

INSTALLATION, OPERATING AND SERVICE INSTRUCTIONS

AP-U™ SERIES

STEEL OIL-FIRED BOILER



For service or repairs to boiler, call your heating contractor. When seeking information on boiler, provide Boiler Model Number and Serial Number as shown on Rating Label.

Boiler Model Number AP U	Boiler Serial Number	Installation Date
Heating Contractor		Phone Number
Address		



New Yorker®
RESIDENTIAL HEATING BOILERS

IMPORTANT INFORMATION - READ CAREFULLY

All boilers must be installed in accordance with National, State and Local Plumbing, Heating and Electrical Codes and the regulations of the serving utilities. These Codes and Regulations may differ from this instruction manual. Authorities having jurisdiction should be consulted before installations are made.

In all cases, reference should be made to the following Standards:

All wiring on boilers shall be made in accordance with the National Electrical Code and/or Local Regulations.

- A. Current Edition of American National Standard ANSI/NFPA 31, "Installation of Oil Burning Equipment", for recommended installation practices.
- B. Current Edition of American National Standard ANSI/NFPA 211, "Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances", For Venting requirements.
- C. Current Edition of American Society of Mechanical Engineers ASME CSD-1, "Controls and Safety Devices for Automatically Fired Boilers", for assembly and operations of controls and safety devices.

The following terms are used throughout this manual to bring attention to the presence of hazards of various risk levels, or to important information concerning product life.

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death, serious injury or substantial property damage.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor injury or property damage.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death, serious injury or substantial property damage.

NOTICE

Indicates special instructions on installation, operation, or maintenance which are important but not related to personal injury hazards.

NOTICE

This boiler has a limited warranty, a copy of which is printed on the back of this manual.

It is the responsibility of the installing contractor to see that all controls are correctly installed and are operating properly when the installation is complete. The warranty for this boiler is valid only if the boiler has been installed, maintained and operated in accordance with these instructions.

DANGER

DO NOT store or use gasoline or other flammable vapors or liquids in the vicinity of this or any other appliance.

WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Failure to follow all instructions in the proper order can cause personal injury or death. Read and understand all instructions, including all those contained in component manufacturers manuals which are provided with the appliance before installing, starting-up, operating, maintaining or servicing this appliance. Keep this manual and literature in legible condition and posted near appliance for reference by owner and service technician.

This boiler requires regular maintenance and service to operate safely. Follow the instructions contained in this manual. Installation, maintenance, and service must be performed only by an experienced, skilled and knowledgeable installer or service agency. All heating systems should be designed by competent contractors and only persons knowledgeable in the layout and installation of hydronic heating systems should attempt installation of any boiler. It is the responsibility of the installing contractor to see that all controls are correctly installed and are operating properly when the installation is completed. Installation is not complete unless a pressure relief valve is installed into the tapping located on top of appliance - See Section III of this manual for details.

This boiler is not suitable for installation on combustible flooring, unless installed with a combustible floor shield (available at extra cost).

Do not install boiler on carpeting.

When boiler is installed on concrete which is over a material that is subject to melting (PVC, PEX radiant tubing, etc.) the combustible floor shield must be used.

A concrete pad is not sufficient to protect combustible flooring.

Do not tamper with or alter the boiler or controls. Retain your contractor or a competent serviceman to assure that the unit is properly adjusted and maintained.

Have Firetubes cleaned at least once a year - preferably at the start of the heating season to remove soot and scale. The inside of combustion chamber should also be cleaned and inspected at the same time.

Have Oil Burner and Controls checked at least once a year or as may be necessitated.

Do not operate unit with jumpered or absent controls or safety devices.

Do not operate unit if any control, switch, component, or device has been subject to water.

Appliance materials of construction, products of combustion and the fuel contain alumina, silica, heavy metals, carbon monoxide, nitrogen oxides, aldehydes and/or other toxic or harmful substances which can cause death or serious injury and which are known to the state of California to cause cancer, birth defects and other reproductive harm. Always use proper safety clothing, respirators and equipment when servicing or working nearby the boiler.

This boiler is designed to burn No. 2 fuel oil only. Do not use gasoline, crankcase drainings, or any oil containing gasoline. Never burn garbage or paper in this boiler. Do not convert to any solid fuel (i.e. wood, coal). Do not convert to any gaseous fuel (i.e. natural gas, LP). All flammable debris, rags, paper, wood scraps, etc., should be kept clear of the boiler at all times.

Keep the boiler area clean and free of fire hazards.

WARNING

This boiler contains very hot water under high pressure. Do not unscrew any pipe fittings nor attempt to disconnect any components of this boiler without positively assuring the water is cool and has no pressure. Always wear protective clothing and equipment when installing, starting up or servicing this boiler to prevent scald injuries. Do not rely on the pressure and temperature gauges to determine the temperature and pressure of the boiler. This boiler contains components which become very hot when the boiler is operating. Do not touch any components unless they are cool.

This appliance must be properly vented and connected to an approved vent system in good condition. Serious property damage could result if the boiler is connected to an approved vent system.

This boiler needs fresh air for safe operation and must be installed so there are provisions for adequate combustion and ventilation air.

The interior of the venting and air intake systems must be inspected and cleaned before the start of the heating season and should be inspected periodically throughout the heating season for any obstructions. Clean and unobstructed venting and air intake systems are necessary to allow noxious fumes that could cause injury or loss of life to vent safely and will contribute toward maintaining the boiler's efficiency.

This boiler is supplied with controls which may cause the boiler to shut down and not re-start without service. If damage due to frozen pipes is a possibility, the heating system should not be left unattended in cold weather; or appropriate safeguards and alarms should be installed on the heating system to prevent damage if the boiler is inoperative.

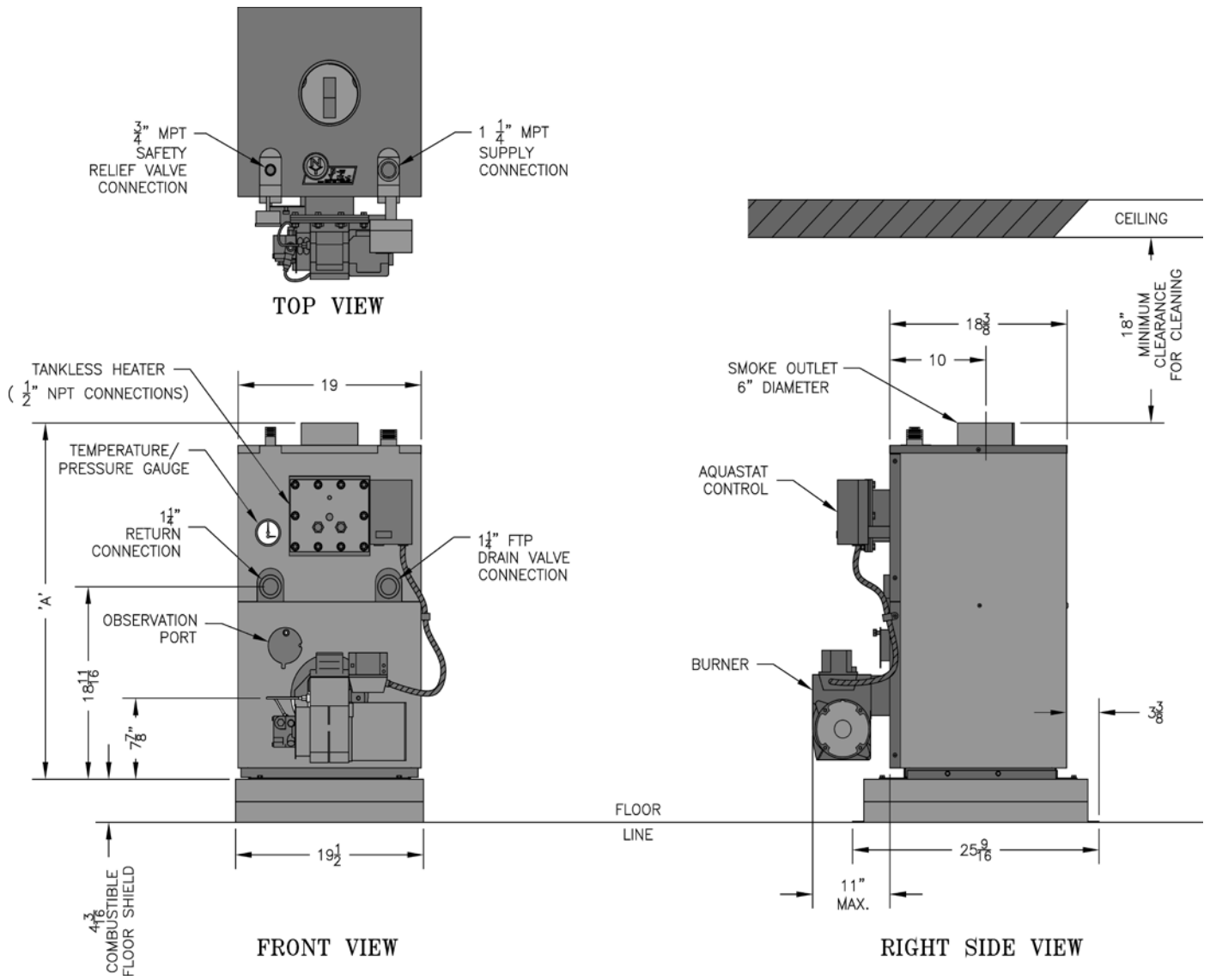
Do not operate boiler on combustible floor without a factory supplied floor shield. Concrete over wood joists is considered combustible flooring. Do not operate on masonry floors, which may contain moisture.

It is the responsibility of the installing contractor to see that all controls are correctly installed and are operating properly when installation is complete including verifying that the limit sensor is fully installed.

Failure to properly install Limit Sensor may result in property damage, personal injury or loss of life due to elevated operating temperatures and/or pressures.

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Boiler Model Number	Dimension 'A'	Minimum Recommended Chimney Sizes		Water Capacity (gallons)	Approx. Shipping Weight (lb.)
		Rectangular	Round		
AP-490U	34-9/16	8" x 8" x 15'	6" x 15'	10.7	290
AP-590U				10.1	300
AP-690U	41"		7" x 15'	16.3	340
AP-790U				15.4	355

Figure 1: AP-U Series Boiler Dimensional Data

I. Pre-Installation

- A. INSPECT SHIPMENT** carefully for any signs of damage.
1. ALL EQUIPMENT is carefully manufactured, inspected and packed. Our responsibility ceases upon delivery of the crated boiler to the carrier in good condition.
 2. ANY CLAIMS for damage or shortage of shipment must filed immediately against the carrier by the consignee. No claims for variances from, or shortage in orders, will be allowed by the manufacturer unless presented within sixty (60) days after receipt of goods.
- B. LOCATE BOILER** in front of final position before removing crate.

CAUTION

Do not drop boiler. Do not bump boiler jacket against floor.

1. LOCATE so that smoke pipe connection to chimney will be short and direct. BOILER IS NOT SUITABLE FOR INSTALLATION ON COMBUSTIBLE FLOOR unless combustible floor shield, supplied by New Yorker® Boiler Co. Inc., is used.

DO NOT install on carpeting. See Figure 3 for floor shield part number and installation instructions.

2. FOR BASEMENT INSTALLATION, provide a solid base, such as concrete, if floor is not level, or if water may be encountered on floor around boiler.
3. PROVIDE SERVICE CLEARANCE of at least 48" from the front of the jacket for servicing of burner and removal of tankless heater.

For minimum clearances to combustibles materials. See Figure 2.

WARNING

Do not support boiler by placing blocks at the four (4) corners of the boiler. Boiler base must be evenly supported under entire base.

Do not operate boiler on combustible floor without a factory supplied floor shield. Concrete over wood joists is considered combustible flooring. Do not operate on masonry floors, which may contain moisture.

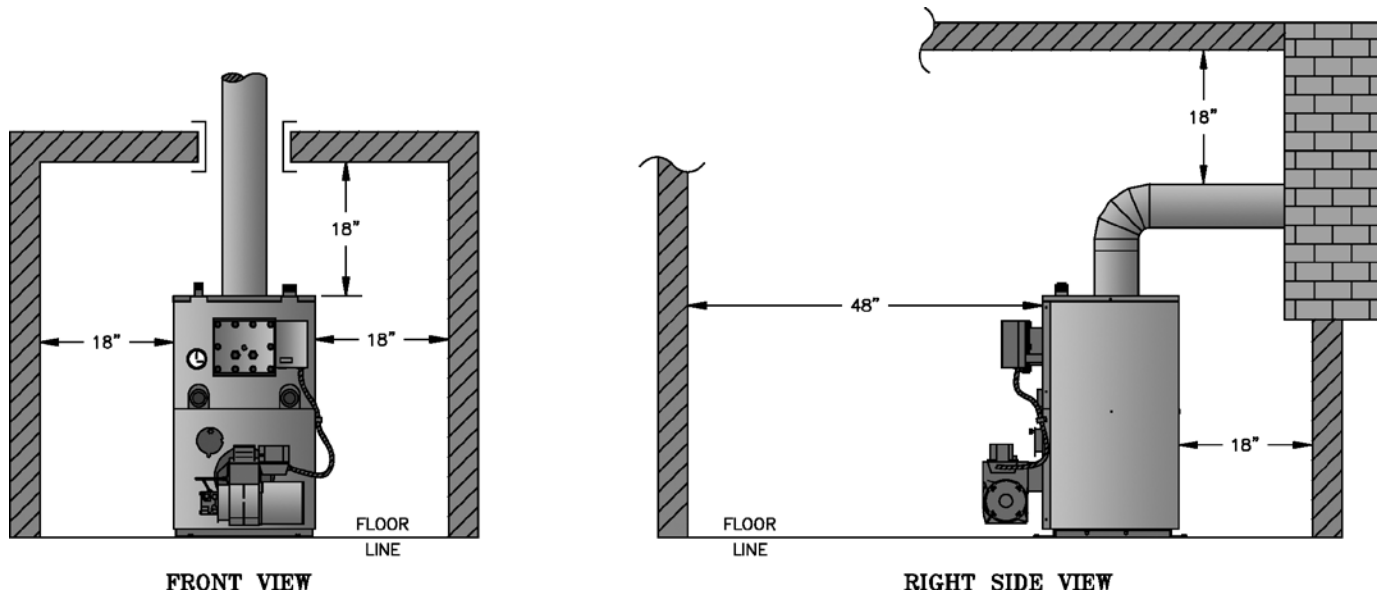


Figure 2: Minimum Clearances to Combustible Materials

NOTE:

1. Listed clearances comply with American National Standard ANSI/NFPA 31, Installation of Oil Burning Equipment.
2. AP-U™ boilers can be installed in rooms with clearances from combustible material as listed above. Listed clearances can not be reduced for alcove or closet installations.
3. For reduced clearances to combustible material, protection must be provided as described in the above ANSI/NFPA 31 standard.

C. REMOVAL OF BOILER

1. Move boiler (in carton) to installation site as close as practical.
2. Remove the carton sleeve.
3. Remove four (4) hex head lag screws, attaching boiler base plate to shipping skid.
4. Carefully, walk boiler to the edge of the skid. Tilt the boiler back, allowing boiler base edge to rest on the floor, then, remove the skid.

D. PROVIDE COMBUSTION AND VENTILATION

AIR. Local code provisions may apply and should be referenced.

WARNING

Adequate combustion and ventilation air must be provided to assure proper combustion and to maintain safe ambient air temperatures.

Do not install boiler where gasoline or other flammable vapors or liquids, or sources of hydrocarbons (i.e. bleaches, fabric softeners, etc.) are used or stored.

1. Determine volume of space (boiler room). Rooms communicating directly with the space in which the appliances are installed, through openings not furnished with doors, are considered a part of the space.
$$\text{Volume}(\text{ft}^3) = \text{Length}(\text{ft}) \times \text{Width}(\text{ft}) \times \text{Height}(\text{ft})$$
2. Determine total input of all appliances in the space. Add inputs of all appliances in the space and round the result to the nearest 1000 BTU per hour.
3. Determine type of space. Divide Volume by total input of all appliances in space. If the result is greater than or equal to 50 ft³/1000 BTU per hour, then it is considered an *unconfined space*. If the result is less than 50 ft³/1000 BTU per hour then the space is considered a *confined space*.
4. For boiler located in an *unconfined space of a conventionally constructed building*, the fresh air infiltration through cracks around windows and doors normally provides adequate air for combustion and ventilation.

5. For boiler located in a confined space or an unconfined space in a building of unusually tight construction, provide outdoor air with the use of two permanent openings which communicate directly or by duct with the outdoors or spaces (crawl or attic) freely communicating with the outdoors. Locate one opening within 12 inches of top of space. Locate remaining opening within 12 inches of bottom of space. Minimum dimension of air opening is 3 inches. Size each opening per following:

a. **Direct communication with outdoors.**

Minimum free area of 1 square inch per 4,000 BTU per hour input of all equipment in space.

- b. **Vertical ducts.** Minimum free area of 1 square inch per 4,000 BTU per hour input of all equipment in space. Duct cross-sectional area shall be same as opening free area.

- c. **Horizontal ducts.** Minimum free area of 1 square inch per 2,000 BTU per hour input of all equipment in space. Duct cross-sectional area shall be same as opening free area.

Alternate method for boiler located within confined space. Use indoor air if two permanent openings communicate directly with additional space(s) of sufficient volume such that combined volume of all spaces meet criteria for unconfined space. Size each opening for minimum free area of 1 square inch per 1,000 BTU per hour input of all equipment in spaces, but not less than 100 square inches.

6. Louvers and Grilles of Ventilation Ducts

- a. All outside openings should be screened and louvered. Screens used should not be smaller than 1/4 inch mesh. Louvers will prevent the entrance of rain and snow.
- b. Free area requirements need to consider the blocking effect of louvers, grilles, or screens protecting the openings. If the free area of the louver or grille is not known, assume wood louvers have 20-25 percent free area and metal louvers and grilles have 60-75 percent free area.
- c. Louvers and grilles must be fixed in the open position, or interlocked with the equipment to open automatically during equipment operation.

INSTALLATION INSTRUCTIONS FOR OPTIONAL SHIELD REQUIRED FOR COMBUSTIBLE FLOOR

This shield for combustibles floors is intended for use **only** with the following New Yorker oil-fired boilers:

Use Part Number 6183504 for the following models:

AP-490U AP-590U AP-690U AP-790U
ADDS 4-3/16" TO BOILER HEIGHT

- 1) Place shield on combustibles floor with "TOP" surface upward and "FRONT" surface directly below the expected position of the oil burner.
- 2) Locate shield such that clearances to combustibles walls are as indicated in Figure 3. These dimensions will assure that the boiler jacket will be at least 18" from the side and rear walls and 48" from the front wall, as required by ANSI/NFPA 31.
- 3) Fasten shield to combustibles floor to keep shield from shifting position during setting of boiler.
- 4) Set boiler squarely on top of shield such that base plate of boiler rests flat on top surface of shield and does not over-hang shield on any side. Confirm clearance to combustibles walls. Refer to Figure 2.
- 5) Do not enclose boiler (including shield) on all four sides. Boiler may be enclosed on any three sides while maintaining minimum clearances shown in Figure 2 for each of those three sides.

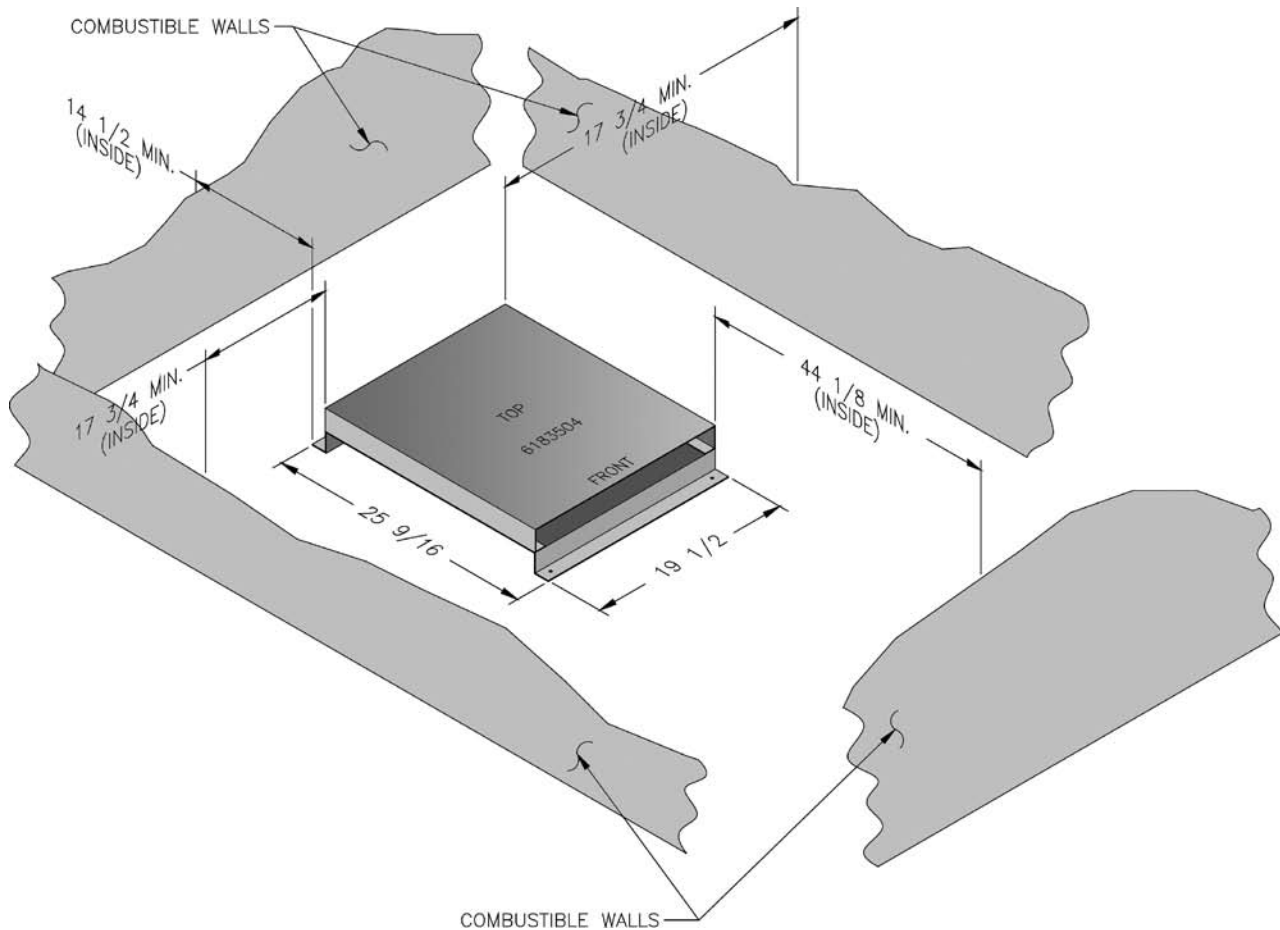


Figure 3: Floor Shield

II. Knockdown Boiler Assembly

Knockdown AP-U Series boilers are shipped as two separate items:

- Bare Boiler Assembly (mounted on skid)
- Jacket Carton Assembly

Inspect shipment carefully for any signs of damage.

A. REMOVAL OF BOILER

1. Remove and discard four boiler-to-skid hold down fasteners. Refer to Figure 4.
2. Carefully walk boiler to the skid edge. Tilt the boiler back, allowing the base edge to rest on the floor, and remove the skid.
3. Remove the adhesive backed label-containing envelope from boiler and set aside.
4. Remove Misc. Parts Bag and bagged Temperature and Pressure Gauge (both tucked inside canopy assembly flue collar) and set aside.

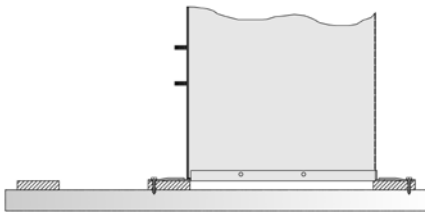


Figure 4: Bare Boiler on Skid

B. INSTALLING THE JACKET

1. Remove jacket parts and jacket hardware bag from Jacket Carton Assembly shipping carton.
2. Install the Wrap-Around jacket panel first. Bend Wrap-Around panel as shown in Figure 5. Attach the bent panel to base using three #10-1/2" slotted hex washer head screws supplied. Engage all screws but do not tighten yet.
3. Remove 5/16-18 hex nut, 5/16 flat washer, observation cover spring and Observation Port Cover and set aside.
4. Attach Lower Front Jacket panel to installed Wrap-Around panel with four #10-1/2" slotted hex washer head screws supplied. See Figure 5.
5. Attach Upper Front Jacket panel to installed Wrap-Around panel with four #10-1/2" slotted hex washer head screws supplied. See Figure 5.
6. Lastly, install Top Jacket panel and secure to installed Wrap-Around panel with two remaining #10-1/2" slotted hex washer head screws. See Figure 5.
7. Once installed, center Top Jacket panel opening over canopy assembly flue collar and tighten up all three screws securing Wrap-Around panel to base.

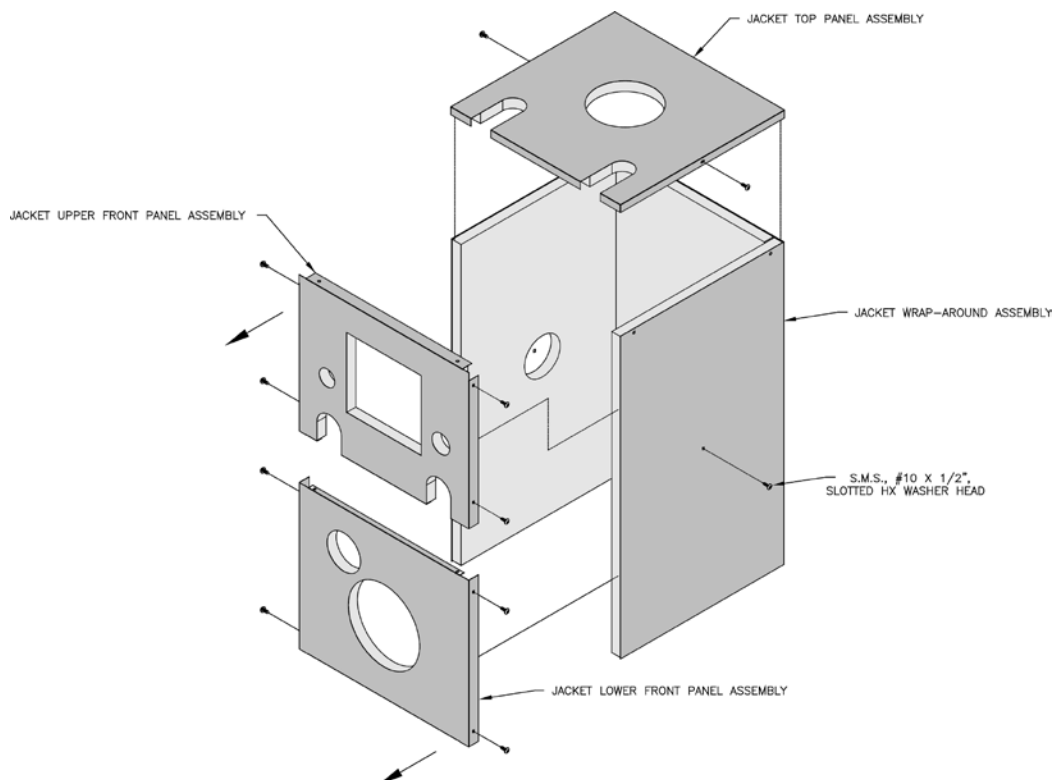


Figure 5: Jacket Installation

8. Locate Rating Label and Energy Guide Label from Bare Boiler Assembly.
9. Attach labels per Figure 6.

NOTICE

Installation is not complete until the Rating and Energy Guide Labels are installed.

C. INSTALLATION OF BOILER CONTROLS

1. Install provided Temperature and Pressure gauge and aquastat well into appropriate tappings; tighten securely to prevent water leaks.
2. Install provided 1-1/4 x 3/4 reducing hex bushing and drain valve into lower right hand 1-1/4 forged coupling 'drain' tapping.
3. Install provided 1-1/4 x 3" black nipple into lower left hand 1-1/4 forged coupling 'return' tapping.
4. Mount the limit control onto the provided immersion well. Tighten clamp screws to secure control to immersion well. Apply heat transfer paste (not furnished) to limit sensor and fully insert limit sensor into immersion well such that the tip on the limit sensor touches the bottom of the immersion well. See Figure 7. Wire the control per Figure 16 or Figure 17, Section V "Electrical", as applicable.

WARNING

Aquastat bulb must be fully inserted into the well.

5. Install provided safety relief valve (for details see Figure 10).
6. Re-install Observation Port Cover and related hardware in reverse order to removal. See Figure 8.

D. BURNER INSTALLATION

1. Insure burner gasket proper fit/positioning on burner air tube, relative to burner mounting flange, prior to burner mounting. See Figure 8.

CAUTION

Do not install burner without gasket.

2. Mount installer-supplied burner onto base front panel studs and secure with provided 5/16 flat washers and brass 5/16-18 hex nuts. Refer to Figure 8.
3. Wire the burner per instructions, provided with the burner, and, Figure 16, 16A, 17 or 17A, as applicable.

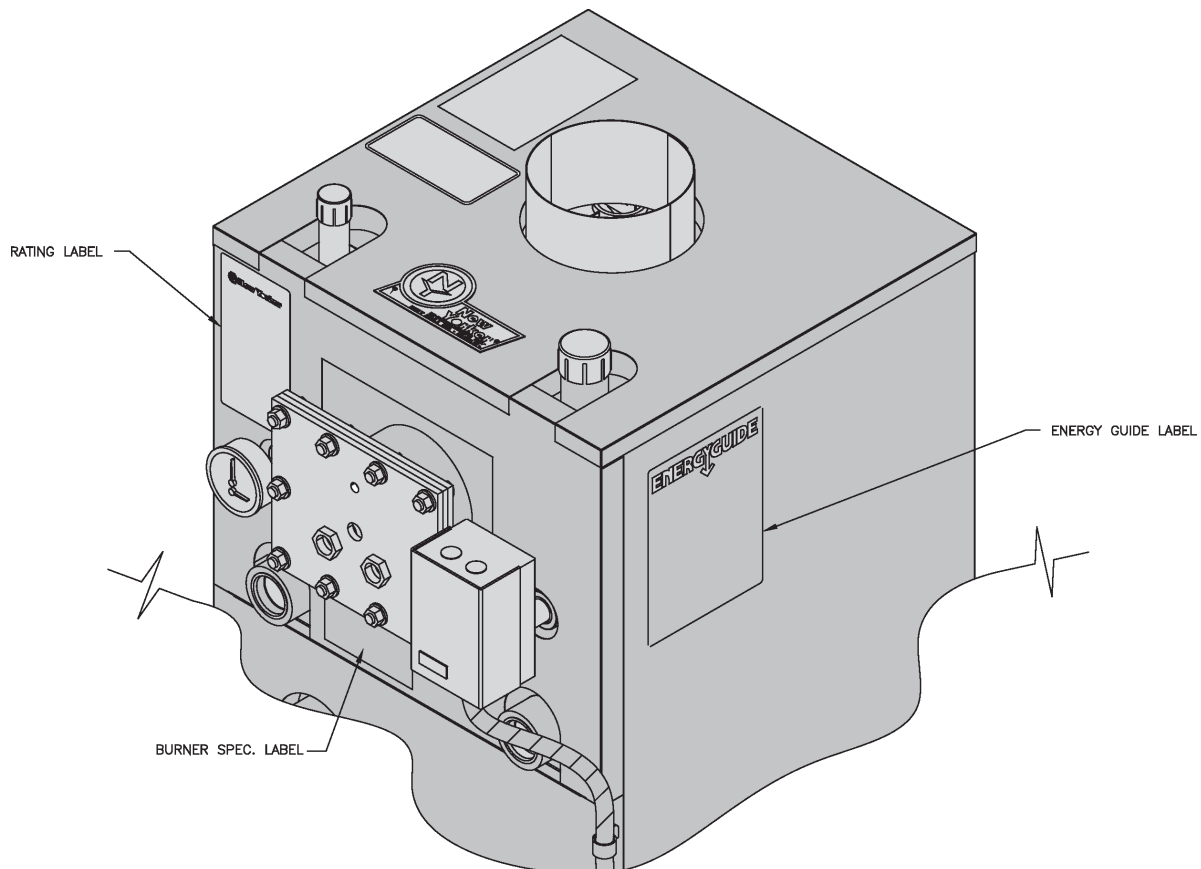


Figure 6: Label Locations

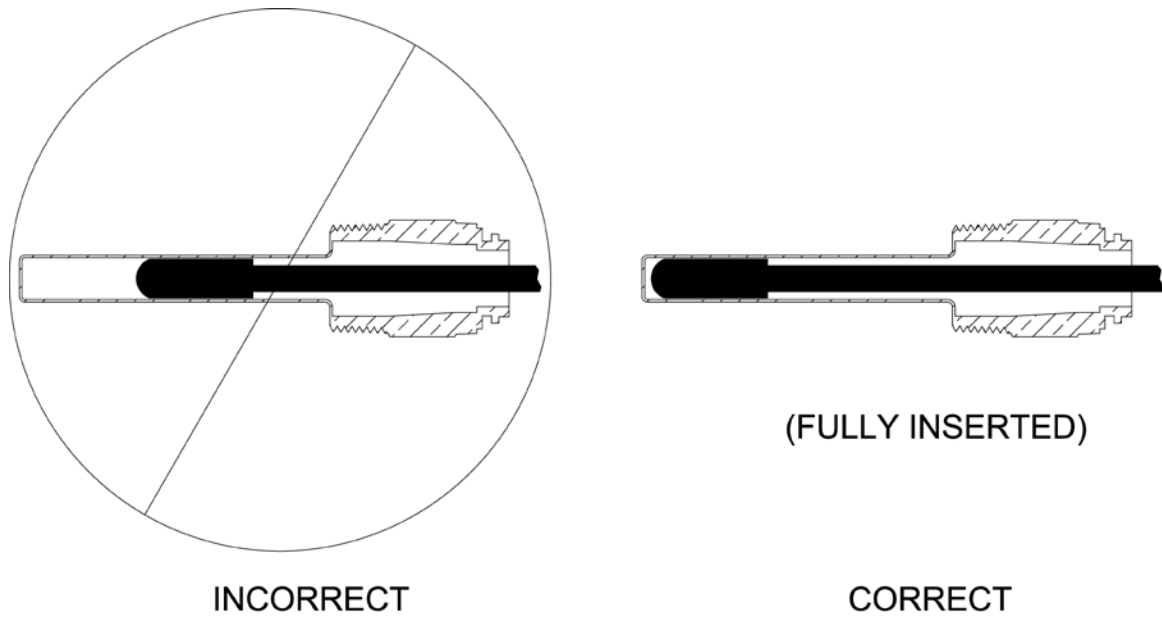


Figure 7: Limit Sensor Insertion

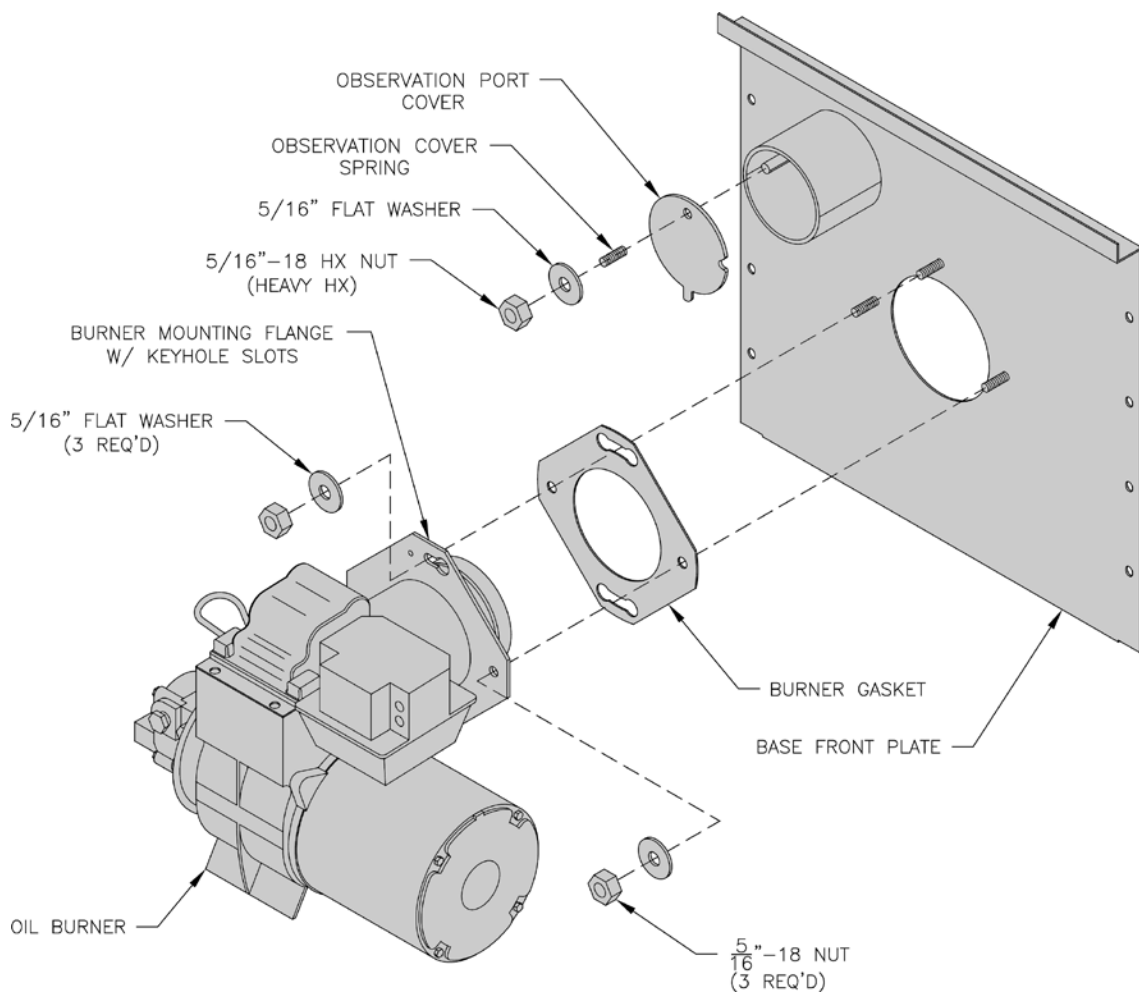


Figure 8: Burner Mounting

III. Water Piping and Trim

WARNING

Failure to properly pipe boiler may result in improper operation and damage to boiler or structure.

Oxygen contamination of boiler water will cause corrosion of iron and steel boiler components, and can lead to boiler failure. New Yorker's Standard Warranty does not cover problems caused by oxygen contamination of boiler water or scale (lime) build-up caused by frequent addition of water.

A. DESIGN A PIPING SYSTEM and install boiler which will prevent oxygen contamination of boiler water and frequent water additions.

1. There are many possible causes of oxygen contamination such as:
 - a. Addition of excessive make-up water as a result of system leaks.
 - b. Absorption through open tanks and fittings.
 - c. Oxygen permeable materials in the distribution system.
2. In order to insure long product life, oxygen sources should be eliminated. This can be accomplished by taking the following measures:
 - a. Repairing system leaks to eliminate the need for addition of make-up water.
 - b. Eliminating open tanks from the system.
 - c. Eliminating and/or repairing fittings which allow oxygen absorption.
 - d. Use of non-permeable materials in the distribution system.
 - e. Isolating the boiler from the system water by installing a heat exchanger.

- a. If this boiler is used in connection with refrigeration systems, the boiler must be installed so that the chilled medium is piped in parallel with the heating boiler using appropriate valves to prevent the chilled medium from entering the boiler. See Figure 9. Also, consult I=B=R Installation and Piping Guides.

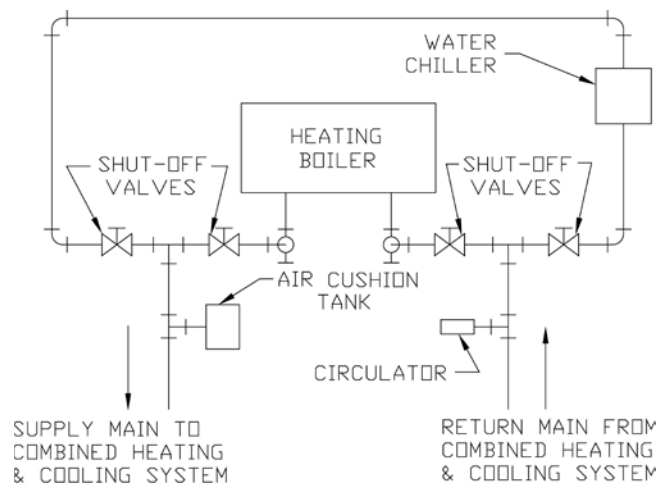


Figure 9: Recommended Piping for Combination Heating and Cooling (Refrigeration) System

- b. If this boiler is connected to heating coils located in air handling units where they may be exposed to refrigerated air, the boiler piping must be equipped with flow control valves to prevent gravity circulation of boiler water during the operation of the cooling system.
- c. If boiler is used with an Indirect-Fired Domestic Water Heater, install the Indirect-Fired Domestic Water Heater as a separate heating zone. Refer to the Indirect-Fired Domestic Water Heater Installation, Operating, and Service Instructions for additional information.
- d. Use a system bypass if the boiler is to be operated in a system which has a large volume or excessive radiation where low boiler water temperatures may be encountered (i.e. converted gravity circulation system, etc.) The bypass should be the same size as the supply and return lines with valves located in the bypass and return

WARNING

System supply and return piping must be connected to correct boiler pipe.

New Yorker recommends sizing the system circulator to supply sufficient flow (GPM) to allow a 20°F temperature differential in the system. When sizing the system circulator, the pressure drop of all radiators, baseboard and radiant tubing and all connecting piping must be considered.

3. Connect System supply and return piping to boiler. See Figures 10 and 11. Also, consult I=B=R Installation and Piping Guides. Maintain minimum ½ inch clearance from hot water piping to combustible materials.

line as illustrated in Figures 11 and 12 in order to regulate water flow for maintenance of higher boiler water temperature. Set the bypass and return valves to a half throttle position to start. Operate boiler until the system water temperature reaches its normal operating range. Adjust the valves to maintain 180°F to 200°F boiler water temperature and greater the 120°F return temperature. Adjust both valves simultaneously. Closing the boiler return valve while opening the bypass valve will raise the boiler return temperature. Opening the boiler return valve while closing the by-pass valve will lower the boiler return temperature.

- e. A water boiler installed above radiation level must be provided with a low water cutoff device as part of the installation.

- B. INSTALL SAFETY RELIEF VALVE.** See Figures 10, 11 and 12. Safety Relief Valve must be installed with spindle in the vertical position. Installation of the relief valve must be consistent with ANSI/ASME Boiler and Pressure Vessel Code, Section IV.

WARNING

Safety (relief) valve discharge piping must be piped near floor to eliminate potential of severe burns. Do not pipe in any area where freezing could occur. Do not install any shut-off valves, plugs or caps.

- C. AIR VENT.** An air vent or purge must be incorporated in the system to easily remove air from the boiler when the system is filled. The boiler has a built in dip tube which works with the air vent to clear the boiler of air. Improper application of the air vent will cause steaming in the boiler. See Figure 10.
- D. INSTALL DRAIN VALVE** in return piping. See Figures 11 and 12.

- E. OIL, GREASE, AND OTHER FOREIGN MATERIALS** which accumulate in new hot water and a new or reworked system should be boiled out, and then thoroughly flushed. A qualified water treatment chemical specialist should be consulted for recommendations regarding appropriate chemical compounds and concentrations which are compatible with local environmental regulations.

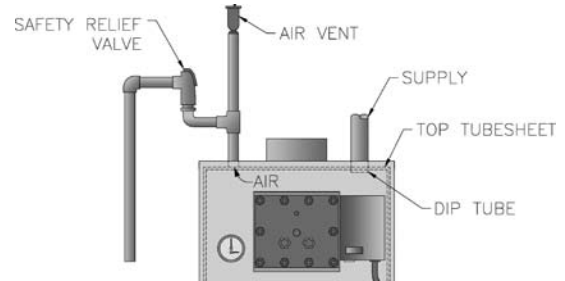


Figure 10: Air Vent and Safety Relief Valve Installation Detail

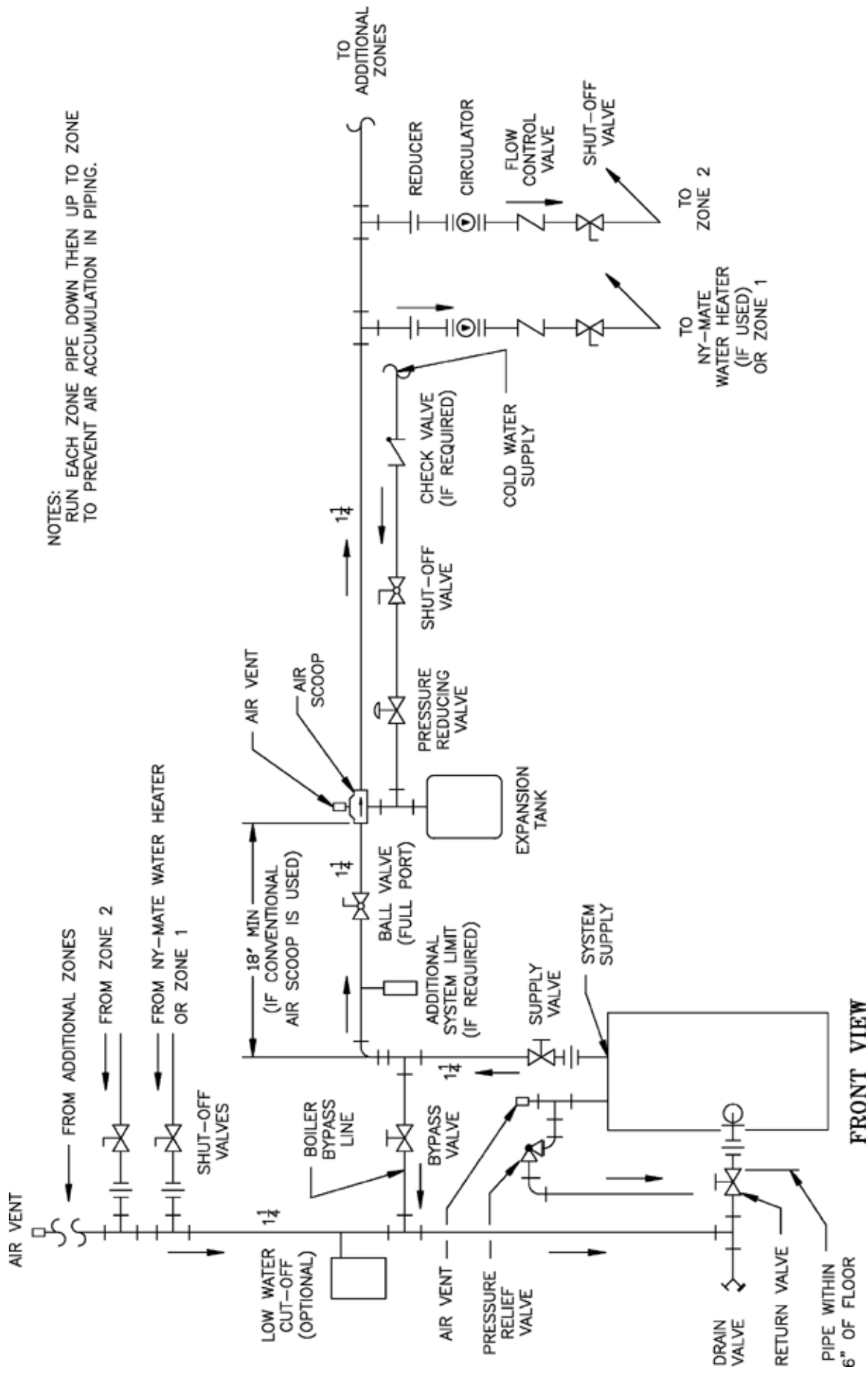
- F. AFTER THE BOILER AND SYSTEM HAVE BEEN CLEANED** and flushed, and before refilling the entire system add appropriate water treatment chemicals, if necessary, to bring the pH between 7 and 11.
- G. CONNECT TANKLESS HEATER PIPING AS SHOWN IN FIGURE 13.** See Table 1 for Tankless Heater Rating.

WARNING

Install automatic mixing valve at tankless heater outlet to avoid risk of burns or scalding due to excessively hot water at fixtures. Adjust and maintain the mixing valve in accordance with the manufacturer's instructions. Do not operate tankless heater without mixing valve.

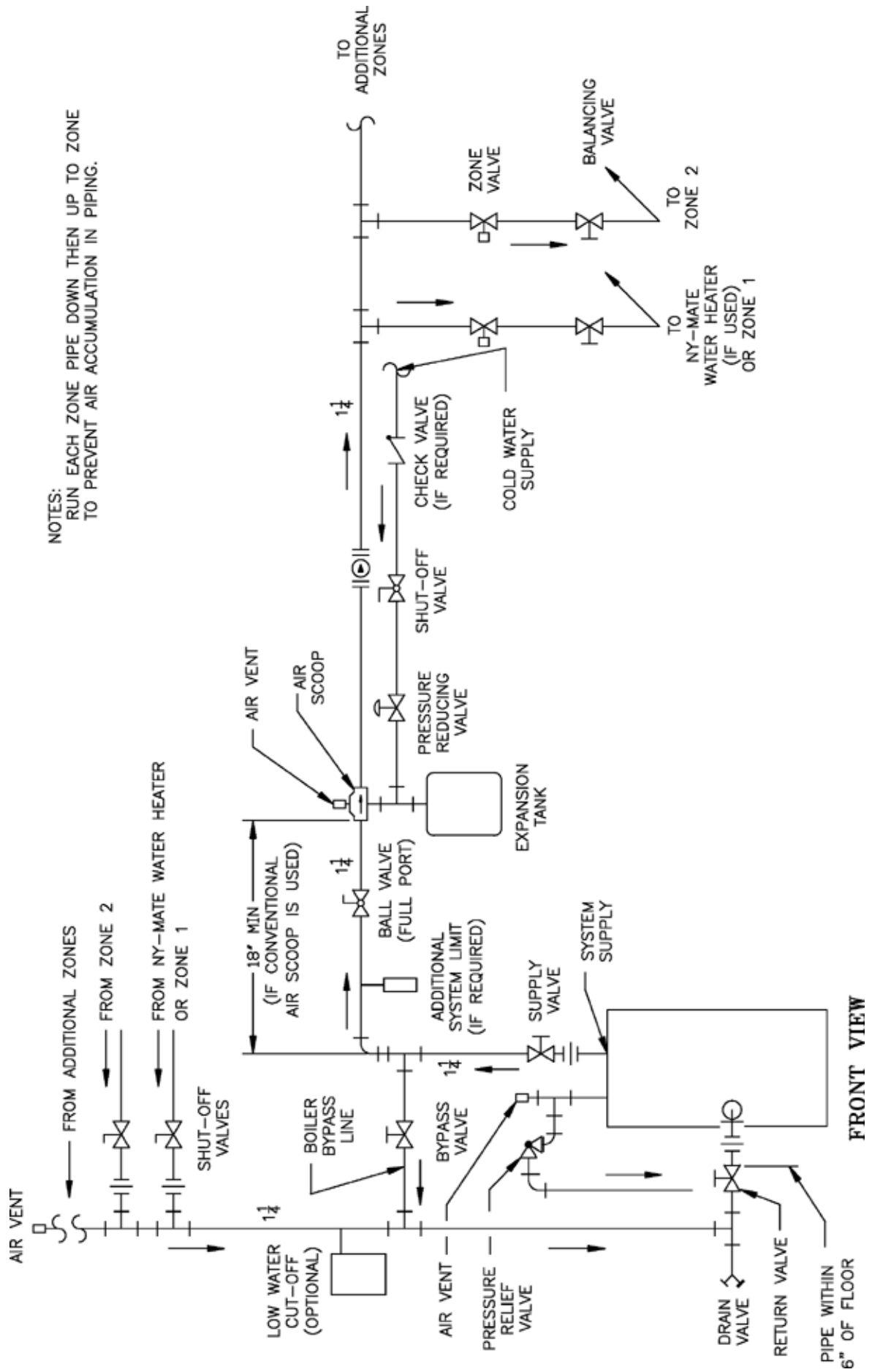
WARNING

Installation is not complete unless a safety relief valve is installed as shown in Figure 10.



NOTES:
 RUN EACH ZONE PIPE DOWN THEN UP TO ZONE
 TO PREVENT AIR ACCUMULATION IN PIPING.

Figure 11: Recommended Boiler Piping for Circulator Zoned Heating Systems



NOTES:
 RUN EACH ZONE PIPE DOWN THEN UP TO ZONE
 TO PREVENT AIR ACCUMULATION IN PIPING.

Figure 12: Boiler Piping for Zone Valve Zoned Heating Systems

THE FOLLOWING GUIDELINES SHOULD BE FOLLOWED WHEN PIPING THE TANKLESS HEATER:

1. **FLOW REGULATION** — If flow through the heater is greater than its rating, the supply of adequate hot water may not be able to keep up with the demand. For this reason a flow regulator matching the heater rating should be installed in the cold water line to the heater. The flow regulator should preferably be located below the inlet to the heater and a minimum of 3' away from the inlet so that the regulator is not subjected to excess temperatures that may occur during "off" periods when it is possible for heat to be conducted back through the supply line. The flow regulator also limits the flow of supply water regardless of inlet pressure variations in the range of 20 to 125 psi.
2. **TEMPERING OF HOT WATER** — Installation of an automatic mixing valve will lengthen the delivery of the available hot water by mixing some cold water with the hot. This prevents the possibility of scalding hot water at the fixtures. In addition, savings of hot water will be achieved since the user will not waste as much hot water while seeking a water temperature. Higher temperature hot water

required by dishwashers and automatic washers is possible by piping the hot water from the heater prior to entering the mixing valve. The mixing valve should be "trapped" by installing it below the cold water inlet to heater to prevent lime formation in the valve. Refer to Figure 13.

3. **FLUSHING OF HEATER** — All water contains some sediment which settles on the inside of the coil. Consequently, the heater should be periodically backwashed. This is accomplished by installing hose bibs as illustrated and allowing water at city pressure to run into hose bib A, through the heater, and out hose bib B until the discharge is clear. The tees in which the hose bibs are located should be the same size as heater connections to minimize pressure drop.
4. **HARD WATER** — A water analysis is necessary to determine the hardness of your potable water. This is applicable to some city water and particularly to well water. An appropriate water softener should be installed based on the analysis and dealer's recommendation. This is not only beneficial to the tankless heater but to piping and fixtures plus the many other benefits derived from soft water.

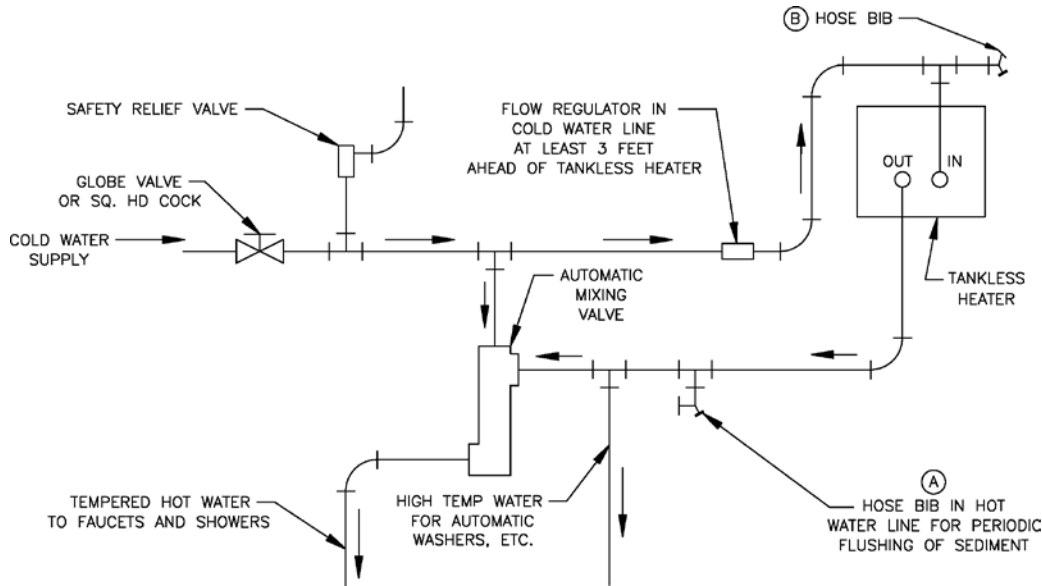


Figure 13: Schematic Tankless Heater Piping

Table 1: Tankless Heater Ratings

Boiler Model	Tankless Heater Model			
	S-4		S-5	
	GPM	PSID	GPM	PSID
AP-490U	3	12	3½	15
AP-590U	3¼	16	3¾	25
AP-690U	3½	19		
AP-790U				

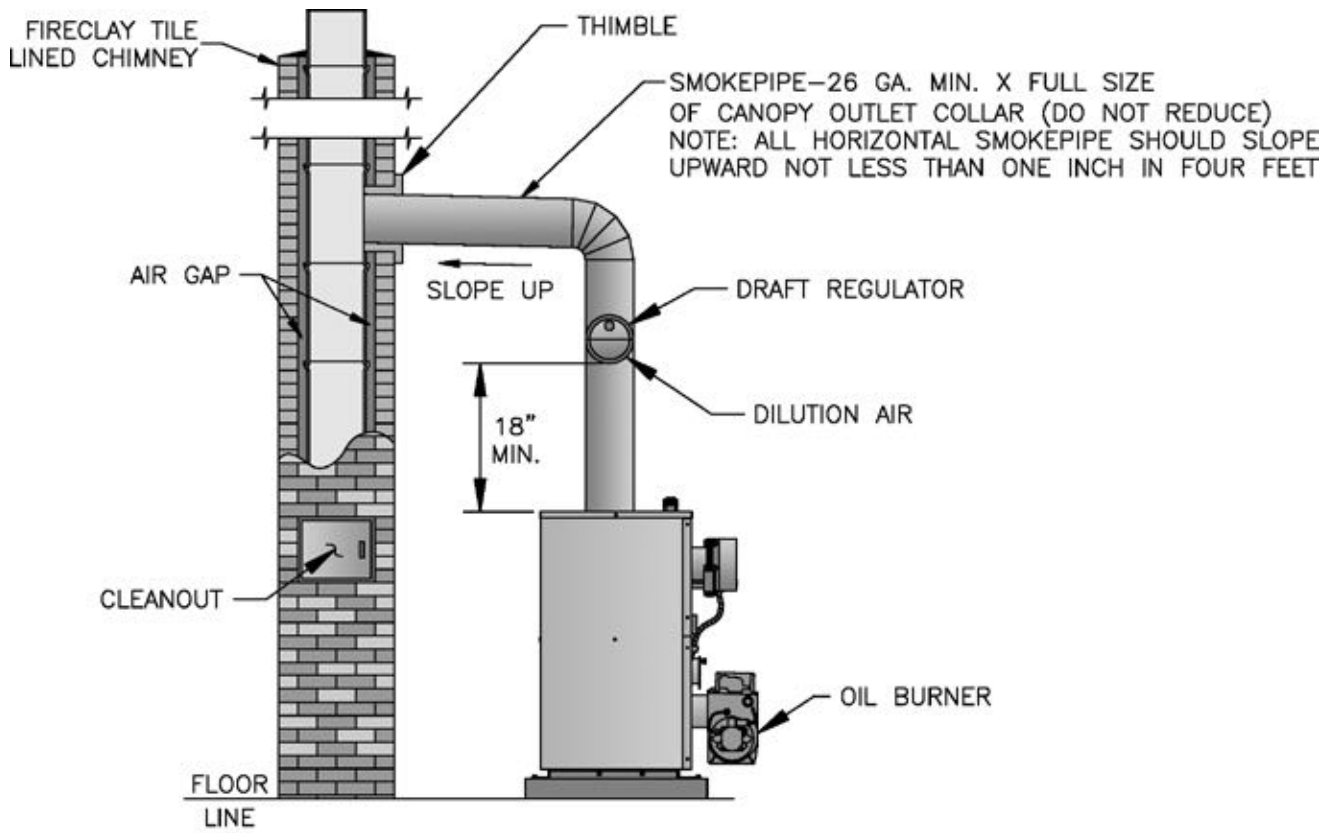
IV. Venting

A. GENERAL GUIDELINES.

1. Vent system installation must be in accordance with these instructions and applicable provisions of local building codes. Contact local building or fire officials about restrictions and installation inspection in your area.
2. The AP-U Series is designed to be vented into a fireclay tile-lined masonry chimney or chimney constructed from type-L vent or a factory built chimney that complies with the type HT requirements of UL103. The chimney or vent pipe shall have a sufficient draft at all times, to assure safe proper operation of the boiler. See Figure 14 for recommended installation.
 - a. Install a draft regulator (supplied by installer) following the instructions furnished with the regulator. See Figure 15 for alternate regulator locations.
 - b. With any new or replacement installation the chimney has to be considered. Chimneys that have a high heat loss become less suitable as the heat loss of the home goes down and the efficiency of the boiler goes up. Most homes have a chimney appropriate for the fuel and the era in which the home was built. That may have been a coal fired or an inefficient oil fired boiler built into a home without insulation or storm windows. With increasing fuel prices that home probably has been insulated and fitted with storm windows so that the heat loss of the home has been reduced. This requires less fuel to be burned and sends less heat up the chimney. A new boiler probably has a higher efficiency than the boiler being replaced. That probably

means that the stack temperature from the new boiler will be lower than that from the old boiler and with less room air being drawn up the chimney to dilute the stack gases. The combination of a large uninsulated chimney, reduced firing rate, reduced firing time, lower stack temperature and less dilution air can, in some cases, contribute to the condensing of small amounts of water vapor in the chimney. Such condensation, when it occurs, can cause chimney deterioration. In extreme cases, the chimney may have to be lined to insulate the chimney and thus prevent the condensation. The addition of dilution air into the chimney may assist in drying the chimney interior surfaces. A massive chimney on a cold, or exposed outside wall may have produced adequate draft when it was fired with a higher input and greater volumes of heated gases. With reduced input and volume, the draft may be severely affected. In one instance our research showed a new chimney of adequate sizing produced only $-.035''$ W.C. after 30 minutes of continuous firing at 13.0% CO_2 . Outside wall chimneys take longer to heat up and can have $.00''$ W.C. draft at burner start-up. You may have to consider a special alloy chimney flue liner with insulation around it and stabilizing draft cap or even a draft inducing fan in severe cases.

- c. For the same reasons as in (2.) above, heat extractors mounted into the breeching are not recommended.
3. For minimum clearances to combustible materials refer to Figure 2.



LEFT SIDE VIEW

Figure 14: Recommended Smokepipe Arrangement and Chimney Requirements

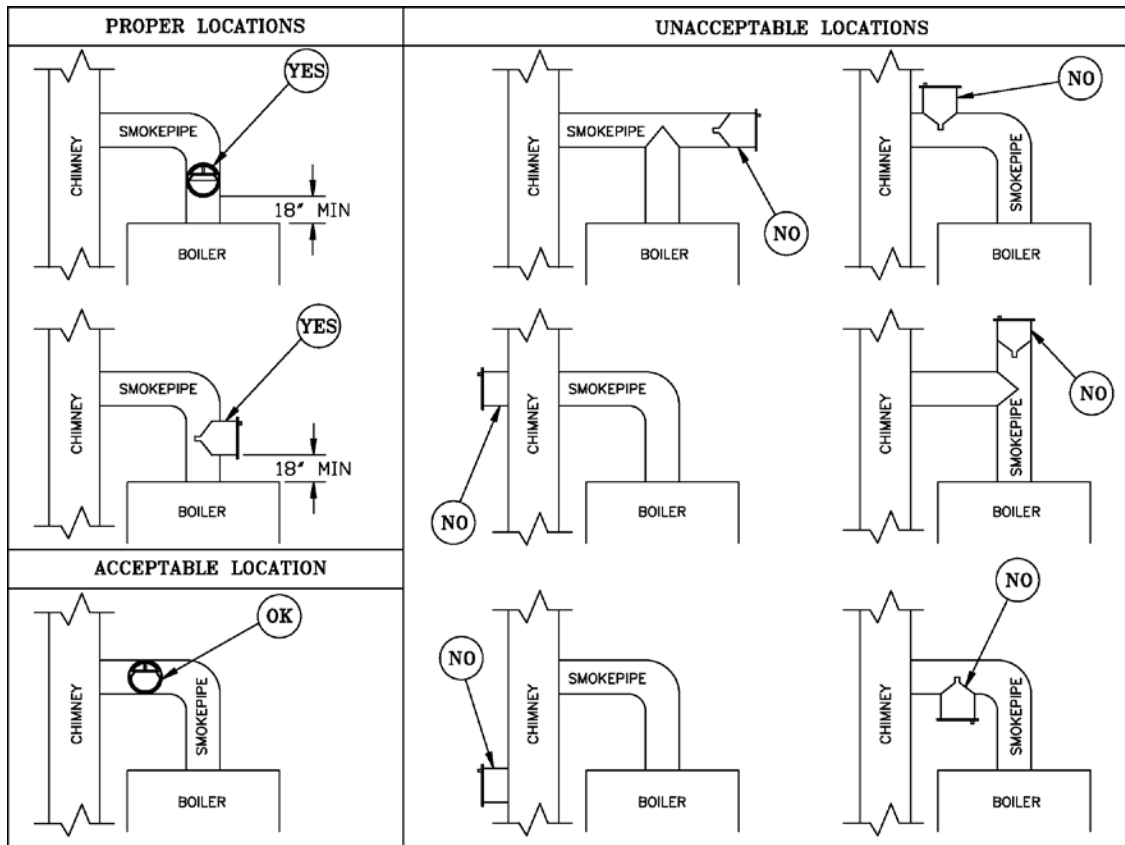


Figure 15: Draft Regulator Locations

V. Electrical

DANGER

Positively assure all electrical connections are unpowered before attempting installation or service of electrical components or connections of the boiler or building. Lock out all electrical boxes with padlock once power is turned off.

WARNING

Failure to properly wire electrical connections to the boiler may result in serious physical harm.

Electrical power may be from more than one source. Make sure all power is off before attempting any electrical work.

Each boiler must be protected with a properly sized fused disconnect.

Never jump out or make inoperative any safety or operating controls.

The wiring diagrams contained in this manual are for reference purposes only. Refer to the wiring diagram of any controls used with the boiler. Read, understand and follow all wiring instructions supplied with the controls.

A. GENERAL

1. Install wiring and electrically ground boiler in accordance with requirements of the authority having jurisdiction, or in absence of such requirements the National Electrical Code, ANSI/NFPA 70, and/or the CSA C22.1 Electric Code.
2. A separate electrical circuit must be run from the main electrical service with an over-current device/disconnect in the circuit. A service switch is recommended and may be required by some local jurisdictions.
3. Wiring should conform to Figure 16 and/or 17.

B. SYSTEM CONTROLS AND WIRING

1. Refer to National Electric Code or Local Electric Codes for proper size and type of wire required. Follow Code.
2. Use anti-short bushings on all wiring passing through boiler jacket, junction boxes and/or control boxes.
3. Use armored cable (BX) over all exposed line voltage wiring.
4. If an indirect water heater is used, use priority zoning. Do not use priority zoning for Hydro-Air Systems.
5. Single Zone System – Refer to Figure 16 or 17 for the electrical diagram for this type of system. Connect the system circulator wire leads to the proper locations on the Aquastat control, L7224A/L7248A. See Figure 16A or 17A. Connect the thermostat to the 'T-T' terminals on the L7224A/L7248A control. Set thermostat heat anticipator settings to 0.60 amps.

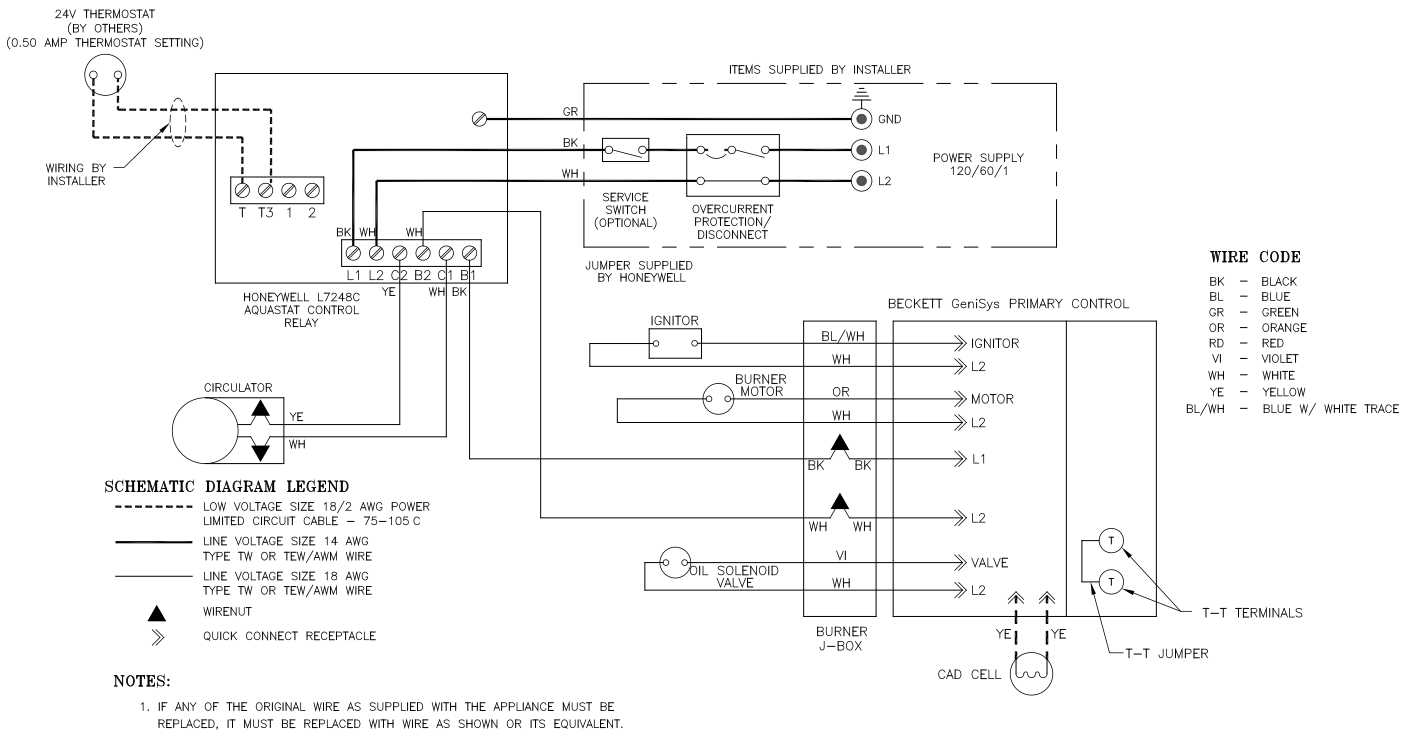


Figure 16: AP-U Boiler Wiring Less Tankless, Single Circulator w/Beckett Burner

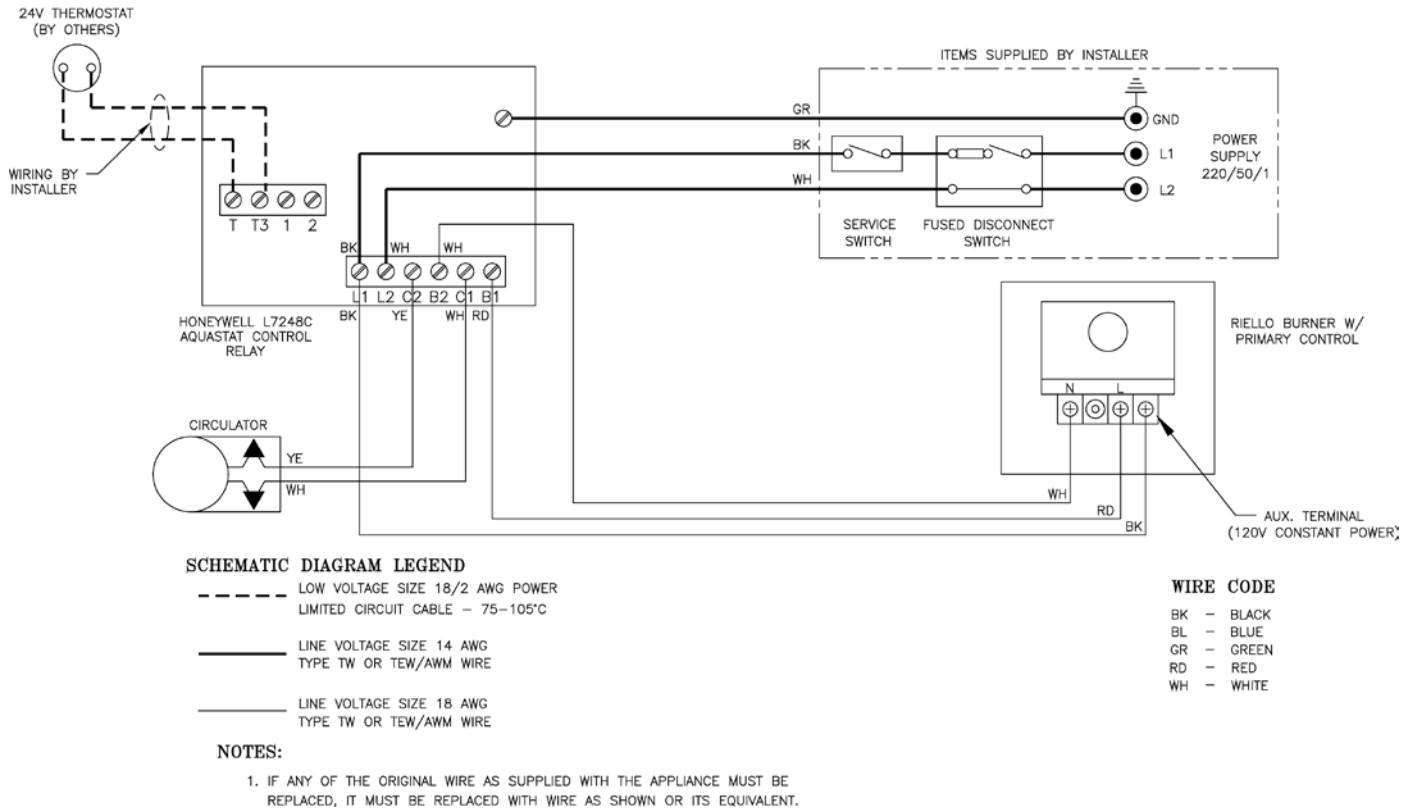


Figure 16A: AP-U Boiler Wiring Less Tankless, Single Circulator w/Riello Burner

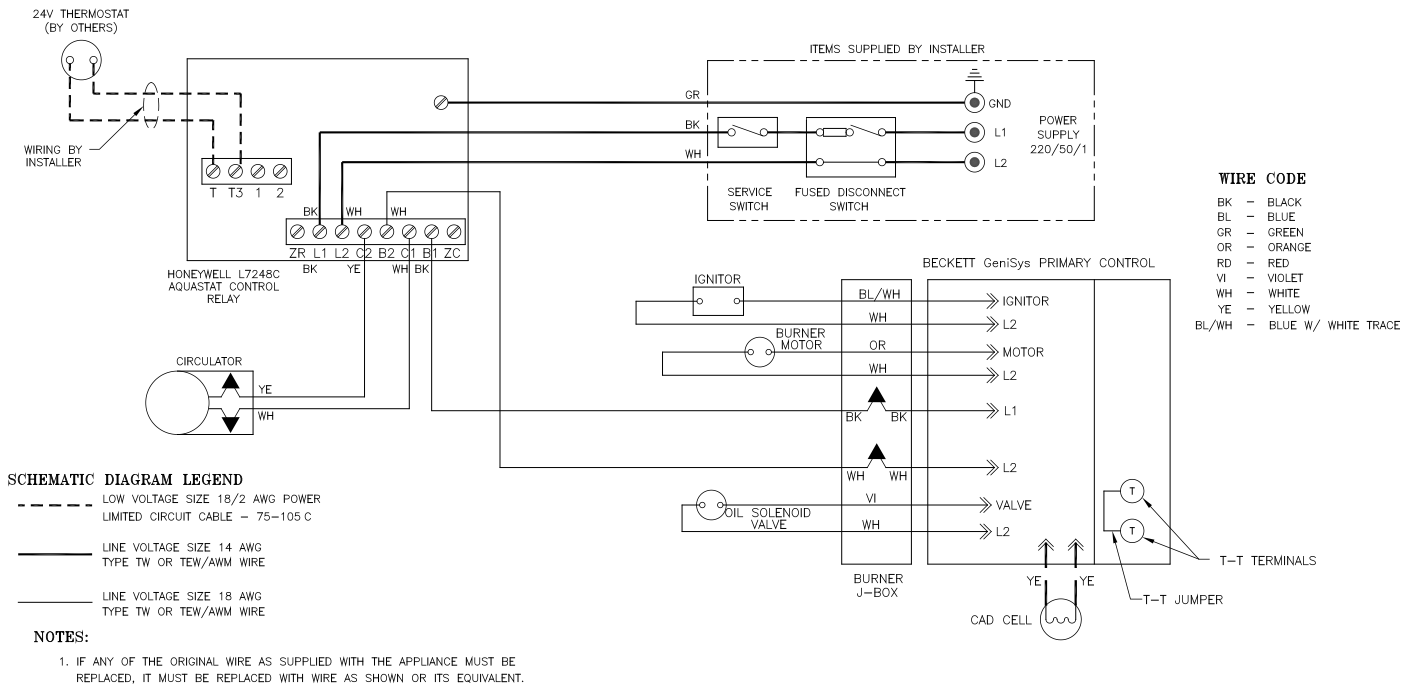


Figure 17: AP-U Boiler Wiring with Tankless, Single Circulator w/Beckett Burner

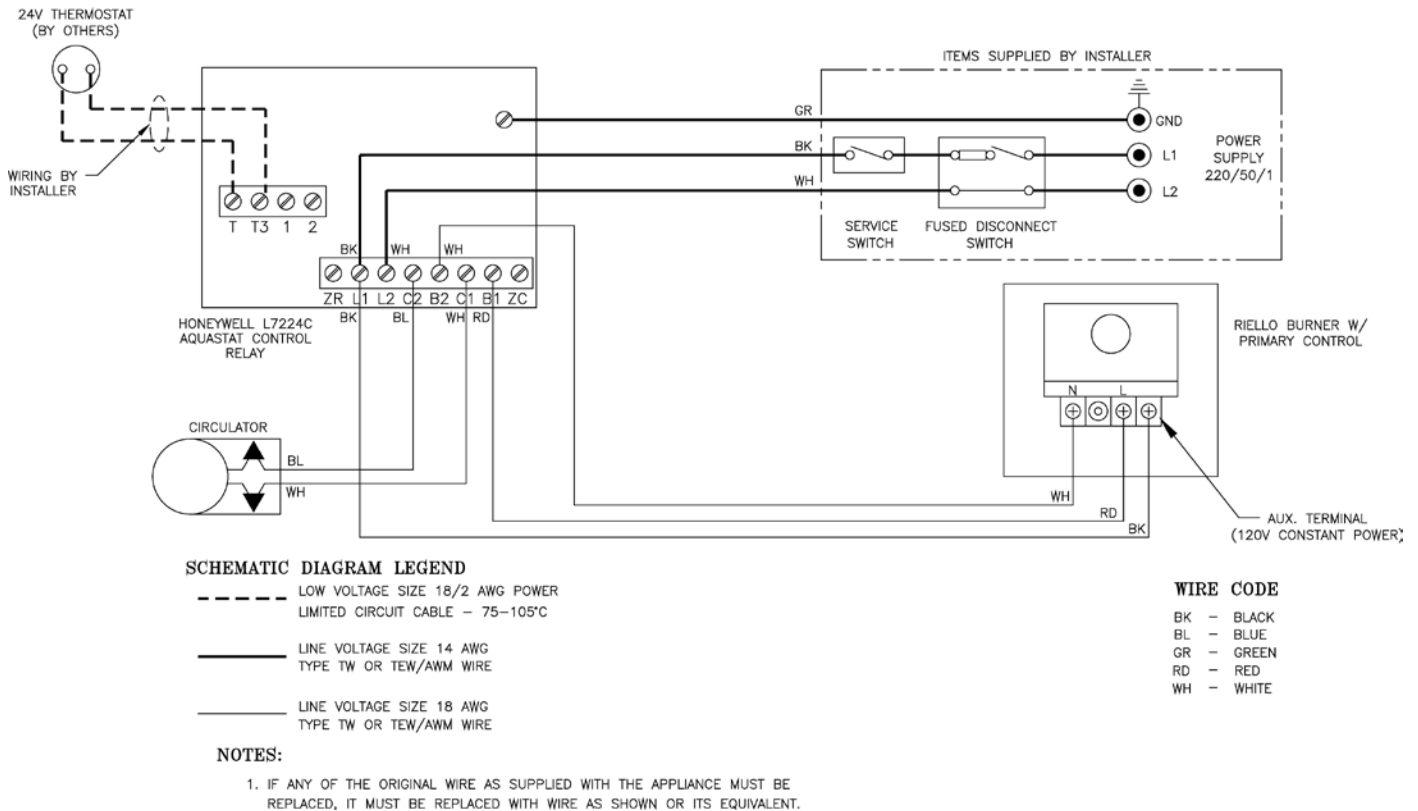


Figure 17A: AP-U Boiler Wiring with Tankless, Single Circulator w/Riello Burner

VI. Oil Piping

A. GENERAL.

1. Use flexible oil line(s) so that burner can be removed without disconnecting the oil supply.
2. A supply line fuel oil filter is recommended as a minimum for all firing rates but a pleated paper fuel oil filter is recommended for the lowest firing rate application to prevent nozzle fouling.
3. Use Flared fittings only. Do not use compression fittings.
4. Use of a high efficiency micron filter (Garber or equivalent) in addition to conventional filter is highly recommended.

B. SINGLE-PIPE OIL LINES.

1. Standard burners are provided with single-stage 3450 rpm fuel units with the bypass plug removed for single-pipe installations.
2. The single-stage fuel unit may be installed single-pipe with gravity feed or lift. Maximum allowable lift is 8 feet. See Figure 18.

NOTICE

Oil piping must be absolutely airtight or leaks or loss of prime may result. Bleed line and fuel unit completely.

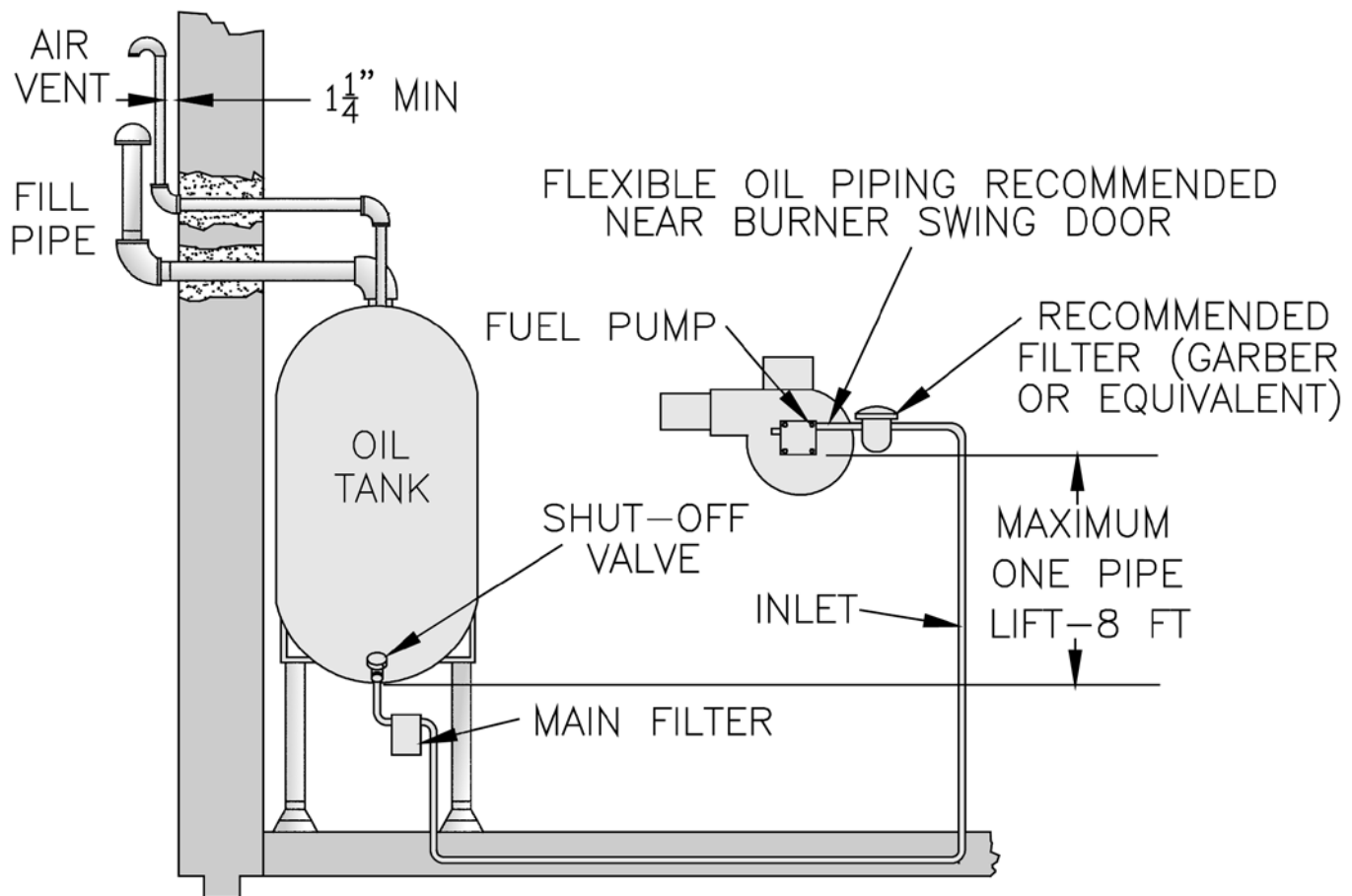


Figure 18: Single-Pipe Installation

**Table 2: Single Stage Units (3450 RPM)
Two Pipe Systems**

Lift "H" (See Figure)	Maximum Length of Tubing "H" + "R" (See Figure)	
	3/8" OD Tubing (3 GPH)	1/2" OD Tubing (3 GPH)
0'	84'	100'
1'	78'	100'
2'	73'	100'
3'	68'	100'
4'	63'	100'
5'	57'	100'
6'	52'	100'
7'	47'	100'
8'	42'	100'
9'	36'	100'
10'	31'	100'
11'	26'	100'
12'	21'	83'
13'	---	62'
14'	---	41'

**Table 3: Two-Stage Units (3450 RPM)
Two Pipe Systems**

Lift "H" (See Figure)	Maximum Length of Tubing "H" + "R" (See Figure)	
	3/8" OD Tubing (3 GPH)	1/2" OD Tubing (3 GPH)
0'	93'	100'
2'	85'	100'
4'	77'	100'
6'	69'	100'
8'	60'	100'
10'	52'	100'
12'	44'	100'
14'	36'	100'
16'	27'	100'
18'	---	76'

C. TWO-PIPE OIL LINES

1. For two-piped systems, where more lift is required, the two-stage fuel unit is recommended. Table 2 (single-stage) and Table 3 (two-stage) show allowable lift and lengths of 3/8 inch and 1/2 inch OD tubing for both suction and return lines. Refer to Figure 19.

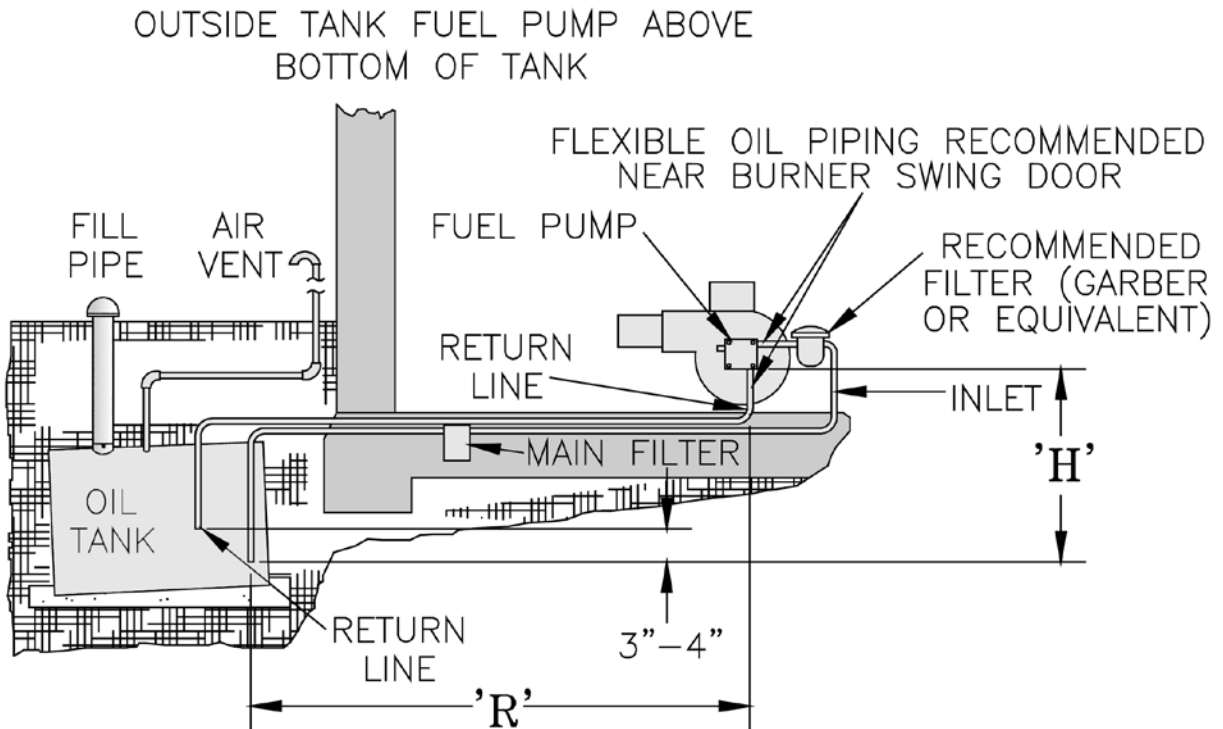


Figure 19: Two-Pipe Installation

VII. System Start-Up

- A.** VERIFY that the venting, water piping, oil piping, and electrical system are installed properly. Refer to installation instructions contained in this manual.
- B.** CONFIRM all electrical, water and oil supplies are turned off at the source and that the vent is clear from obstructions.

WARNING

Completely read, understand and follow all instructions in this manual before attempting start up.

- C.** FILL ENTIRE HEATING SYSTEM WITH WATER and vent air from system. Use the following procedure on a Series Loop or multi-zoned system installed as per Figure 11 or 12.
1. Close isolation valve in boiler supply piping.
 2. Isolate all circuits by closing zone valves or balancing valves.
 3. Attach a hose to hose bib located just below isolation valve in boiler supply piping. (Note - Terminate hose at a suitable floor drain or outdoor area).
 4. Starting with one circuit at a time, open zone valve or valve.
 5. Open hose bib .
 6. Open fill valve (Make-up water line should be located directly after isolation valve in boiler supply piping between air scoop and expansion tank).
 7. Allow water to flow into drain until discharge from hose is bubble free for 30 seconds.
 8. When zone is completely purged of air, close zone valve or balancing valve. Open the zone valve for the next zone to be purged. Repeat this step until all zones have been purged. At completion, open all zone valves or valves.

WARNING

The maximum operating pressure of this boiler is 30 psig. Never exceed this pressure. Do not plug or change pressure relief valve.

9. Close hose bib, continue filling the system until the pressure gauge reads 12 psig. Close fill valve. (Note - If make-up water line is equipped with pressure reducing valve, system will automatically fill to 12 psig.
10. Open isolation valve in boiler supply piping.
11. Remove hose from hose bib.

- D.** CONFIRM that the boiler and system have no water leaks.
- E.** CHECK CONTROLS, WIRING AND BURNER to be sure that all connections are tight and burner is rigid. Verify that all electrical connections have been completed, fuses installed, that the oil tank is filled and oil lines have been tested.
- F.** LUBRICATION. Follow instruction on burner and circulator label to lubricate, if oil lubricated. Most motors currently used on residential type burners employ permanently lubricated bearings and thus do not require any field lubrication. Water lubricated circulators do not need field lubrication.
- G.** ADJUST CONTROLS SETTINGS with burner service switch turned "ON".
1. SET ROOM THERMOSTAT about 10°F below room temperature.
 2. PRESS RED RESET BUTTON on front of Primary Control hold button for 15 seconds and release to reset primary control.
 3. On WATER BOILERS WITHOUT TANKLESS HEATERS equipped with **L7248** electronic aquastat controller, set High Limit (HL) at 180°F. This temperature can be varied to suit installation requirements. L7248 controller has the High Limit adjustment range from 180°F to 240°F (82°C to 116°C). High Limit Differential is fixed at 15°F (8°C).
 4. On WATER BOILERS WITH TANKLESS HEATERS equipped with **L7224** electronic aquastat controller, set operating control (low limit [LL]) at 190°F and high limit (HL) at 210°F. Operating control (low limit) setting must be a minimum of 20°F below high limit setting.
L7224 controller has the High Limit adjustment range from 130°F to 240°F (55°C to 116°C), and the Low Limit adjustment range from 110°F to 220°F (43°C to 104°C). High Limit Differential is fixed at 10°F (6°C), and Low Limit Differential has adjustment range from 10°F (6°C) to 25°F (14°C).
 5. ADJUSTING AQUASTAT CONTROLLER SETTINGS. To discourage unauthorized changing of Aquastat settings, a procedure to enter the **ADJUSTMENT** mode is required. To enter the **ADJUSTMENT** mode, press the **UP**, **DOWN**, and **I** buttons (refer to Figure 20) simultaneously for three seconds. Press the **I** button until the feature requiring adjustment is displayed:
 - HL_ — High Limit.

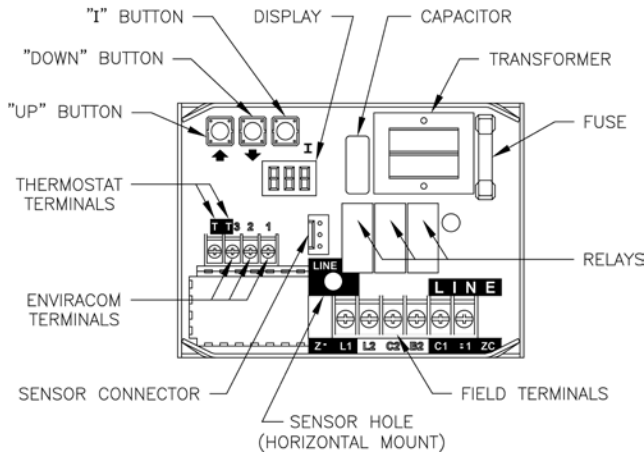


Figure 20: L7248/L7224 Circuit Board Layout - Horizontal Mount

- LL_ — Low Limit.
- Ldf — Low Limit Differential.
- °F — °C.

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.

Note that **L7224** Aquastat Controller will display all four (4) above-listed adjustment features, but **L7248** Aquastat Controller **will not** display Low Limit and Low Limit Differential adjustment features.

6. DISPLAY READOUT

In the **RUN** mode, the Aquastat will flash "bt" (boiler temp) followed by the temperature (i.e., 220), followed by °F or °C.

To read boiler settings, press the **I** key to read the parameter of interest. For example, press **I** High Limit (**HL**) is displayed, followed by a three-digit number, i.e., 220, followed by °F or °C. Pressing the **I** button again (on L7224 models) will display the Low Limit (**LL**) followed by a three-digit number and the corresponding degree designator. See Display Readout, Figure 21.

After approximately 60 seconds without any key

Text	Description	Display Shows
<i>bt</i>	Boiler Temperature	bt
<i>HL</i>	High Limit	HL
<i>LL</i>	Low Limit	LL
<i>Ldf</i>	Low Limit Differential	Ldf
<i>tt</i>	Local Thermostat Status	tt
<i>tte</i>	Enviracom Thermostat Status	tte
<i>err</i>	Error Code	err
<i>f</i>	Degrees Fahrenheit	°F
<i>C</i>	Degrees Celsius	°C

Figure 21: Display Readout Definitions

presses, the display will enter a dim display mode. To return to the bright display mode, simply press any key.

7. OPERATION

The L7224 model can be in any of four operational states - Normal, High Limit, Low Limit and Error. The controller moves back and forth from High Limit to Normal to Low Limit state as part of normal operation.

The L7248 model is restricted to three operational states - Normal, High Limit and Error. The controller moves back and forth from High Limit to Normal state as part of normal operation.

For both models, the controller will enter the Error state when there is an abnormal condition. The operating states are:

- Normal: Boiler temperature went below the High Limit setting (minus the Differential) and has not exceeded the High Limit setting; or the boiler temperature went above the Low Limit setting and has not gone below the Low Limit setting (minus the Differential).
- High Limit: Boiler temperature went above the High Limit setting and has not dropped below the High Limit setting (minus the Differential).
- Low Limit: Boiler temperature went below the Low Limit setting (minus the Low Limit Differential) and has not gone above the Low Limit setting.
- Error: The controller has detected an error condition (e.g., open sensor) and has shut down the burner output. The ZC output is energized. The controller continues to monitor the system and automatically restarts if the error condition clears. Refer to Table 4.

The operating sequence for the L7224/L7248 is shown in Table 5.

Table 4: LED Error Codes

Error Code	Cause / Action
Err1	Sensor fault; check sensor.
Err2	ECOM fault; check EnviraCOM™ wiring.
Err3	Hardware fault; replace control.
Err4	B1 fault; check B1 wiring/voltage.
Err5	Low Line; check L1-L2, 110 Vac.
Err6	Fuse; check ECOM wires, replace fuse.
Err7	EEPROM, HL, LL, Hdf, Ldf; reset to default values. Restore desired settings.
Err8	Repeated B1 fault (voltage present at B1 when output is turned off); check B1 wiring/voltage.

Table 5: L7224 / L7248 Controller Operating Sequence

Action	System Response
Thermostat calls for heat.	Circulator starts when water temperature is above Low Limit setting (if applicable). Boiler temperature is checked. Burner starts when water temperature is below High Limit setting.
Boiler exceeds the High Limit.	Burner is turned off. Burner restarts when the water temperature drops below the High Limit setting minus the Differential.
Thermostat is satisfied.	Circulator and burner turn off.
Error condition 1-5.	If an error condition is detected, all outputs except ZC are shut down. Burner is off. Control continues to function and restarts when error is corrected. During the error check sequence, the system checks for drift in the sensor and corrosion in the connections.
Error condition 6.	EnviraCOM communication is not available.
Error condition 7.	The control has reset the High Limit, Low Limit and Differential setting to a default setting and will continue to run at those settings. Performance of the system will be degraded.
Error condition 8.	If the error condition is detected, all outputs except ZC are shut down. Burner is off. Control continues to function and restarts when all three user keys have been pressed longer than 60 seconds.

8. HIGH LIMIT CONTROLLER

The High Limit opens and turns off the burner when the water temperature reaches the setpoint. The High Limit automatically resets after the water temperature drops past the setpoint and through the Differential. The L7248 models have High Limit Differential presets of 15°F (8°C). The L7224 models have High Limit Differential presets of 10°F (6°C).

9. LOW LIMIT AND CIRCULATOR CONTROLLER

On a temperature rise, with the adjustable Differential at the default setting of 10°F (6°C), the burner circuit breaks and the circulator circuit makes (assuming no call for heat is present) at the Low Limit setpoint. On a temperature drop of 10°F (6°C) below the Low Limit setpoint, the burner circuit makes and the circulator circuit breaks. See Figure 22.

10. CHECKOUT

Put the system into operation and observe at least one complete cycle to make sure that the controller operates properly. See Step 11, TROUBLE SHOOTING to use LED to assist in determining system operation.

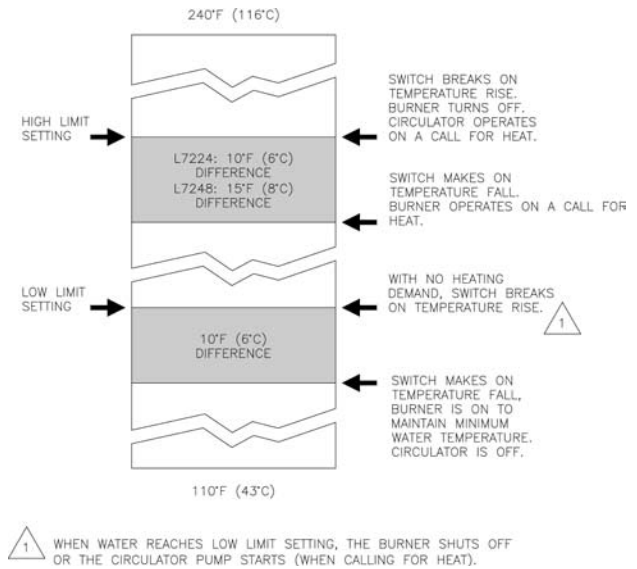


Figure 22: Setpoints and Differentials

11. TROUBLE SHOOTING

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 Table 4 for a description of each error and suggested actions.

For Beckett Burner

H. REMOVE GUN ASSEMBLY

1. Check nozzle size, head size, gun setting, and positioning of electrodes. This information is shown in Figure 23, and Table 6.
2. Reinstall gun assembly.

I. VERIFY OIL BURNER SETTINGS BEFORE STARTING

1. BURNER AIR BAND AND AIR SHUTTER SETTINGS, see Table 6.
2. OPEN ALL OIL LINE VALVES.
3. Attach a plastic hose to fuel pump vent fitting and provide a container to catch the oil.
4. REMOVE GAUGE PORT PLUG from fuel pump and install pressure gauge.

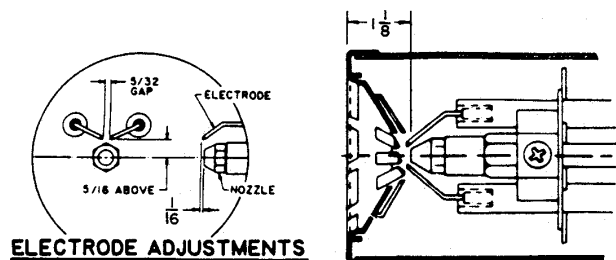


Figure 23: Electrode / Head Setting

Table 6: Beckett AFG Burners

Boiler Model	Firing Rate (GPH)	Nozzle	Air		Settings	
			Shutter	Band	Head (stop screw)	Pump Pressure
*AP-490U	0.75	0.65 - 80°AB Danfoss	7	0	N/A	140
AP-590U	1.00	0.85 - 80°B HAGO	4	0	N/A	140
AP-690U	1.10	0.90 - 80°B HAGO	6	0	N/A	140
AP-790U	1.35	1.10 - 80°B HAGO	8	0	N/A	140

* Equipped with low firing rate baffle

J. START OIL BURNER

1. Open vent fitting on fuel pump.
2. TURN 'ON' BURNER service switch and allow burner to run until oil flows from vent fitting in a SOLID stream without air bubbles for approximately 10 seconds.
3. Close vent fitting and burner flame should start immediately.
4. If the burner does not start immediately, check the manual overload switch on the motor, if so equipped, and the safety switch on the burner primary control.

K. ADJUST OIL PRESSURE

1. Locate oil pressure adjusting screw and turn screw until Pressure Gauge reads the correct pump pressure required for the specific boiler. Refer to Table 6.
2. DO NOT REMOVE PRESSURE GAUGE until later.

L. OTHER ADJUSTMENTS

1. ADJUST THE AIR BAND AND/OR AIR SHUTTER.

Beckett Burners:

- a. Adjust air supply by loosening lock screws and moving the air shutter and if necessary the air band. Refer to Table 6 preliminary settings.
2. ADJUST DRAFT REGULATOR for a draft of -.02" (water gauge) over the fire after chimney has reached operating temperature and while burner is running.
3. READJUST AIR BANDS on burner for a light orange colored flame while draft over the fire is -.02" w.c. Use a smoke test and adjust air for minimum smoke (not to exceed #1) with a minimum of excess air. Make final check using suitable instrumentation to obtain a CO₂ of 11.5 to 12.5% with draft of -.02" w.c. in fire box. These settings will assure a safe and efficient operating

condition. If the flame appears stringy instead of a solid flame, try another nozzle of the same type. Flame should be solid and compact. After all adjustments have been made, recheck for a draft of -.02" w.c. over the fire.

4. TURN "OFF" BURNER and remove pressure gauge. Install gauge port plug and tighten. Start burner again.

For Riello Burner

M. INSPECT NOZZLE, ELECTRODES AND TURBULATOR SETTING

1. Loosen Burner Cover Screws and remove Burner Cover.
2. Installation/Removal of Drawer Assembly, Refer to Figure 24.

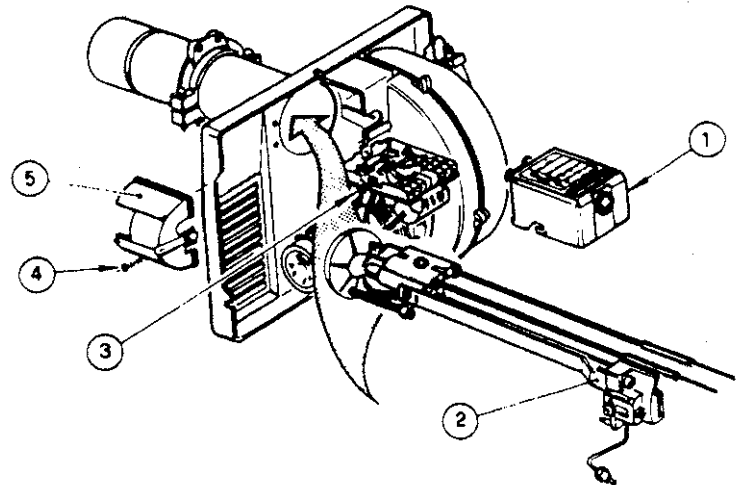


Figure 24: Installation/Removal of Drawer Assembly

- a. Removal:
 - Disconnect oil delivery tube nut from pump.
 - Loosen SCREW (3), and then unplug PRIMARY CONTROL (1) by carefully pulling it back and then up.
 - Remove the AIR TUBE COVER PLATE (5) by loosening the retaining

SCREW (4) (Two SCREWS-Model F5).

- Loosen SCREW (2), and then slide the complete drawer assembly out of the combustion head as shown.

b. Installation:

To insert drawer assembly, reverse the procedure in Step 2a.

3. **Nozzle Replacement**, Refer to Figure 25

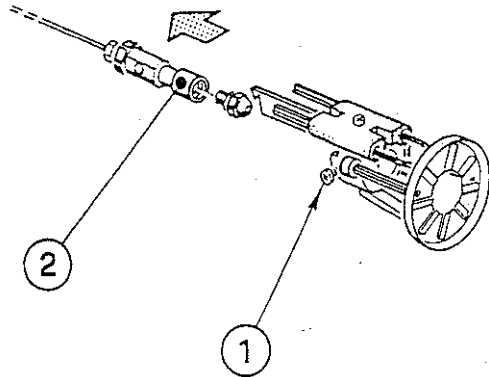


Figure 25: Nozzle Replacement

- Remove the NOZZLE ADAPTER (2) from the DRAWER ASSEMBLY by loosening the SCREW (1).
- Remove existing nozzle from nozzle adapter.
- Insert the proper NOZZLE into NOZZLE ADAPTER and tighten securely (Do not over tighten).
- Replace adapter, with nozzle installed, into drawer assembly and secure with screw (1).

4. **Inspect and measure burner electrodes.** Refer to Figure 26 for the proper electrode settings.

IMPORTANT: THESE DIMENSIONS MUST BE OBSERVED AND VERIFIED.

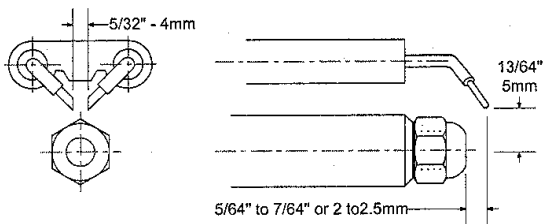


Figure 26: Electrode Setting

5. **Re-install Drawer Assembly into Combustion Head** per Step 2a.

6. **Turbulator Setting**, Refer to Figure 27

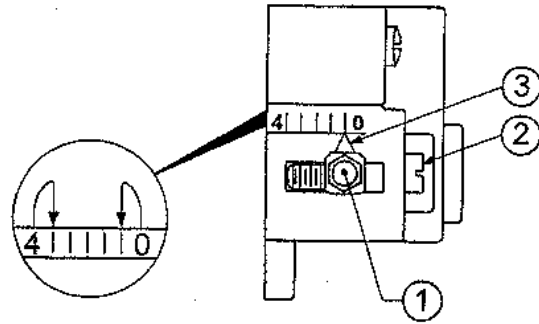


Figure 27: Turbulator Setting

- Confirm the turbulator setting is correct for standard higher (maximum) input oil nozzle installed in the burner. If the lower (minimum) input is desired, readjust turbulator setting to index mark specified in Table 7.
- Loosen NUT (1), and then turn SCREW (2) until the INDEX MARKER (3) is aligned with the correct index number in the Burner Setup chart (Table 7).
- Retighten the RETAINING NUT (1).

MODEL F3 NOTE: Zero and three are scale indicators only. From left to right the first line is 3 and the last line 0.

7. **Pump Connections and Port Identification**, Refer to Figure 28.

This burner is shipped with the oil pump set to operate on a **single** line system. To operate on a **two-line** system the bypass plug must be installed.

WARNING: Do not operate a **single** line system with the by-pass plug installed. Operating a **single** line system with the by-pass plug installed will result in damage to the pump shaft seal.

NOTE: Pump pressure was factory pre-set but must be checked at time of burner start-up. A pressure gauge is attached to the **PRESSURE/BLEEDER PORT (7)** for pressure readings. Two **PIPE**

Table 7: Riello Burner Specifications

Boiler Model	Firing Rate (GPH)	Burner Model	Nozzle (Delavan)	Air Gate Setting	Turbulator Setting	Pump Pressure (PSIG)	Combustion Head	Insertion Depth
AP-490U	0.75	40F3	0.65 - 60W	2.75	1	145	VSBT	1¼
AP-590U	1.00	40F5	0.85 - 80B		0			
AP-690U	1.10		0.90 - 80B	3				
AP-790U	1.35		1.10 - 80B	3.5				

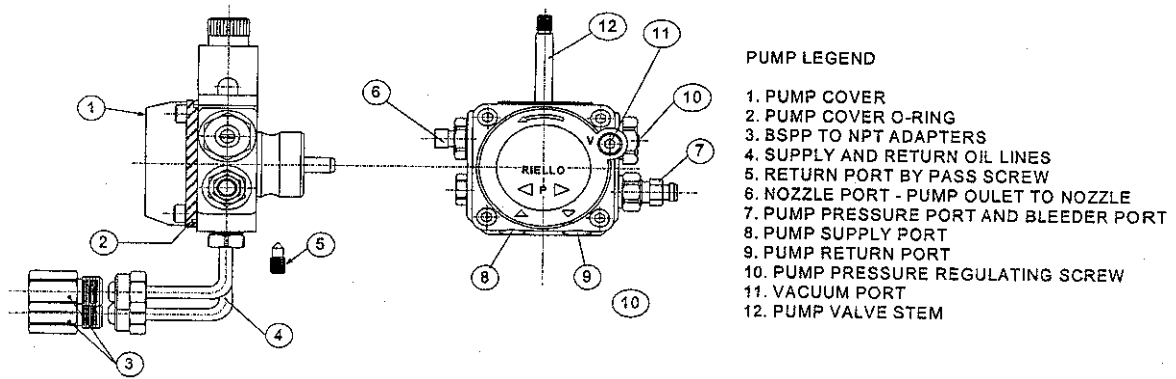


Figure 28: Pump Connections and Port Identification

CONNECTORS (4) are supplied with the burner for connection to either a single or two-line system. Also supplied are two **ADAPTORS (3)**, two female ¼" NPT to adapt oil lines to burner pipe connectors. All pump port threads are **British Parallel Thread** design. Direct connection of NPT threads to the pump **will damage** the pump body.

Riello manometers and vacuum gauges **do not** require any adapters, and can be safely connected to the pump ports. An NPT x metric adapter **must** be used when connecting other gauge models.

8. **Replace Burner Cover** and Tighten Burner Cover Screws.

N. VERIFY OIL BURNER SETTINGS BEFORE STARTING

1. Check burner **AIR DAMPER (GATE)** and **TURBULATOR** settings per Table 7, readjust if necessary.
2. **OPEN ALL OIL LINE VALVES.**
3. Provide a pan to catch oil.
4. Remove pressure port/bleeder plug from fuel pump and install Riello Combination Pressure Gauge and Bleeder Valve Assembly.
5. **OPEN FLAME OBSERVATION PORT COVER** on burner swing door.

O. START OIL BURNER

1. Open bleeder valve (vent fitting) on Riello Combination Pressure Gauge and Bleeder Valve Assembly.
2. **TURN 'ON' BURNER** service switch and allow burner to run until oil flows from vent fitting in a **SOLID** stream without air bubbles for approximately 10 seconds.
3. Close vent fitting and burner flame should start immediately.

P. ADJUST OIL PRESSURE

1. Locate oil pressure adjusting screw and turn screw to obtain proper pump pressure, refer to Table 7.

Q. ADJUST OIL BURNER WHILE OPERATING (flame present)

1. **ADJUST DRAFT REGULATOR** for a draft of -0.02" (water gauge) over the fire after chimney has reached operating temperature and while burner is running.
2. **READJUST THE AIR DAMPER SETTING** on the burner for a light orange colored flame while the draft over the fire is -0.02". Use a smoke tester and adjust air for minimum smoke (not to exceed #1) with a minimum of excess air. Make final check using suitable instrumentation to obtain a CO₂ of 11.5 to 12.5% with draft of -0.02" (water gauge) in fire box. These settings will assure a safe and efficient operating condition. If the flame appears stringy instead of a solid fire, try another nozzle of the same type. Flame should be solid and compact. After all adjustments are made recheck for a draft of -0.02" over the fire.
3. **READJUST THE TURBULATOR SETTING** only if necessary.
 - a. AP-490U through AP-790U
Move the turbulator setting forward or back one position at a time to optimize the smoke and CO₂ readings.
4. Turn "OFF" burner and remove Riello Combination Pressure Gauge and Bleeder Valve Assembly. Install pressure port/bleeder plug and tighten. Start burner again.

R. FLAME FAILURE

WARNING

Do not attempt to start the burner when excess oil has accumulated, when the unit is full of vapor, or when the combustion chamber is very hot.

The AP-U boiler controls operate the burner automatically. If for unknown reasons the burner ceases to fire and the reset button on the primary control has tripped, the burner has experienced ignition failure.

Before pressing the reset button, call your serviceman immediately.

S. CHECK FOR CLEAN CUT OFF OF BURNER

1. AIR IN THE OIL LINE between fuel unit and nozzle will compress when burner is on and will expand when burner stops, causing oil to squirt from nozzle at low pressure as burner slows down and causing nozzle to drip after burner stops. Usually cycling the burner operation about 5 to 10 times will rid oil line of this air.
2. IF NOZZLE CONTINUES TO DRIP, repeat step N.1. If this does not stop the dripping, remove cut off valve and seat, and wipe both with a clean cloth until clean. Then replace and readjust oil pressure. If dripping or after burn persist replace fuel pump.

T. HINTS ON COMBUSTION

1. NOZZLES— Although the nozzle is a relatively inexpensive device, its function is critical to the successful operation of the oil burner. The selection of the nozzle supplied with the AP-U boiler is the result of extensive testing to obtain the best flame shape and efficient combustion. Other brands of the same spray angle and spray pattern may be used but may not perform at the expected level of CO₂ and smoke. Nozzles are delicate and should be protected from dirt and abuse. Nozzles are mass produced and can vary from sample to sample. For all of those reasons a spare nozzle is a desirable item for a serviceman to carry.
2. FLAME SHAPE — Looking into the combustion chamber through the flame plug hole, the flame should appear straight with no sparklers rolling up toward the top of the chamber. If the flame drags to the right or left, sends sparklers upward or makes wet spots on the combustion chamber, the nozzle should be replaced. If the condition persists look for fuel leaks, air leaks, water or dirt in the fuel as described in following steps.
3. FUEL LEAKS— Any fuel leak between the pump and the nozzle will be detrimental to good combustion results. Look for wet surfaces in the air tube, under the ignitor, and around the air inlet. Any such leaks should be repaired as they may cause erratic burning of the fuel and in the extreme case may become a fire hazard.
4. AIR LEAKS— Any such leaks should be repaired, as they may cause erratic burning of the fuel and in extreme cases may become a fire hazard.

There may be many possible causes of leaks in oil lines such as:

- a. Fitting leaks due to misflared tubing or damaged fitting.
- b. Fuel line leak due to crushed or bent tubing.
- c. Filter connection leaks.

- d. Tank connection leaks.

The following actions can eliminate air leaks:

- a. Bleed pump as detailed in System Start-Up Section of this manual.
 - b. Replace flare fittings.
 - c. Replace oil supply line.
 - d. Repair oil filter leaks
 - e. Replace or repair tank fittings.
5. GASKET LEAKS— If 11.5% to 12.5% CO₂ with a #1 smoke cannot be obtained in stack, look for air leaks around the canopy seal. Such air leaks will cause a lower CO₂ reading in the stack. The smaller the firing rate the greater effect an air leak can have on CO₂ readings.
 6. DIRT— A fuel filter is a good investment. Accidental accumulation of dirt in the fuel system can clog the nozzle strainer and produce a poor spray pattern from the nozzle.
 7. WATER— Water in the fuel, in large amounts, will stall the fuel pump. Water in the fuel pump, in smaller amounts, will cause excessive wear on the pump, but more importantly water does not burn. It chills the flame, causes smoke, and allows unburned fuel to pass through the combustion chamber and clog the flueways of the boiler.

NOTICE

CHECK TEST PROCEDURE. A very good test for isolating fuel side problems is to disconnect the fuel system and with a 24" length of tubing, fire out of an auxiliary five gallon pail of clean, fresh, warm #2 oil from another source. If the burner runs successfully when drawing out of the auxiliary pail then the problem is isolated to the fuel or fuel lines being used on the jobsite.

8. COLD OIL— If the oil temperature approaching the fuel pump is 40°F or lower, poor combustion or delayed ignition may result. Cold oil is harder to atomize at the nozzle. Thus, the spray droplets get larger and the flame shape gets longer. An outside fuel tank that is above grade or has fuel lines buried in the ground above the frost line is a good candidate for cold oil. The best solution is to place the tank and oil lines in the ground below the frost line.
9. HIGH ALTITUDE INSTALLATIONS
Typically, the rule to use for high altitudes is to increase the air supply by 4% per each 1000 ft. above 2000 ft. altitude from sea level. This means that the air setting will have to be higher than the calibration marks in proportion to the altitude. Use instruments and set for 11.5 to 12.5% CO₂.
10. START-UP NOISE — Late ignition is the cause of start-up noises. If it occurs recheck for electrode settings, flame shape, air or water in the fuel lines.

11. SHUT DOWN NOISE — If the flame runs out of air before it runs out of fuel, an after burn with noise may occur. That may be the result of a faulty cut-off valve in the fuel pump, or it may be air trapped in the nozzle line. It may take several firing cycles for that air to be fully vented through the nozzle. Water in the fuel or poor flame shape can also cause shut down noises.

U. TEST CONTROLS

WARNING

Before installation of the boiler is considered complete, the operation of all boiler controls must be checked, particularly the primary control and high limit control.

1. CHECK THERMOSTAT OPERATION. Raise and lower thermostat setting as required to start and stop burner.
2. VERIFY PRIMARY CONTROL SAFETY FEATURES using procedures outlined in Instructions furnished with control (See back of Control Cover) or Instructions as follows:

WARNING

Service of this boiler should be undertaken only by trained and skilled personnel from a qualified service agency.

- a. **Simulate flame failure:**
 - Follow the starting procedure to turn on the burner.
 - Close the hand valve in the oil supply line.
 - Control enters recycle mode and tries to restart burner after approximately 60 seconds.
- * Safety switch should lock out in approximately 15 seconds. Ignition and motor should stop and oil valve should open to stop oil flow.
 - Indicator light will flash ½ second on, ½ second off.
 - Push red reset button to reset safety switch.
- b. **Simulate ignition failure:**
 - Follow the starting procedure to turn on the burner, but do not open the oil supply hand valve.
- * Safety switch should lock out in approximately 15 seconds. Ignition and motor should stop and oil valve should open to stop oil flow.

- Indicator light will flash ½ second on, ½ second off.
- Push red reset button to reset safety switch.

c. **Simulate power failure:**

- Follow the starting procedure to turn on the burner.
 - With the burner running, turn off the power to the system by tripping the circuit breaker or removing the fuse.
 - Burner should stop.
 - Restore power. Burner should start.
- * The CleanCut Oil Pump's Solenoid Valve is a bypass valve, not a blocking valve.
3. VERIFY HIGH LIMIT OPERATION.
 - a. Adjust thermostat to highest setting.
 - b. Observe temperature gauge. When temperature is indicated, adjust limit to setting below observed temperature. Burner should stop.
 - c. Adjust limit to setting above observed temperature. Burner should start.
 - d. Adjust thermostat to lowest setting. Adjust limit to desired setting.

V. Boiler is now ready to be put into service.

IMPORTANT

IF, DURING NORMAL OPERATION, IT IS NECESSARY TO ADD WATER MORE FREQUENTLY THAN ONCE A MONTH, CONSULT A QUALIFIED SERVICE TECHNICIAN TO CHECK YOUR SYSTEM FOR LEAKS.

A leaky system will increase the volume of make-up water supplied to the boiler which can significantly shorten the life of the boiler. Entrained in make-up water are dissolved minerals and oxygen. When the fresh, cool make-up water is heated in the boiler the minerals fall out as sediment and the oxygen escapes as a gas. Both can result in reduced boiler life. The accumulation of sediment can eventually isolate the water from contacting the steel. When this happens the steel in that area gets extremely hot and eventually cracks. The presence of free oxygen in the boiler creates a corrosive atmosphere which, if the concentration becomes high enough, can corrode the steel through from the inside. Since neither of these failure types are the result of a manufacturing defect the warranty does not apply. Clearly it is in everyone's best interest to prevent this type of failure. The maintenance of system integrity is the best method to achieve this.

Advances in the new Series 5 Beckett R7184B1032 Oil Primary Controls found on New Yorker AP-U boilers are bringing new features to Oil-Fired AP-U's.

New Beckett Series 5 Control Features Include:

- EnviraCOM™ communication terminals and logic have been added for future HVAC system networking.
- Quick connect terminals on the control allow quick component change out and reduce the number of leads in the wiring box.

See below for location of Beckett R7184B1032 Series 5 Control features:

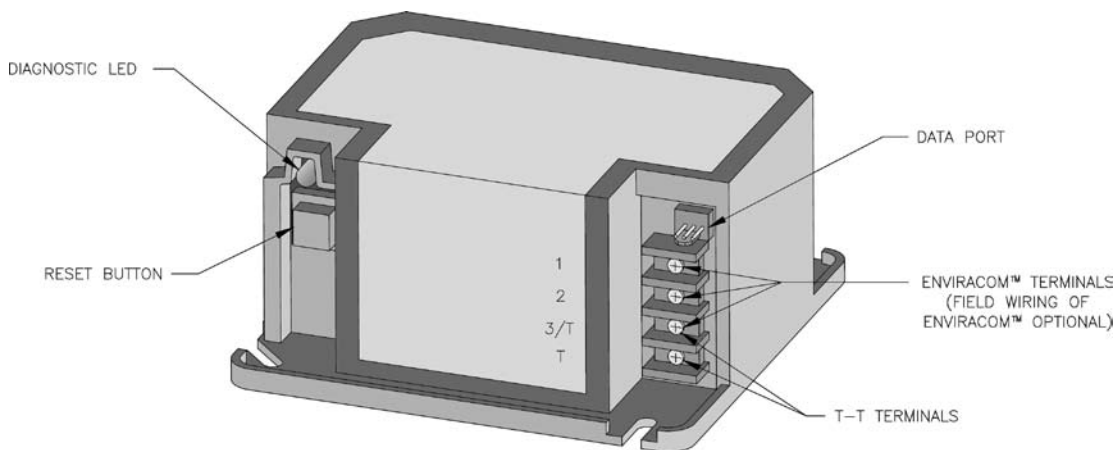


Figure 29: Beckett R7184B1032, Series 5 Control

NOTE: The use of EnviraCOM™ terminals is not required for control operation.

VIII. Service and Cleaning

NOTICE

BURNER SHUTDOWN: Open Service Switch to turn off burner.

Manual Oil Supply Valve should be closed and Electric Service to boiler turned off if boiler will not be operated for an extended period of time.

- A. GENERAL.** Inspection service and cleaning should be conducted annually. Turn off electric power and close oil supply valve while conducting service or maintenance.
- B. FIRETUBES AND COMBUSTION CHAMBER.** (See Figure 30)

1. CLEAN THE FIRETUBES
 - a. Disconnect electric to burner and remove stack.
 - b. For access to the firetubes, pull top jacket panel off. Remove brass nuts, that hold canopy down. Without taking off carriage bolts, pull canopy off.
 - c. Remove turbulators.
 - d. Using a firetube brush clean firetubes. **DO NOT** extend brush past the end of the bottom tubesheet.
 - e. Assemble the boiler in reverse order.

Units should be cleaned at least once a year, preferably at the end of each heating season.

It is not necessary to remove burner to clean boiler.

Brush, scrape, or vacuum from **top**.

NOTE: UNITS SHOULD BE CLEANED AT LEAST ONCE A YEAR, PREFERABLY AT THE END OF EACH HEATING SEASON.

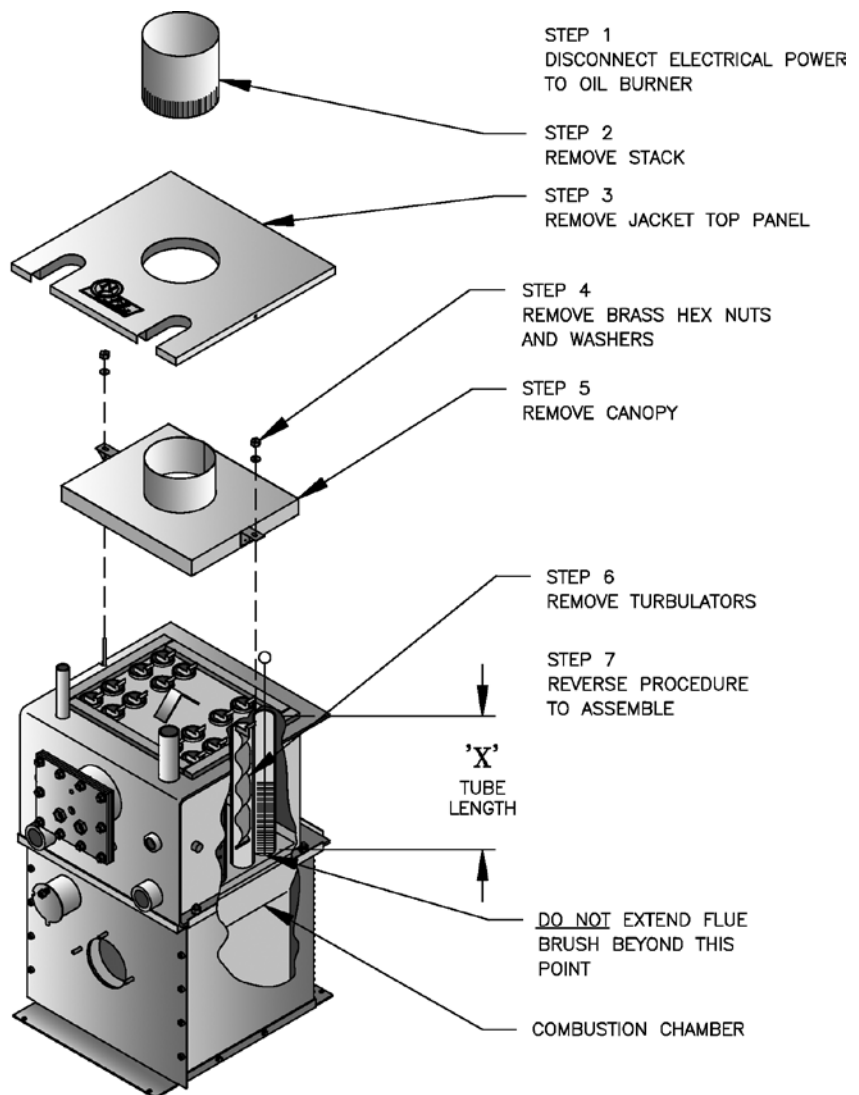
IT IS NOT NECESSARY TO REMOVE BURNER TO CLEAN BOILER.

BRUSH, SCRAPE OR VACUUM CLEAN FLUE TUBES CAREFULLY FROM TOP WITHOUT EXTENDING CLEANING TOOLS BEYOND BOTTOM OF FLUE TUBES TO PREVENT DAMAGE TO COMBUSTION CHAMBER.

CAUTION

COMBUSTION CHAMBER IS A LIGHTWEIGHT CERAMIC TYPE. **DO NOT** EXTEND CLEANING TOOLS BEYOND BOTTOM OF FLUE TUBES TO PREVENT DAMAGE TO COMBUSTION CHAMBER.

BOILER MODEL	DIMENSION 'X'
AP-490U & AP-590U	13 $\frac{3}{8}$
AP-690U & AP-790U	19 $\frac{7}{8}$



CLEANING INSTRUCTIONS

Figure 30: Cleaning of AP-U Boiler

Important Product Safety Information **Refractory Ceramic Fiber Product**

Warning:

The Repair Parts list designates parts that contain refractory ceramic fibers (RCF). RCF has been classified as a possible human carcinogen. When exposed to temperatures about 1805°F, such as during direct flame contact, RCF changes into crystalline silica, a known carcinogen. When disturbed as a result of servicing or repair, these substances become airborne and, if inhaled, may be hazardous to your health.

AVOID Breathing Fiber Particulates and Dust

Precautionary Measures:

Do not remove or replace RCF parts or attempt any service or repair work involving RCF without wearing the following protective gear:

1. A National Institute for Occupational Safety and Health (NIOSH) approved respirator
 2. Long sleeved, loose fitting clothing
 3. Gloves
 4. Eye Protection
- Take steps to assure adequate ventilation.
 - Wash all exposed body areas gently with soap and water after contact.
 - Wash work clothes separately from other laundry and rinse washing machine after use to avoid contaminating other clothes.
 - Discard used RCF components by sealing in an airtight plastic bag. RCF and crystalline silica are not classified as hazardous wastes in the United States and Canada.

First Aid Procedures:

- If contact with eyes: Flush with water for at least 15 minutes. Seek immediate medical attention if irritation persists.
- If contact with skin: Wash affected area gently with soap and water. Seek immediate medical attention if irritation persists.
- If breathing difficulty develops: Leave the area and move to a location with clean fresh air. Seek immediate medical attention if breathing difficulties persist.
- Ingestion: Do not induce vomiting. Drink plenty of water. Seek immediate medical attention.

IX. Repair Parts

All AP-U™ Repair Parts may be obtained through your local New Yorker Wholesale distributor. Should you require assistance in locating a New Yorker distributor in your area, or have questions regarding the availability of New Yorker products or repair parts, please contact New Yorker Boiler Co., Inc. Customer Service at (215) 855-8055 or Fax (215) 855-8229.

AP-U Series Boiler Jacket Repair Parts

ITEM	DESCRIPTION	PART NUMBER	QTY.
1	Jacket Top Panel Assembly	6047104	1
2	Jacket Lower Front Panel Assembly	60471042	1
3	Jacket Upper Front Panel Assembly - 490U / 590U	60471041	1
	Jacket Upper Front Panel Assembly - 690U / 790U	60471061	1
4	Jacket WAR Panel Assembly - 490U / 590U	60471043	1
	Jacket WAR Panel Assembly - 690U / 790U	60471063	1
5	Temperature / Pressure Gauge	100282-01	1
6	Honeywell L7248A1000 Aquastat	100879-01	1
	Honeywell L7224A1008 Aquastat	100862-01	1
7	Observation Port Cover	7026001	1
	Observation Cover Spring V1	8026015	1
	Flat Washer, SAE, 5/16"	80860647	1
	Hex Nut, 5/16 -18, Heavy	80860402	1
8	Burner Primary Control, GeniSys 7505	103447-01	1

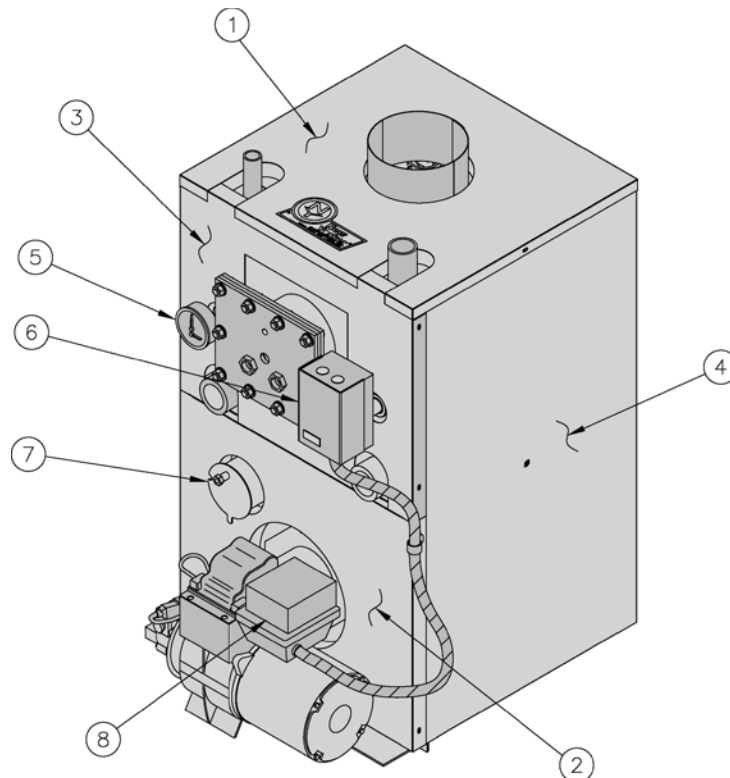


Figure 31: AP-U Boiler Jacket Parts and Controls

AP-U Series Boiler Repair Parts (continued)

ITEM NO.	DESCRIPTION	PART NO.	QTY.
9	Hex Nut, 1/4 - 20, Brass	80860119	2
10	Flat Washer, SAE 1/4	80860424	10
11	C-bolt, 1/4 - 20 x 3	80860847	2
12	1/4" Threaded Stud Push Retainer	80861725	2
13	Canopy Assembly	6113509	1
14	Fiberglass Tape Gasket 1/8 x 1 x 12-3/8"	9206032	1
15	Fiberglass Tape Gasket 1/8 x 1 x 13-3/8"	9206032	1
16	Turbulator, Short	7116037	'A'
	Turbulator, Long	7116038	
17	Shell Assembly	See Table Below	'B'
18	Hex Lock Nut 1/4 - 20	80860456	4
19	Machine Screw 1/4 - 20 x 1-1/4"	80860810	4
20	Base Assembly	61835062	1
21	Combustion Chamber	8203006	1
22	Base Front Insulation	8203512	1
23	Cerafelt, 1/2" Thick x 2" x 18-1/2"	9206003	1
24	Cerafelt, 1/2" Thick x 2" x 13-3/4"	9206003	1
25	S-4 Heater Coil Assembly	6037201	1
	S-5 Heater Coil Assembly	6037202	1
26	Blanket Heater Cover Plate	7033715	1
27	Gasket, Blanket Heater Cover Plate	8206036	1
28	SA-307B 3/8 x 1-1/4" Hex Head Bolt	80861360	10
29	Heavy Hex Nut, 3/8 - 16	80860400	10
30	Flat Washer USS, 3/8"	80860645	10

BOILER MODEL	'A'	'B'
AP-490U	12	63071100
AP-590U	16	63071101
AP-690U	12	63071102
AP-790U	16	63071103

X. Beckett AFG Burner Parts for AP-U Series Boilers

FOR REPLACEMENT OIL BURNER PARTS, CONTACT YOUR WHOLESALER OR THE BURNER MANUFACTURER:

R. W. BECKETT CORP.
P. O. BOX 1289
ELYRIA, OHIO 44036
1-800-645-2876

NOTE: When ordering parts always give the serial and model numbers shown on the boiler and burner. Also, provide the name of the part(s) and part(s) number as listed below.

Boiler Model	AP-490U	AP-590U	AP-690U	AP-790U
Burner Model	AFG	AFG	AFG	AFG
Air Tube Combination	AF40WR	AF40BZ	AF40WB	AF40BZ
Spec. No.	NY2101	NY2103	NY2105	NY2108
AFG Housing	5874BK	5874BK	5874BK	5874BK
Air Band	3492BKA	3492BKA	3492BKA	3492BKA
Air Band Nut	4150	4150	4150	4150
Air Band Screw	4198	4198	4198	4198
Air Shutter	3709	3709	3709	3709
Air Shutter Screw	4198	4198	4198	4198
Blower Wheel	2999U	2999U	2999U	2999U
Bulkhead Fitting	571801	571801	571801	571801
Bulkhead Fitting Locknut	3666	3666	3666	3666
Connector Tube Assembly	5636	5636	5636	5636
Coupling	2454	2454	2454	2454
Electrode Clamp	149	149	149	149
Electrode Clamp Screw	4219	4219	4219	4219
Electrode Insulator Assembly	5780	5780	5780	5780
Spider Spacer Assembly	5653	5653	5653	5653
Escutcheon Plate	3493	3493	3493	3493
Flange and Air Tube Assembly	3146806	3146806	3146806	3146806
Gasket	3811	3811	3811	3811
Head	360003	360004	360004	360004
Head Screws	4221	4221	4221	4221
Hole Plug	2139	2139	2139	2139
Housing Assembly w/Inlet Bell	5877	5877	5877	5877
Motor	21805U	21805U	21805U	21805U
Nozzle Adapter	213U	213U	213U	213U
Nozzle Line Electrode Assembly	NL40WR	NL40BZ	NL40WB	NL40BZ
Pump	21844	21844	21844	21844
Static Plate	3898	31646	3898	31646
Ignitor	51771U	51771U	51771U	51771U
Ignitor Hinge Screw	4217	4217	4217	4217
Ignitor Holding Screw	4198	4198	4198	4198
Ignitor Gasket Kit	51304	51304	51304	51304
Wire Guard	3345	3345	3345	3345
Junction box	5770	5770	5770	5770
Flame Detector	7006Q	7006Q	7006Q	7006Q
Baffle	5880	---	---	---

Ordering Information for Quality Replacement Parts

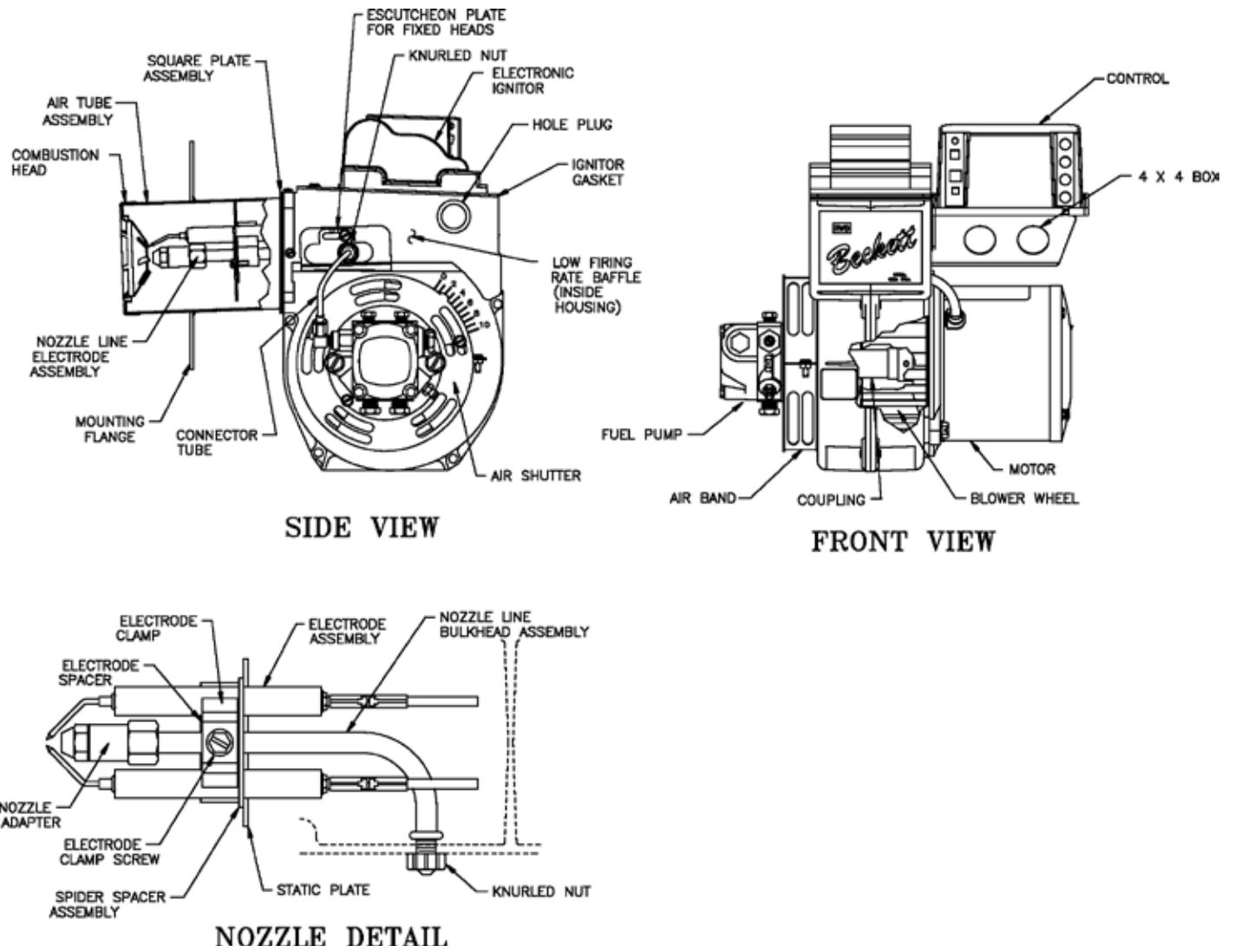


Figure 33: BECKETT AFG MODEL BURNER

XI. Riello Burner Parts for AP-U Series Boilers

NOTE: When ordering parts always give the serial and model numbers shown on the boiler and burner.

Refer to *Models F3 & F5 Installation Manual, Riello 40 Series Residential Oil Burners (C6501010)* for an exploded view of the burner and a list of spare parts.

For replacement Riello oil burner parts, contact your wholesaler or the burner manufacturer:

Riello Corporation of America
35 Pond Park Road
Hingham, Massachusetts 02043
Telephone: (617) 749-8292
Facsimile: (617) 740-2069
Toll Free: (outside Massachusetts)
(800) 992-7637

Riello Canada Inc.
2165 Meadowpine Blvd.
Mississauga, Ontario L5N 6H6
Telephone: (905) 542-0303
Facsimile: (905) 542-1525
Toll Free: (800) 387-3898

XII. Low Water Cut Off (LWCO) on Hot Water Boilers

WARNING

DO NOT ATTEMPT to cut factory wires to install an aftermarket Low Water Cut Off (LWCO). Only use connections specifically identified for Low Water Cut Off.

In all cases, follow the Low Water Cut Off (LWCO) manufacturer's instructions.

When

A low water cutoff is required to protect a hot water boiler when any connected heat distributor (radiation) is installed below the top of the hot water boiler (i.e. baseboard on the same floor level as the boiler). In addition, some jurisdictions require the use of a LWCO with a hot water boiler.

Where

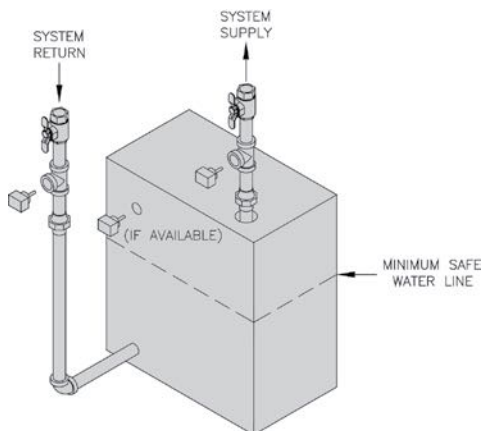
The universal location for a LWCO on both gas and oil hot water boilers is above the boiler, in either the supply or return piping. The minimum safe water level of a water boiler is at the uppermost top of the boiler; that is, it must be full of water to operate safely.

What Kind

Typically, in residential applications, a probe type LWCO is used instead of a float type, due to their relative costs and the simplicity of piping for a probe LWCO.

How to Pipe

A "tee" is commonly used to connect the probe LWCO to the supply or return piping, as shown below.



LWCO Location

Select the appropriate size tee using the LWCO manufacturer's instructions. Often, the branch connection must have a **minimum** diameter to prevent bridging between the probe and the tee. Also, the run of the tee must have a minimum diameter to prevent the end of the probe from touching or being located too close to the inside wall of the run of the tee.

Ideally, manual shutoff valves should be located above the LWCO and the boiler to allow for servicing. This will allow probe removal for inspection without

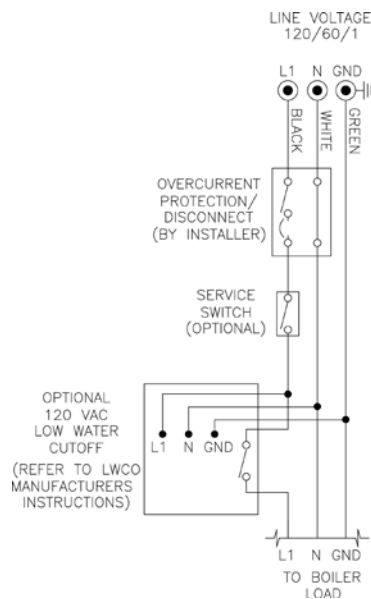
draining the heating system. Many probe LWCO manufacturers recommend an annual inspection of the probe.

How to Wire

LWCO's are available in either 120 VAC or 24 VAC configurations. The 120 VAC configuration can be universally applied to both gas and oil boilers by wiring it in the line voltage service to the boiler (after the service switch, if so equipped).

The presence of water in a properly installed LWCO will cause the normally open contact of the LWCO to close, thus providing continuity of the 120 VAC service to the boiler.

It is recommended to supply power to the probe LWCO with the same line voltage boiler service as shown below.



Wiring of Typical LWCO

A 24 VAC LWCO is used primarily for gas fired boilers where a 24 volt control circuit exists within the boiler. However, a 24 VAC LWCO can only be used if the boiler manufacturer has provided piping and wiring connections and instructions to allow for this application.

How to Test

Shut off fuel supply. Lower water level until water level is BELOW the LWCO. Generate a boiler demand by turning up thermostat. Boiler should not attempt to operate. Increase the water level by filling the system. The boiler should attempt to operate once the water level is above the LWCO.

Limited Warranties

For Residential Cast Iron and Steel Water Boilers

By this Warranty Statement New Yorker Boiler Co., Inc. ("New Yorker"), issues limited warranties subject to the terms and conditions stated below. These limited warranties apply to residential cast iron and steel water boilers labeled with the New Yorker® brand which are sold on or after March 1, 2004.

ONE YEAR LIMITED WARRANTY

One Year Limited Warranty for Residential Water Boilers New Yorker warrants to the original consumer purchaser at the original installation address that its residential cast iron and steel water boilers will be free from defects in material and workmanship under normal usage for a period of one year from the date of original installation. In the event that any defect in material or workmanship is found during the one year period following the date of installation, New Yorker will, at its option, repair the defective part or provide a replacement free of charge, F.O.B. its factory.

FIVE YEAR LIMITED WARRANTY

Five Year Pressure Vessel Limited Warranty for WCTM Residential Water Boilers New Yorker warrants to the original consumer purchaser at the original installation address that the pressure vessel of the boiler will be free of defects in material and workmanship under normal usage for a period of five years following the date of installation. In the event that any defect in material or workmanship is found during the five year period following the date of installation, New Yorker will, at its option, repair the defective pressure vessel or provide a replacement free of charge, F.O.B. its factory.

LIFETIME LIMITED WARRANTY

Lifetime Pressure Vessel Limited Warranty for AP-UTM, FR™, S-APT™, microTEK3™, microTEKDV™, CLW™, CG-AT™, and PVCG™ Residential Water Boilers New Yorker warrants to the original consumer purchaser at the original installation address that the pressure vessel component of the boiler will be free of defects in material and workmanship under normal usage for the lifetime of the original consumer purchaser. In the event that any defect in material or workmanship is found during the ten year period following the date of installation, New Yorker will, at its option, repair the defective pressure vessel or provide a replacement free of charge, F.O.B. its factory. In the event that any defect in material or workmanship is found after the tenth year following the date of installation, New Yorker will provide a replacement pressure vessel upon payment by the original consumer purchaser of an amount equal to a percentage of the then current retail price of the model boiler involved (or, in the event that such model is not then in production, the most comparable model then in production), as follows:

Years In Service	11th	12th	13th	14th	15th	16th	17th	18th
Consumer Purchaser Pays	5%	10%	15%	20%	25%	30%	35%	40%
Years In Service	19th	20th	21st	22nd	23rd	24th	25th and beyond	
Consumer Purchaser Pays	45%	50%	55%	60%	65%	70%	75%	

EXCEPTIONS AND EXCLUSIONS

- Components Manufactured by Others** Following the expiration of the foregoing one year limited warranty, all component parts of a boiler which are manufactured by others (such as burners, burner controls, circulator, tankless water heater, and New Yorker Link) shall be subject only to the manufacturer's warranty, if any.
- Removal and Replacement Costs** These warranties do not cover expenses of removal or reinstallation. The consumer purchaser will be responsible for the cost of removing and replacing any defective part and all labor and related materials connected therewith. Replacement parts will be invoiced to the distributor in the usual manner and will be subject to adjustment upon proof of defect.
- Proper Installation** These warranties are conditioned upon the installation of the boiler in strict compliance with New Yorker's Installation, Operating and Service Instructions. New Yorker specifically disclaims any liability of any kind which arises from or relates to improper installation.
- Improper Use or Maintenance** These warranties will not be applicable if the boiler is used or operated over its rated capacity, is installed for uses other than home heating, or is not maintained in accordance with New Yorker's Installation, Operating and Service Instructions and hydronics industry standards.

5. **Improper Operation** These warranties will not be applicable if the boiler has been damaged as a result of being improperly serviced or operated, including but not limited to the following: operated with insufficient water; allowed to freeze; subjected to flood conditions; or operated with water conditions and/or fuels or additives which cause unusual deposits or corrosion in or on the pressure vessel or associated controls.

6. **Geographic Limitations** These warranties apply only to boilers installed within the 48 contiguous United States.

7. **Installation Requirements** In order for these warranties to be effective:

- The boiler must be installed in a single or two-family residential dwelling. This warranty does not apply to boilers installed in apartments or for commercial or industrial applications.
- The boiler must be installed in strict compliance with New Yorker's Installation, Operating and Service Instructions by an installer regularly engaged in boiler installations.
- Boiler sections must not have been damaged during shipment or installation.
- The boiler must be vented in accordance with chimney recommendations set forth in New Yorker's Installation, Operating and Service Instructions.

8. **Exclusive Remedy** New Yorker's obligation in the event of any breach of these warranties is expressly limited to the repair or replacement of any part found to be defective under conditions of normal use.

9. **Limitation of Damages** Under no circumstances will New Yorker be liable for incidental, indirect, special or consequential damages of any kind under these warranties, including, without limitation, injury or damage to persons or property and damages for loss of use, inconvenience or loss of time. New Yorker's liability under these warranties shall under no circumstances exceed the purchase price paid for the boiler involved. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

10. **Limitation of Warranty** These limited warranties are given in lieu of all other express warranties and set forth the entire obligation of New Yorker with respect to any defect in a residential water boiler. New Yorker shall have no express obligations, responsibilities or liabilities of any kind, other than those set forth herein.

ALL APPLICABLE IMPLIED WARRANTIES, IF ANY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY LIMITED IN DURATION TO A PERIOD OF ONE YEAR, EXCEPT THAT IMPLIED WARRANTIES, IF ANY, APPLICABLE TO THE PRESSURE VESSEL OF A RESIDENTIAL WATER BOILER SHALL BE LIMITED IN DURATION TO THE LESSER OF THE DURATION OF SUCH IMPLIED WARRANTY OR A PERIOD EQUAL TO THE TERM OF THE APPLICABLE EXPRESS WARRANTY. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

PROCEDURE FOR OBTAINING WARRANTY SERVICE

Upon discovery of a condition believed to be related to a defect in material or workmanship covered by these warranties, the original consumer purchaser should notify the installer, who will in turn notify the distributor. If this action is not possible or does not produce a prompt response, the original consumer purchaser should write to New Yorker Boiler Co., Inc. at P.O. Box 10, Hatfield, PA 19440-0010, giving full particulars in support of the claim.

The original consumer purchaser is required to make available for inspection by New Yorker or its representative the parts claimed to be defective and, if requested by New Yorker, to ship those parts prepaid to New Yorker at the above address for inspection or repair. In addition, the original consumer purchaser agrees to make all reasonable efforts to settle any disagreement arising in connection with any warranty claim before resorting to legal remedies in the courts.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

