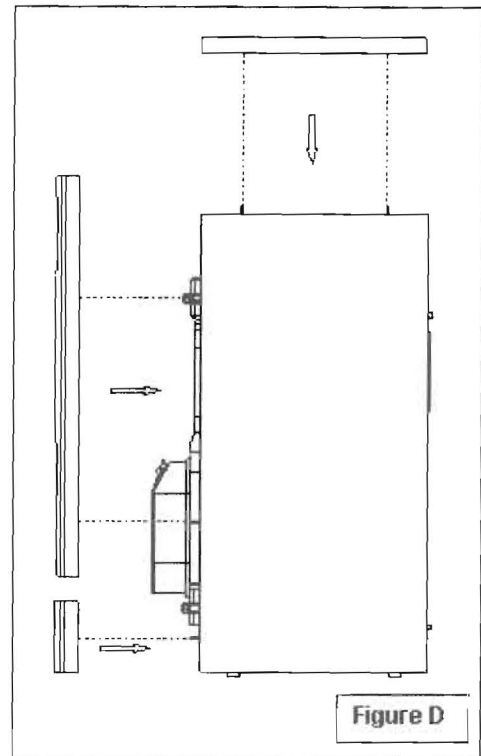
1. Connect the boiler return and supply manifold piping to the main circulating system as selected. A pump-away type system is preferred, but conventional piping systems may also be used.
2. Install a manual shut-off valve on both the return line and supply line and on the boiler by-pass loop. The by-pass loop is a must on all standing cast iron radiation systems. This eliminates flooding (cold return) on a low mass boiler and gravity flow during off cycles. If the PENSOTTI BLUELINE Series Boiler is to be used with large water content systems, or the boiler will be placed into use in a low water temperature system such as a converted gravity circulation system, a full size bypass loop is recommended. The loop should run from the supply line to the return line with a gate valve, as shown in the drawings. With the valve full open the boiler should be allowed to operate and the valve throttled to provide a 180°F to 200°F supply water temperature. Failure to install this valve may lead to condensing of the flue gasses, corrosion of the heat exchanger and premature boiler failure resulting in a loss of warranty coverage.
3. A.S.M.E. Boiler Code requires feed or make-up water to 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.
4. The maximum operating water temperature is 205°F (96°C).
5. The maximum operating water pressure is 30 psi.
6. The pressure relief valve must be piped from the boiler and downward to within 6 in. of the floor (or by code) to avoid the potential for accidental face and body injuries.
7. An expansion tank, circulating pump and automatic air eliminators must be part of the system.
8. Recommended location of circulator, expansion tank, relief valve and other trim is shown in **Figure 3, Figure 4, Figure 5, and Figure 6.**
9. The relief valve, backflow-preventer and drain valve should be piped according to code and should be piped to discharge safely.
10. If the PENSOTTI BLUELINE is to be used with a storage type domestic hot water system other than provided by PNA, Inc. connect and wire according to manufacturer's instructions.

5. Place the bracket with the panel to the sides, using self-tapping screws.
6. Position the jacket cover to the upper part of the sides, **Figure D**, using the springs and then place the rear adapter on the cover to the rear of the sides.
7. Secure the jacket's front panels, using the springs on the front of the sides, starting from the bottom.

Piping and Wiring

Once the unit is in its proper location and level with the jacket and controls in place it is ready for piping and connection to the heating and domestic water systems, fuel system, room thermostat and 110 Volt 60 cycle AC current.

Assemble and install the oilburner to manufacturer specifications and apply a bead of RTV silicone between air tube and flange. Mount and level burner and fully tighten all mounting nuts.



Piping

Heat Distribution System

Before connecting the PENSOTTI BLUELINE boiler to an existing piping system, the system should be flushed to prevent scale and sludge from returning to the boiler.

If the present system is being converted from a gravity open system, this is a must item, and a by-pass must be considered.

The PENSOTTI BLUELINE is a low mass boiler and care should be taken to ensure that a high volume of water should not be allowed to flood the boiler from a high volume standing cast iron system. The high flow will cause combustion problems from cool surface impingement within the boiler.

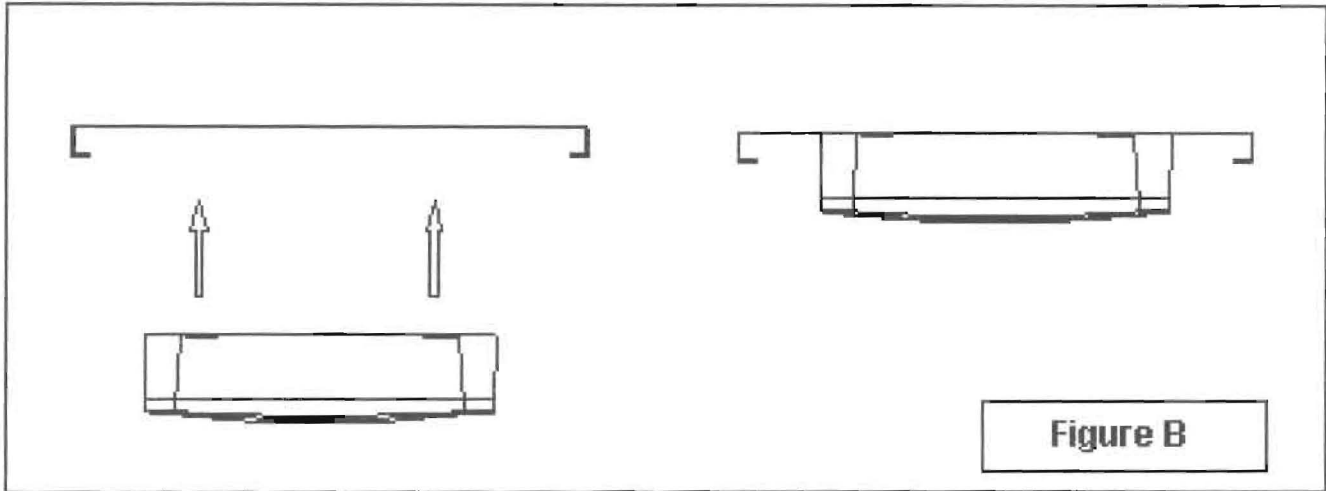
If a high-pressure test of the existing hydronic system is necessary, the boiler itself must not be exposed to the pressure test. Isolate the boiler during the test.

Boiler Replacement and Service Caution

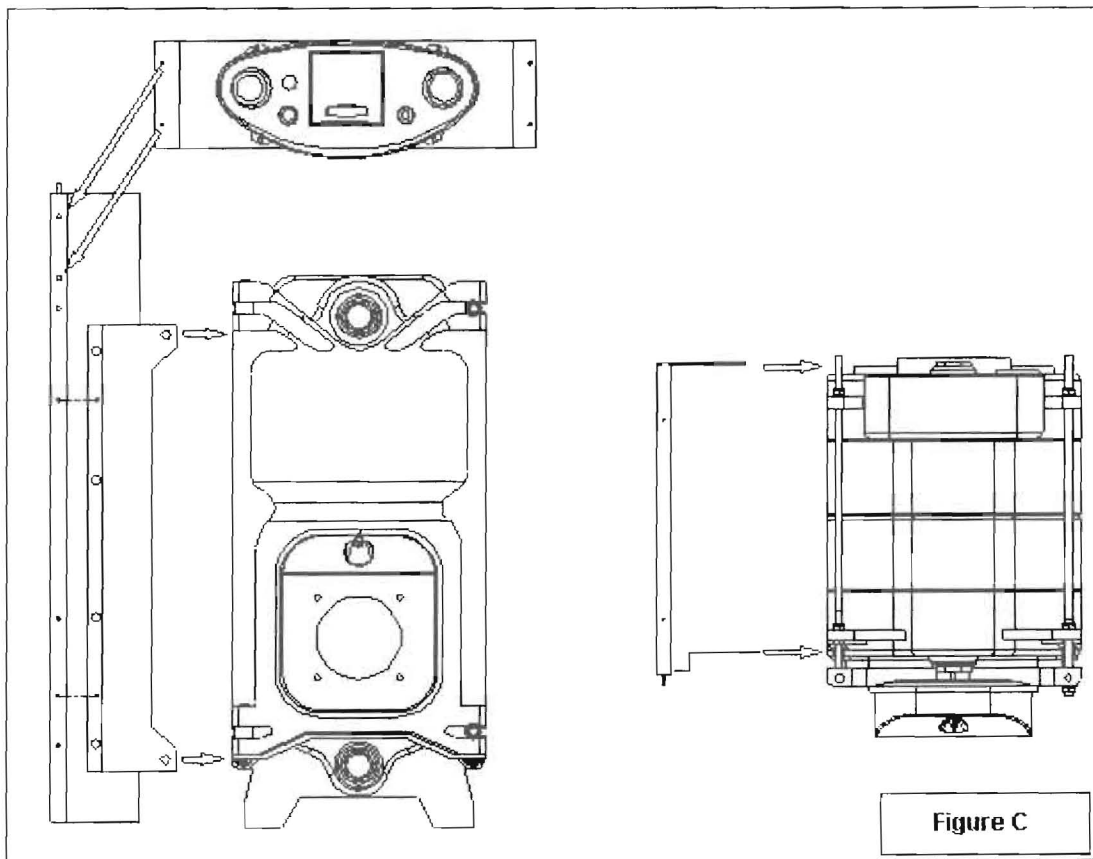
The replacement of old large cast iron and steel boilers with new modern compact efficient boilers (sometimes called low mass) can cause problems from corrosion being produced with low operating water temperatures.

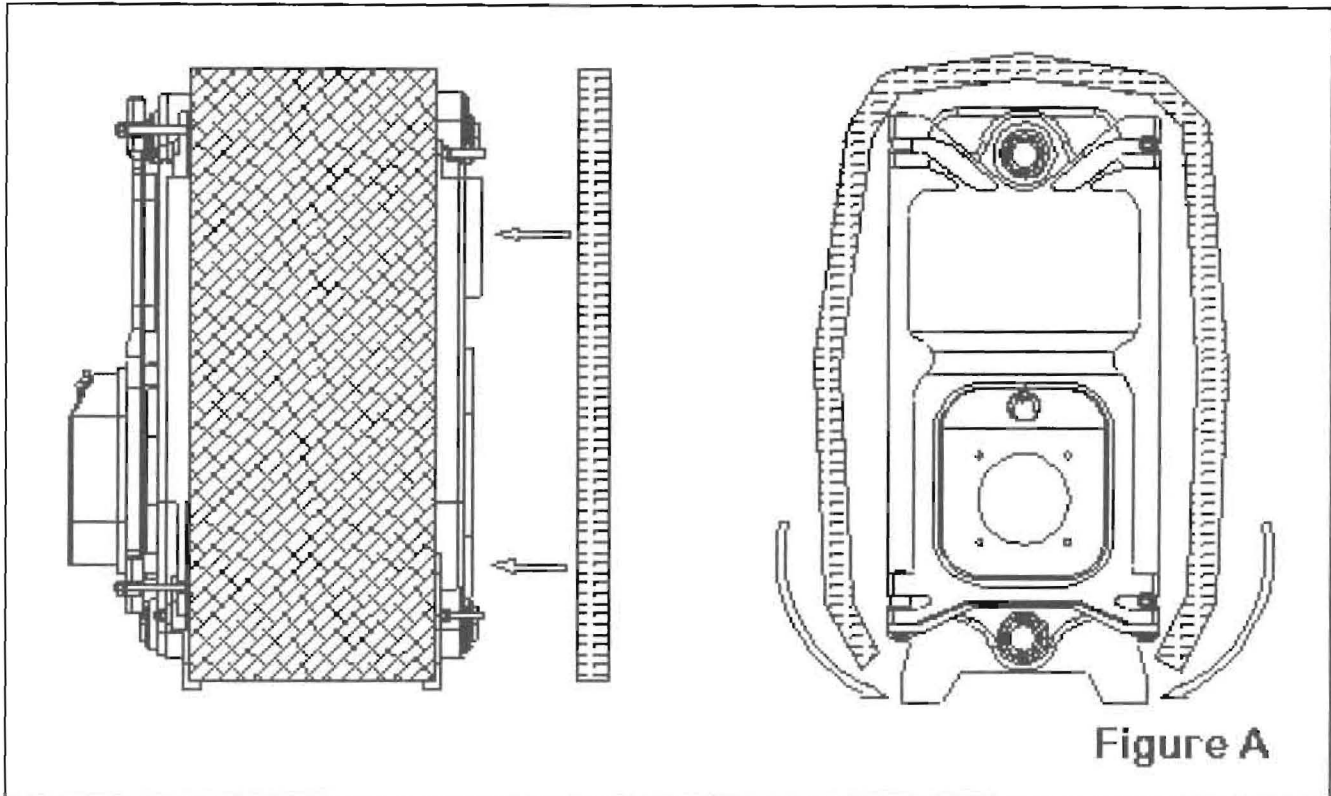
Combustion by-products in fuels produce acidic sulfur oxides which corrode cast iron and steel surfaces, when the oxides condense in a water solution on the boiler surfaces.

The water dewpoint on the inside surfaces of a boiler is 120°F (49°C) for fuel oil burning and



4. Place the two support brackets on the side of the boiler block using the 4 main tie rods, and then fix the sides of the jacket to these brackets, **Figure C**. Make sure that the factory cables are installed into the knockouts provided in the left side of the jacket. **IMPORTANT:** The three capillaries must be inserted all the way into the well on the front of the boiler and locked in place with retainer clip.





Mounting the Jacket

Once the unit has been positioned the installation of the jacket should be the first thing completed. The PENSOTTI BLUELINE boiler is supplied with the jacket in a separate box. The parts are called out in **Figure 2** and described in **Table 2**.

To assemble the jacket proceed as follows:

1. Wind the larger insulating blanket around the boiler casting assembly and use an adhesive tape to close it at the bottom, see **Figure A**.
2. Position the rear insulation blanket and make sure that the holes located on the blanket match those on the boiler block.
3. Place the electrical panel on the upper bracket, **Figure B**, laying the wires in the cable duct on the bracket, and making sure the grounding wire is connected up by fixing the ring at the end of the grounding wire to the brass screw on the bracket.

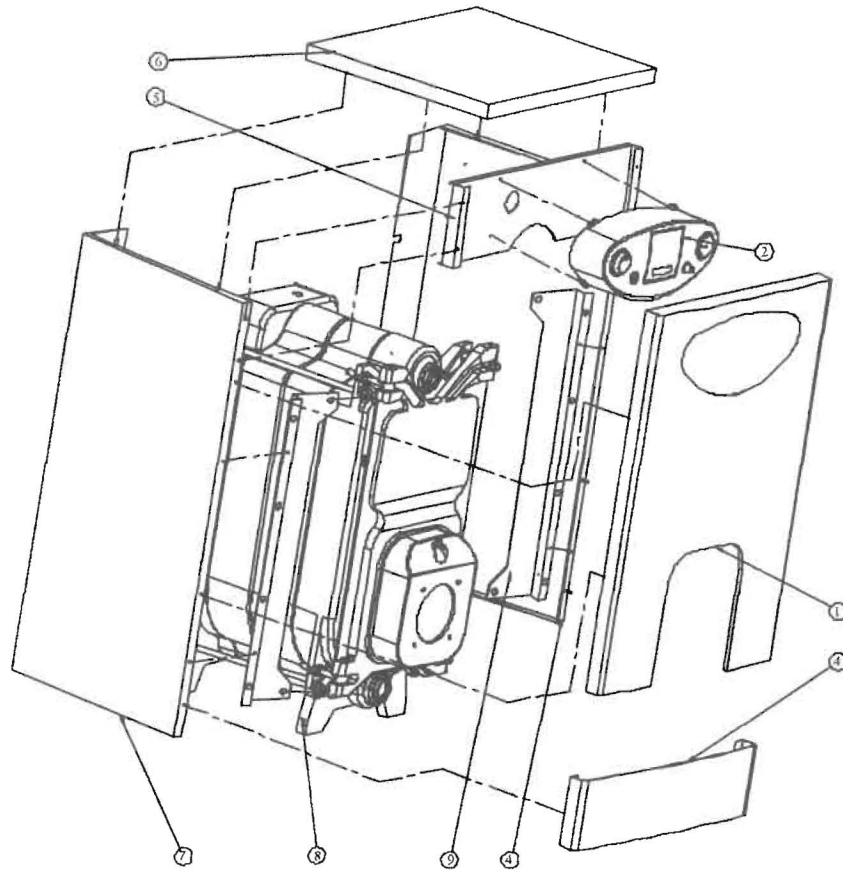


Figure 2

Item Number	Description
1	Upper front piece
2	Complete electrical panel
4	Right side
7	Left side
3	Lower front piece
6	Cover
5	Panel fixing upper bracket
8	Boiler casting assembly
9	Shell sides support bracket
-	Boiler casing insulation blanket
-	Rear insulation blanket
-	Fittings as required

Table 2

Air for Combustion

The PENSOTTI boiler must have an assured supply of combustion air when installed into an enclosed area. A dedicated outside supply of air through an installed duct or pipe should be installed at or within 5 ft. of the boiler. A shut-off damper may automatically control the supply duct when the unit is not operating, but the operating automatic damper must 'fail' in the open position. The combustion air duct must have direct access to the outdoors and have a rain hood and insect screen installed at the outside wall.

Care should be taken when the boiler is to be installed within a home where the operation of exhaust fans, attic fans, kitchen ventilation systems, new high efficiency clothes dryers or fireplaces may create severe *negative* vent pressures and unsatisfactory combustion and venting. Special provisions should be made for additional make-up air to supply the other air requirements.

In cases of electric heat conversions or any structure of tight construction an opening of one (1) square inch of minimum free area per 1000 BTU per hour of burner input must be provided. The air supply to the burner must be provided directly to the burner and originate outside the structure within five feet (5') of the burner. The inlet vent must originate on the same wall surface as the boiler outlet vent, if a direct venting system is used. The inlet hood should be waterproof and include a bug and bird screen.

In cases where the boiler is installed in an area where exhaust, kitchen or bath ventilation systems and fans exist, they may create unsatisfactory combustion or venting conditions. Special consideration should be made for additional air.

All combustion air and ventilation requirements should meet local code and or NFPA Standard 31.

Combustion Air Supply with No Barometric Damper

When no Barometric Damper is used, Table 1 should be used to size the air inlet pipe to the burner air housing.

Table 1

Firing Rate Range (gph)	Chimney Connector Size
0.75 to 1.00	5" round or equivalent
1.00 to 1.50	6" round or equivalent
1.50 to 2.25	7" round or equivalent

NFPA or OEM Burner specifications should take precedence where required.

Clearances for Service and Combustible Materials

Service access to the boiler must be adequate to provide access around the boiler for cleaning and servicing. Consult local fire codes for required clearances.

The easier the service accesses the higher the quality of service the unit will receive.

Minimum clearances for proper service are as follows:

- 8" from the front of the oilburner,
- 18" from the back of the unit, and one side
- 2" from the other side.

The minimum installation clearances to combustible materials are:

- 8" from the front of the oilburner and one side,
- 18" from the back of the unit,
- 2" from other side,
- 18" from the chimney connector.

Leveling Unit

If the floor is uneven, the PENSOTTI BLUELINE boiler may easily be made level by inserting shims under the four cast-iron legs.

Burner Tube Insertion

The insertion of the burner air tube must be flush with the chamber end of the burner refractory mounted to the swing door, see **Figure 1**.

Combustion Air and Ventilation

If a PENSOTTI BLUELINE boiler is being used for a retrofit and is installed in a full basement with adequate infiltration for combustion air it may be installed in the usual way following accepted industry guidelines and good industry practices.

Fresh Air Intake

Recent energy conservation practices have resulted in many people insulating and caulking their homes to a level where the fresh air required for efficient combustion is not always readily available. Particularly if you choose to isolate your PENSOTTI boiler in an enclosed area of your home, a fresh air intake must be installed in this area.

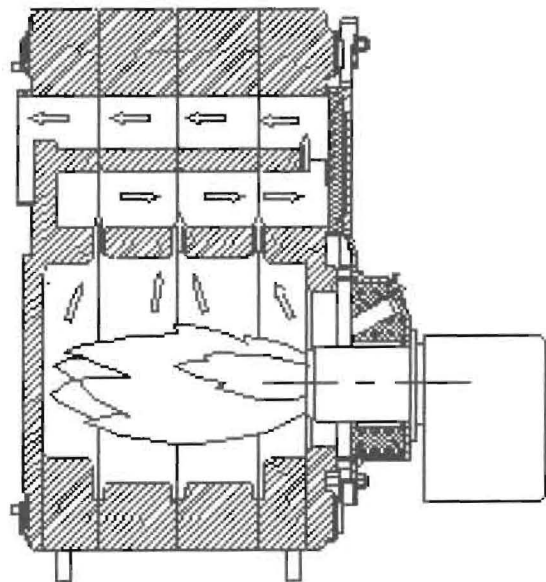


Figure 1

increase in fuel efficiency. Consult PNA, Inc. for further information on Modular (multiple) boiler installations and larger boiler options.

All PENSOTTI BLUELINE boilers must be properly sized to provide domestic hot water. Use the water heater manufacturer's charts to determine the correct BTU requirements for domestic hot water service.

Alternatively, the 'K' factor sizing method, which uses past energy consumption, based on the efficiency of the old appliance and local weather data may also be used.

Replacement heating appliance installations should not use the existing appliance exclusively for determining the size of the new appliance.

As previously noted, recent research indicates that existing installed appliances are often oversized, resulting in excessive energy consumption.

Receiving Shipment

Upon receipt of shipment, inspect all items and cartons for external damage. If external damage is noted, open the item or carton and inspect for damage to equipment. Mark the number of items received in this condition on the delivering carriers' waybill, and request the services of their inspector.

If, upon opening the carton, concealed damage is found, open the entire shipment and note all equipment so damaged. Contact the delivering carrier, not PNA, Inc., and request inspection of the damaged equipment. Do not destroy the carton. The inspector from the freight company will need this to determine the reason for the damage.

Normally claims for any damages should be filed with the freight company within 5 working days after receipt of shipment. It is the responsibility of the consignee to file claim with the delivering carrier for material received in a damaged condition.

Permission to return goods to PNA, Inc. must be authorized by us and are subject to a 15% restocking charge.

Boiler Location

The boiler should be located on a dry, solid, non-combustible, level surface, preferably as close to the chimney or venting inlet as possible, with a minimum of 90° vent elbows. Vent lengths over 10 ft. does not reflect good installation practice.

It is good practice however, to raise the boiler above the floor for service and piping.

The electrical system to this unit should be supplied by a separate circuit provided with a fused disconnect switch at the service panel.

All boiler installations must conform to the A.S.M.E. Boiler Code. If the boiler requires National Board approval consult PNA, Inc. for special order. Many states and local authorities require National Board inspection and registration for installation in buildings used for public assembly, more than four (4) apartments, etc.

It is important therefore that these instructions be followed carefully and that a competent PENSOTTI dealer installs the BLUELINE Series boiler only.

The boiler should only be used as the primary heating source of a well-designed and installed hydronic heating.

It is the responsibility of the installer to ensure that this boiler is installed properly and that all settings and adjustments are made before putting the unit into service.

The boiler is provided with a Lifetime Limited Warranty. A copy of the warranty is found on the inside front cover.

Selection of Boiler Size

It is important that the boiler be properly sized for the job. The boiler should be of a sufficient capacity to satisfy the heat load and the domestic hot water load if the unit is to be used for this purpose.

Most heating systems are oversized. In fact, recent US Government DOE and HUD surveys found existing equipment in the field to be as much as 400% oversized.

Reducing the firing rate of the boiler results in longer burner on-times increased A.F.U.E. and provides significant savings for the consumer.

The improved A.F.U.E. of the PENSOTTI BLUELINE is highly effective heat generator when it is matched to the heatloss of your home.

The first and only correct way to size the boiler is to determine the actual heat loss of the structure to be heated. DO NOT base the heat load on the existing radiation since this may not be adequate. If the boiler size is selected on this basis it may not heat the building properly. Also, take care not too oversize, since this may lead to short cycling and inefficient operation.

After computing a complete and actual heat loss of the structure, you may now select the correct boiler required. The correct boiler is selected by matching the boiler's Net I-B-R Rating to the actual heat loss of the building.

If the calculated load exceeds the capacity of the largest size PENSOTTI BLUELINE boiler, two or more units may be installed. Modular installations can be a sound investment leading to an

A COMMITMENT TO QUALITY

PNA, Inc. is proud to supply you and our network of dealers with the high quality PENSOTTI BLUELINE Cast Iron Boiler throughout the North American marketplace.

We are confident that your purchase of the PENSOTTI home comfort package will provide years of efficient, economical, trouble-free operation.

"Quality remains long after the price is forgotten".

The PENSOTTI BLUELINE boiler is a high efficiency residential heating appliance that provides maximum energy utilization and the highest efficiency.

Fuel cost savings can only be achieved by matching the PENSOTTI BLUELINE boiler to the true heat loss of your residence. During the past couple of decades, the trend towards improving wall and ceiling insulation levels and eliminating air infiltration by caulking and weather-stripping, has made most existing heating appliances oversized.

When you purchase a PENSOTTI home comfort system your new appliance will be sized on the basis of the new heat loss calculation. This will ensure that your new PENSOTTI home comfort system will deliver only the amount of heat required to match your actual home's heating demand. We want to provide you with the maximum comfort level achievable combined with the highest fuel cost savings.

The following are useful bits of information presented under a series of sub-headings.

Annual Fuel Utilization Efficiency (A.F.U.E.)

The A.F.U.E. is a measure of the estimated ability of a heating appliance to extract heat from the fuel, based on a full heating season.

The A.F.U.E. increases as the burner on time increases until it reaches 'steady-state efficiency'. Steady state is the efficiency of the appliance measured when the burner is running.

Any time the burner cycles on and off, the A.F.U.E. drops because of "off-cycle" losses. The A.F.U.E. drops most sharply when the heating plant operates between 10 and 30% burner on time. An increase in the percentage of burner on time improves the A.F.U.E.

A General Comment

The PENSOTTI BLUELINE boiler is a high quality, efficient oilfired heating appliance, which must be installed and serviced by a trained and if required licensed service technician.

Oilfired installations should be installed in accordance with NFPA31 and NFPA211 when no local code is in effect. Be sure that the installation is according to all National, State and local codes and authorities having jurisdiction over heating, electrical, plumbing and oil burner systems.

NOTES

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