

PENSOTTI

BOILERS | PANEL RADIATORS

Installation and User Guide DK2 Series Cast Iron Boiler Assembly, Operating and Maintenance Instructions



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A HISTORY OF QUALITY, TECHNOLOGY, AND VALUE

Pensotti Boilers takes great pride in supplying you with our new enhanced Heatline Quatech Series boiler. As the name suggests the boiler is the result of a fusion of quality and technology. A combination of time tested materials and principles coupled with modern technological advances have enabled us to provide you with what we consider America's best heating value. We are certain that the new Quatech Series boiler will provide you with years of trouble free, dependable, economical operation.

“AMERICA’S BEST HEATING VALUE”

Like all Pensotti's offerings, the Quatech Series boiler is a high efficiency residential heating appliance constructed of the finest materials and designed for use with carefully tested and selected controls. The Quatech was designed to operate most efficiently when properly sized to accommodate your specific heating needs. This can only be accomplished by obtaining a true heat loss calculation for your residence including your domestic hot water needs. In replacement situations it is highly recommended that you consult a heating professional to conduct a heat loss rather than rely on the size of you existing system, as improvements in insulation, windows, and general air infiltration prevention may have changed the necessary boiler output for your situation. This proper sizing allows for the maximum operating efficiency, fuel savings, and optimum comfort levels by insuring adequate capacity and eliminating costly over sizing which may lead to short cycling and increased fuel consumption. Proper matching of capacity can be obtained by comparing the heat loss calculation, including domestic hot water needs, with the Net I-B-R rating of the boiler. In some cases it will be the domestic hot water need that solely determines the boiler size. It is important to note that if your heat loss calculation exceeds the largest boiler in The Quatech Series a modular installation utilizing more than one boiler can be employed. Consult Pensotti Boilers for further information on modular installations.

NOTICE All installations must conform to federal, state and local code.

STEPS PRIOR TO INSTALLATION

Before beginning the installation process it is highly recommender that you read this manual carefully. Your boiler must be installed by a qualified and where required licensed contractor in accordance with all local codes. When local codes are not in effect the boiler must be installed in accordance with NFPA 31 and NFPA 211, Standard for installation of Oil Burning Equipment in the U.S. and CSA B139 in Canada. Failure to have the appliance installed by a qualified technician in accordance with code may void your warranty.

The boiler comes with a limited lifetime warranty which is shown on the inside cover of this manual. Read the warranty carefully prior to installation.

Before installing the boiler inspect all items supplied by Pensotti Boilers for physical damage. Any physical damage should be reported to your boiler wholesaler, not Pensotti, LLC. Your package will include the boiler block, jacket assembly, burner, and trim kit assembly including control.

To avoid injury and potential property damage, Pensotti, LLC has identified, in its opinion, certain potential hazards to health and equipment, which are noted in Bold Face Large Print announcements labeled CAUTION, WARNING, NOTICE, or DANGER. You must pay particular attention to these announcements.

This manual is presented in a sequence that allows for an orderly trouble free installation. We suggest that you follow the instructions in order to eliminate potential hazards.

Prior to system installation there should be an inspection of the chimney or proposed vent system to determine that the condition is acceptable. Repair or replace any defects in the chimney liner. The vent system and installation must be in compliance with NFPA-211 or local building codes. Improperly sized vent systems can cause poor burner operation, sooting, odor or condensation that might create chimney damage. Installation of Barometric draft controls can insure adequate draft. A minimum draft required at the vent collar is negative .01" W.C.

CLEARANCES

Proper clearances must be maintained not only from combustible materials but also to provide adequate access for servicing. All installations must comply with local codes and NFPA-31 and NFPA-211. Consult local fire codes for required clearances. Connections to chimney must be made with the proper gauge thickness and diameter of fluepipe as required by NFPA-211.

MINIMUM SERVICE CLEARANCES

Front- 8in. from the front of the oil burner Back- 18in. from the back of the unit At least 18in from one side (either the Left or Right side) and 1in from the remaining side.

MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS

Front - 18in. from the front of the oil burner Back - 18in. from the back of the unit Left - 1in. from the left side panel of the unit. Right - 1in. from the right side panel of the unit. Chimney connector- 18in. from the chimney connector.
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CAUTION Adequate air supply for both combustion and ventilation must be available.

COMBUSTION AND VENTILATION AIR

Installations taking place in traditional unconfined settings such as basements generally have an adequate supply of both combustion and ventilation air.

In situations where the boiler is to be located in a confined space with all combustion and ventilation air coming from within the building two openings must be made with an adjoining room with one being near the floor and the other being near the ceiling of the boiler room. These openings must be clear and free of obstacles and measure at least 140 sq. in. per gallon of oil burned per hour.

In instances where the air supply for both combustion and ventilation is to come from outside the building two air openings, one near the floor and one near the ceiling, measuring at least 35 sq. in. for each gallon of oil burned per hour.

If there is no accessible source of air for combustion and ventilation available within the building, combustion air ducts may be installed to convey the air. Those ducts used to convey air must have areas of at least 35sq.in per gallon of oil burned per hour for vertical ducts and 70sq.in per gallon of oil burned per hour for horizontal ducts. The area of the ducts and corresponding openings of connected free areas must be equal. The duct must have direct outside access and be installed with a rain hood and insect screen installed at the outside wall. This dedicated supply of ducted air should be installed within 5ft. of the boiler.

ALL VENTILLATION REQUIREMENTS SHOULD CONFORM TO LOCAL CODE AND OR NFPA-31.

Combustion Air Supply-No Barometric Damper

Sizing of the air inlet pipe to the burner air housing is as determined as follows:

GALLONS PER HOUR FIRING RATE	CHIMNEY CONNECTOR SIZE
.75 to 1.0	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 take precedence where required.	

PLACEMENT & LEVELING OF THE UNIT

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

BURNER TUBE INSERTION AND BURNER ATTACHMENT

The insertion of the burner air tube must be back 1/4in. from the chamber end of the burner refractory. Attach the burner in accordance with the burner manufacturers instructions provided. Make sure that the burner is level and that all nuts are fully tightened.

CAUTION

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

PIPING

Prior to connecting the Quatech to an existing piping system certain procedures must be followed. The system should be flushed to insure that scale and sludge will not be introduced to the boiler. This is a must when replacing a gravity open system. The Quatech is a low mass boiler requiring low water content and steps must be taken to insure that the boiler is not flooded from an existing high volume standing cast iron system. If the conversion is from a high volume system a bypass loop must be installed. If high pressure testing of the existing system is necessary make sure the Quatech is isolated during the testing. Manual shut off valves must be installed on both the supply line and on the boiler bypass loop. ASME Boiler Code requires that feed or make up water be introduced to the piping system and not directly to the boiler. Pressure reducing valves should be installed and adjusted to 12psi cold water. The pressure relief valve must be piped from the boiler and downward to within 6in. of the floor or to a height to meet existing code. An expansion tank, circulating pump, and automatic air eliminators must be part of the system. The relief valve, backflow preventer and drain valve should be piped according to code to a drain with piping that is the same size as the relief valve. .

All piping, including heating, domestic hot water, and fuel lines, must be done in accordance with all local codes. It is suggested that you refer to the Water Installation Survey and Hydronics Institute Residential Hydronic Heating Installation/Design Guide.

All piping must be properly sized, free from defect, and be made of copper, steel, brass, aluminum, or PEX.

Test results have shown that the safest operating temperature range for modern boilers including the Quatech is 160 degrees F to 210 degrees F,(90degreesC to 99degrees C). Allowing the water temperature in the boiler to drop below 160 degrees F for an extended period of time can cause corrosion and boiler plugging.

Circulation Pump

A calculation for proper pump selection must be performed for all installations. The pump(s) should not be operated at maximum working pressures above 30PSI or maximum working temperatures above 210 degrees F and within limits advised by the manufacturer. The pump must not be operated unless the system has been bled of all air and completely filled with water.

Recommended locations for the circulator, expansion tank, relief valve and other trim are shown in figure1, figure2, figure3, and figure4.

Controls

The Quatech Boiler package includes a control package with a Hydrolevel model 3250 Hydrostat with built in Low Water Cut-Off and Boiler Reset. Wiring diagrams for both controls are included in this manual on pages 10 & 11, as well as diagrams for a powerventer application and a priority indirect application with a Taco SR503 or equivalent. For special control systems such as outdoor reset, multiple zones, multiple boiler installations, unit heaters, radiant heating etc. consult the respective manufacturers manual or contact Pensotti North America

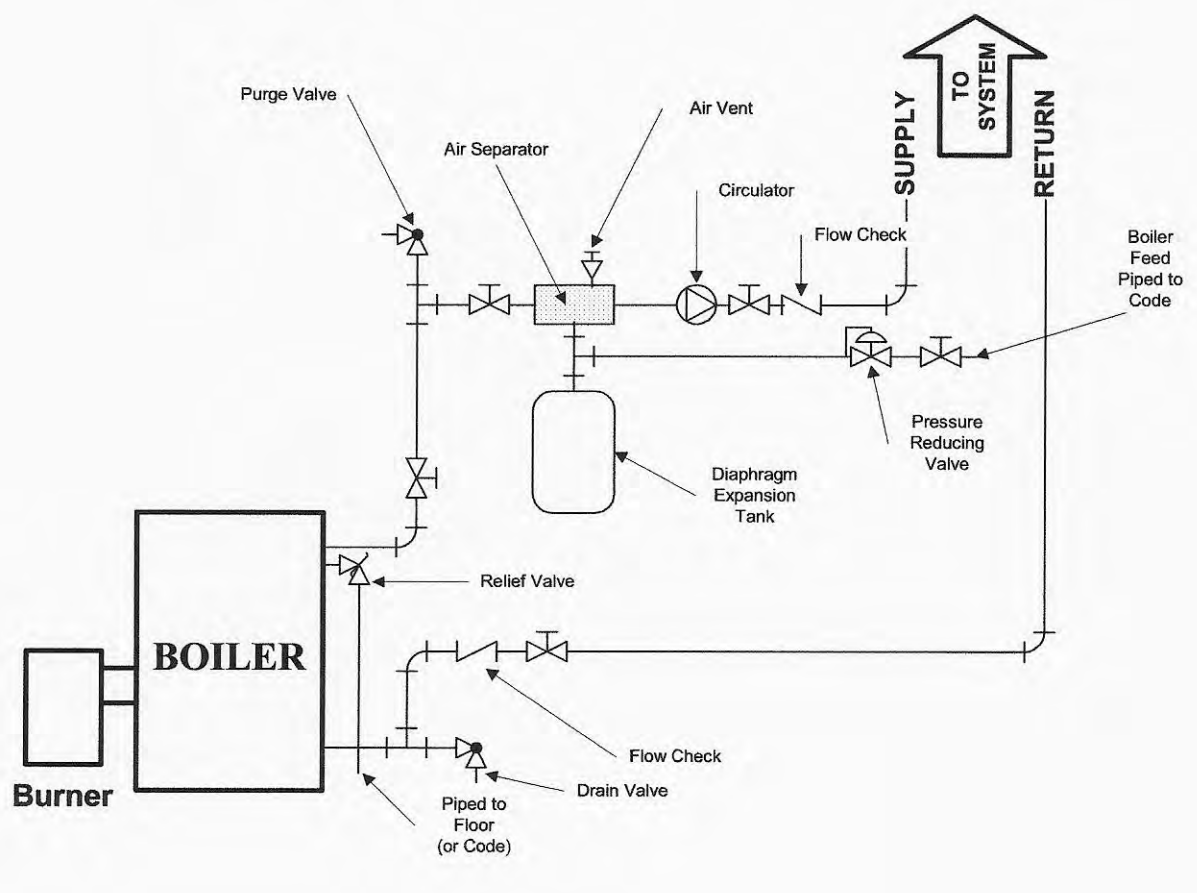


Figure 1

Figure 1 shows a typical installation with no domestic hot water and no by-pass loop installed

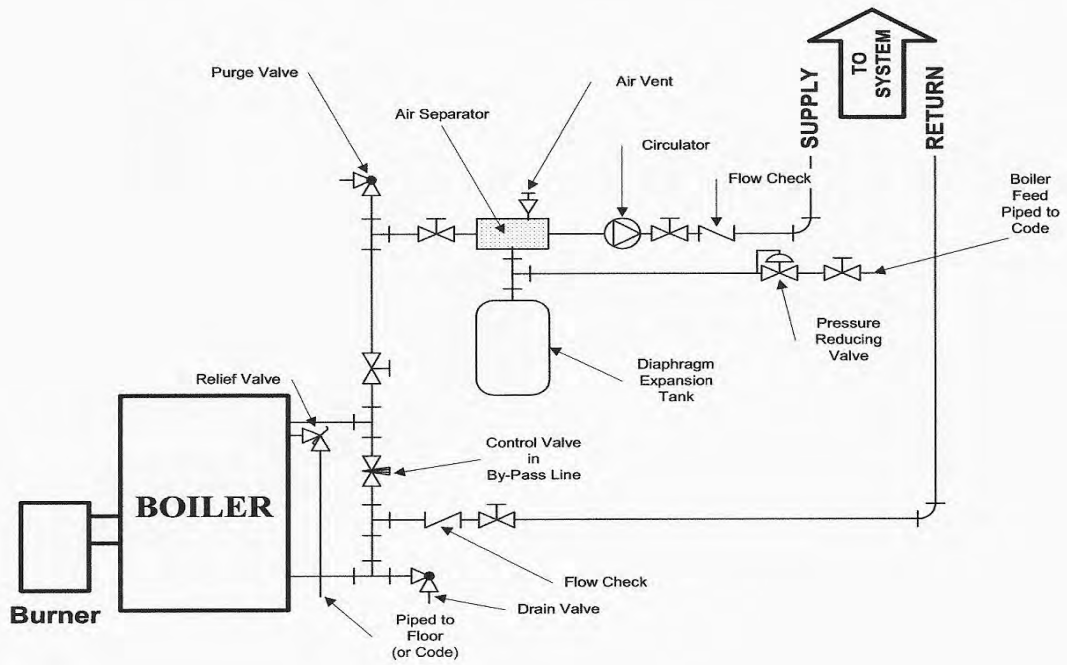


Figure 2

Figure 2 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.

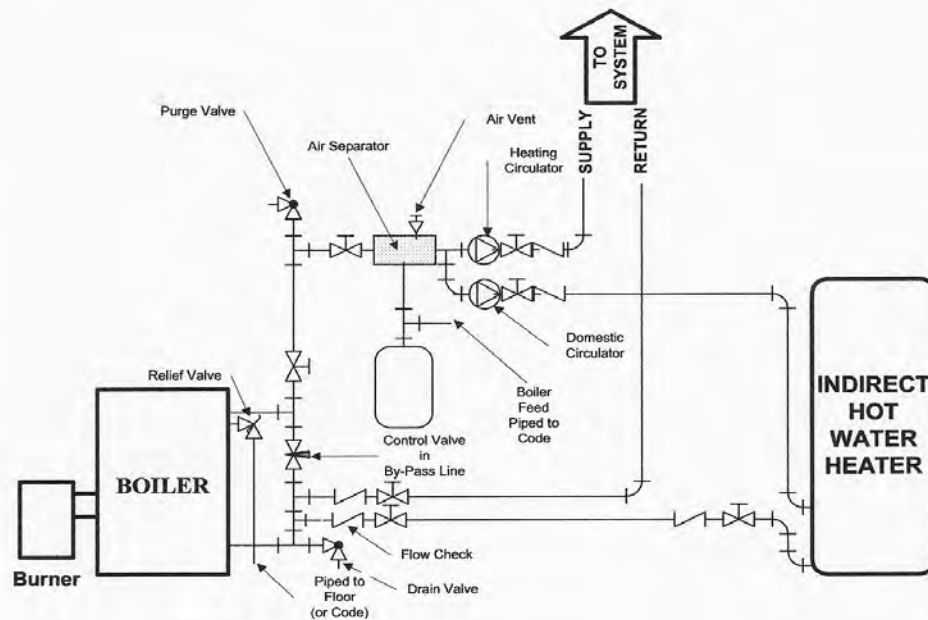


Figure 3

Figure 3 shows a typical installation with 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.

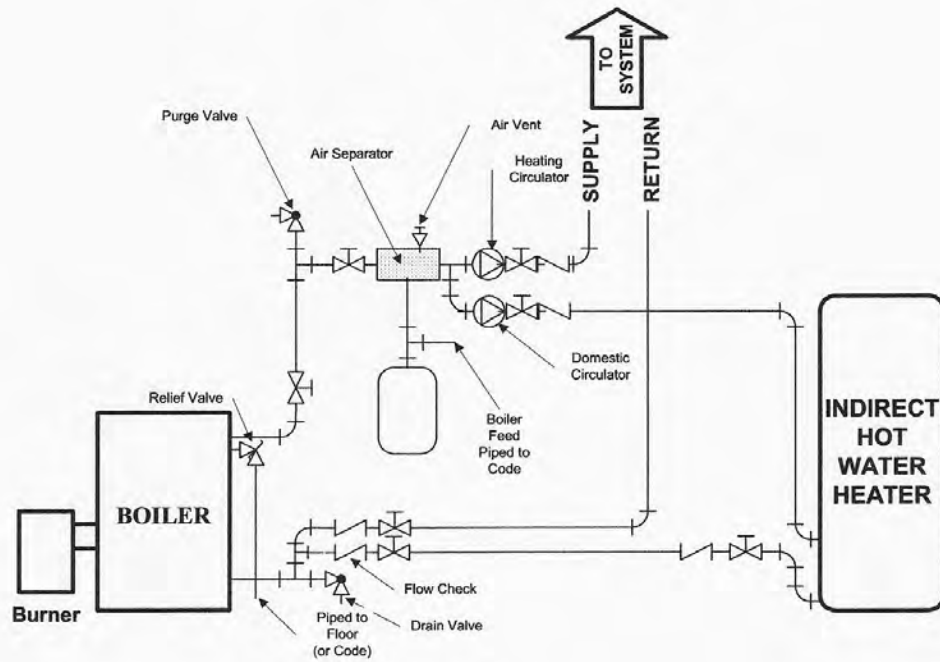


Figure 4

Figure 4 shows a typical installation with domestic hot water supplied by an indirect heater and with no by-pass loop installed.

WARNING

A proper burner harness must be used to avoid energizing of the burner with the mounting plate open. Otherwise severe burns to personnel may develop.

WIRING

All external wiring must be performed in compliance with existing electrical codes within the local jurisdiction. In the United States this is generally the NATIONAL ELECTRICAL CODE, NFPA70. In Canada the C,S,A, STANDARD C22-1 and the Canadian Electrical Code. Connections should be carried out in accordance with this manual and only by qualified individuals.

- The boiler and burner should only be operated on 120 Vac.
- Field connections should be properly sized and protected with a minimum 15 amp fuse or circuit breaker.
- A separate fused disconnect must be installed as required by code so that power can be shut off for servicing.
- The boiler must be ground to the water piping or the main service ground.
- Room thermostats should be installed or relocated 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.
- All electrical devices shall have cover plates, enclosures and guards that must be

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

The Quatech boiler should be equipped with a burner that includes a 15 second pre-purge control. This will insure smooth quiet starts and optimum operating performance. The use of a post purge is recommended with mechanical draft systems.

Figure 5 and Figure 6 show wiring diagrams for use of Hydrolevel 3250 Hydrostat along with installation for a powerventer application and the wiring of a priority indirect with a Taco SR503 or equivalent.

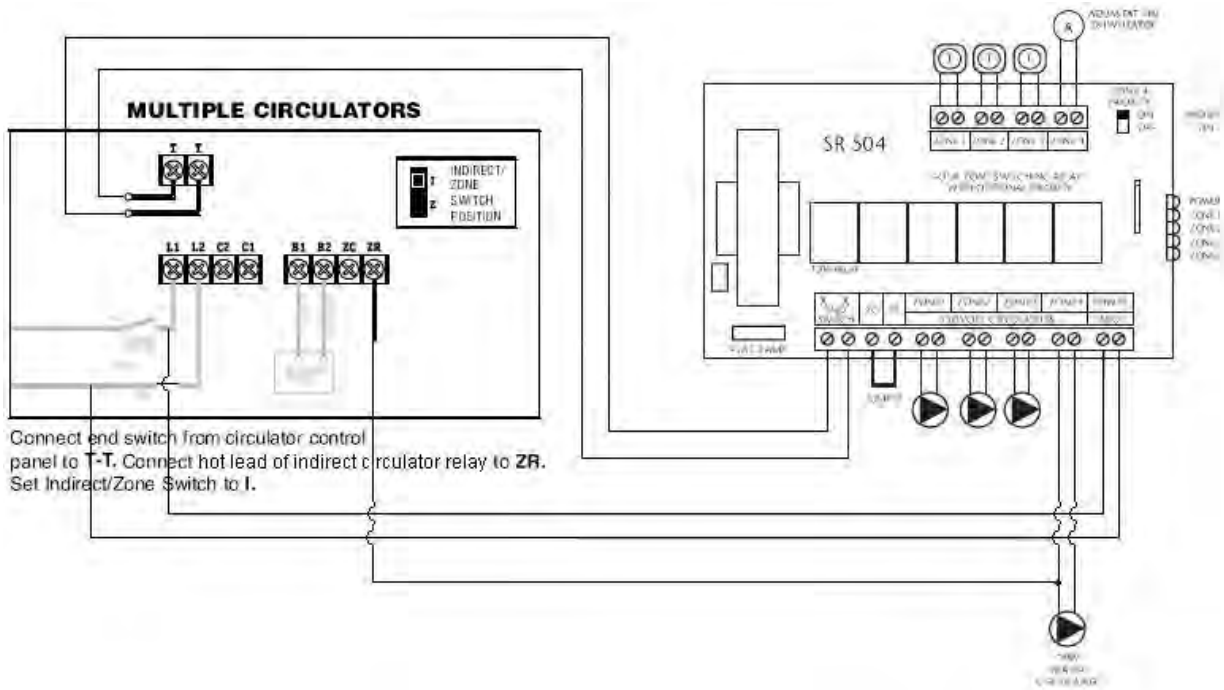
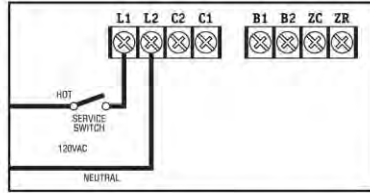


Figure 5

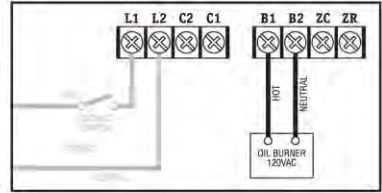
WIRING

WARNING Electrical shock hazard. To prevent electrical shock, death or equipment damage, disconnect power supply before installing or servicing this control.

STEP 1 Connect 120 VAC Hot to terminal L1. Connect 120 VAC Neutral to terminal L2. Disconnect means and overload protection as required (provided by others).



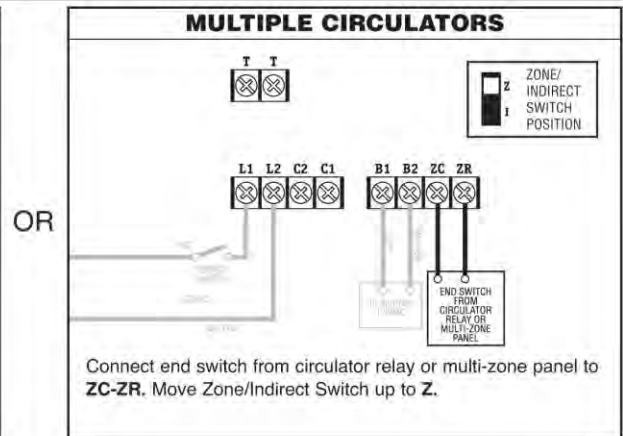
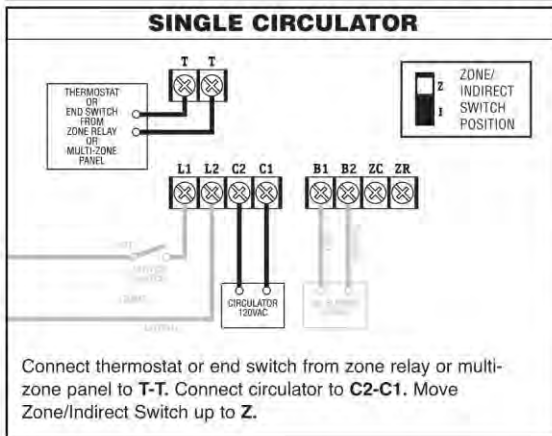
STEP 2 Connect the burner circuit to B1-B2. (B2 is neutral.)



Choose Step 3A or 3B Below Matching Your System Configuration

NOTE: For proper operation of the boiler reset function, all heating thermostats must input to T-T or ZC-ZR terminals as indicated below. Jumping the T-T terminals and wiring the thermostat to the primary will override the economy feature.

STEP 3A: HEATING ONLY - No Indirect Water Heater



STEP 3B: HEATING - With Indirect Water Heater

IMPORTANT: When installing with an indirect water heater, the Zone/Indirect Switch must be set in the I position. When set in the I position, calls to ZC-ZR will bypass the Thermal Targeting feature and allow the boiler to fire to the high limit setting to heat the indirect tank. The indirect signal must be separate from all heating zone signals. If you choose not to separate the indirect signal from the heating zones, the Economy Feature should be turned OFF to insure that the boiler supplies adequate temperature to heat the indirect tank (see page 4).

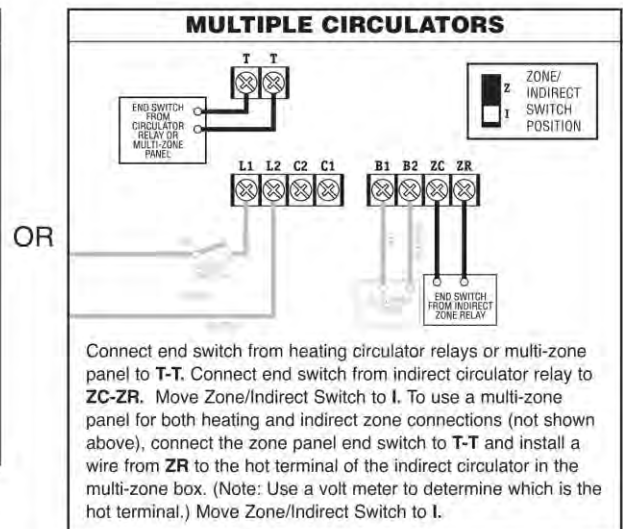
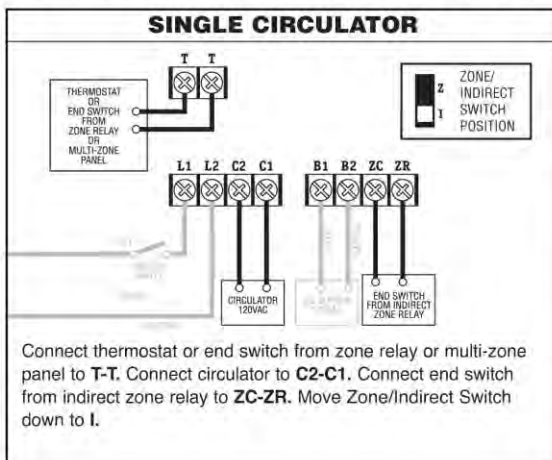


Figure 6

VENTING REQUIREMENTS

Oil fired units must always be connected to flues with proper draft.

All venting of the Quatech Series Boilers shall be done in accordance with national, state, and local codes, and be in conformity with NFPA 31. In addition design of the chimney connectors, chimneys, power venting systems and direct vent systems should also conform to State and local codes and be in accordance with good and accepted industry practice. NFPA 211 should be used in lieu of local codes.

Draft at the boiler breach should be a **negative .02**

If draft is in excess of a **negative .03** a barometric damper must be installed

Natural Draft Applications

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

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

Chimney Connection

To insure safe and efficient boiler operation flue gasses must be released through a clean, properly sized chimney with adequate draft that meets all local codes and regulations and be in accordance with NFPA 211 and NFPA 31. Always inspect and clean the chimney to insure that it is free from obstructions. The boiler must be connected to an independent chimney flue and not with a shared flue pipe. Never connect the boiler to a chimney or liner serving an open fireplace. Adjustable dampers in the chimney or flue pipe should never be used.

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

The height of the chimney should be within the following parameters:

- The top of the chimney should be at least 32 inches above the ridge of the roof.
- The flue pipe should be placed at a rising slope of 15 degrees with all parts of the flue subject to cold being insulated.
- The flue pipe must be properly supported and be 18in. from all combustible surfaces.

Condensation

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

Roof Clearances

Standard roof clearances apply. The installer is responsible for their adequacy.

Mechanical Draft Applications

The following basic guidelines listed below **figure 10** should be followed with mechanical draft applications. It is also strongly recommended that all precautions for Natural Draft Applications be followed. Reference should be made to NFPA 211. **Refer to figure 10 below as a reference.**

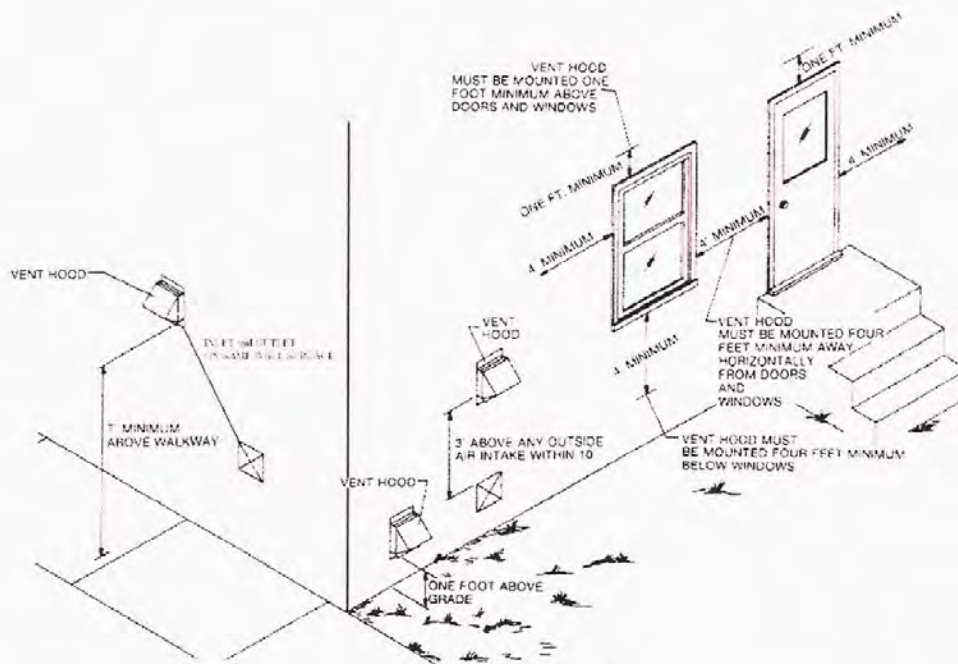


Figure 10

Do not install vent terminals on prevailing wind wall side of structure. Moisture and ice may form around terminal. Make sure the surface is in good repair and protected from damage.

- The terminating vent hood and the inlet air hood are to be placed on the same wall surface on the same wall opposite the prevailing wind.
- All combustion air to the burner is to be supplied from outside of the building.
- The vent hood must be placed at least 12in. above the total accumulated snow level and grade.
- In relation to windows, doors, or other air inlets, the vent hood must not be placed less than 4ft. to the side or below these openings or more than 1ft. above these openings.
- The vent hood must not be placed less than 3ft. above any powered air inlet that is within 10ft.
- The vent hood must not be placed less than 2ft. from any other building.
- The vent hood must be at least 3ft. from the inside corner of the building.
- The vent hood must be at least 4ft. from any roof soffit or ridge vent.
- The vent hood must be at least 7ft. above any public walkway.
- All venting material must consist of suitable materials and terminate at an approved steel hood.
- All vent piping must be sealed from air leaks.
- The vent pipe bend radius is 12in.
- Metal support strapping must be placed every 36in. to prevent the vent pipe from sagging.
- All National codes for the installation of oil burning equipment must be followed. In the U.S. NFPA 31 and NFPA 211 and in Canada CAN/CSA-B139 and local regulations.

- The vent termination shall not terminate underneath a veranda, porch, deck or within 3' of an oil tank vent pipe termination.

Power Venter Applications

If your installation calls for a powerventer then you must follow the recommendations and instructions of the OEM of the powerventer. In addition you must comply with all National, State, and Local codes.

DIRECT VENT APPLICATIONS



DIRECT VENTING IS TO BE USED FOR OIL APPLICATIONS ONLY. THE USE IS LIMITED TO THREE, FOUR, AND FIVE SECTION BOILERS. ONLY Z FLEX DIRECT VENT KITS ARE APPROVED FOR USE WITH THIS SERIES OF BOILERS. ONLY RIELLO BF SERIES BURNERS MAY BE USED.

This manual has previously provided information for Natural and Mechanical draft applications. In addition to instructions provided dealing with those applications the following instructions must be followed for Direct Vent Installations. **Figure 11** below shows a typical direct vent installation. It is suggested that you refer to this figure while adhering to the instructions shown below the figure. Pensotti Boilers and Z Flex recommend that the entire heating appliance including the direct vent assembly be checked annually by a qualified heating professional.

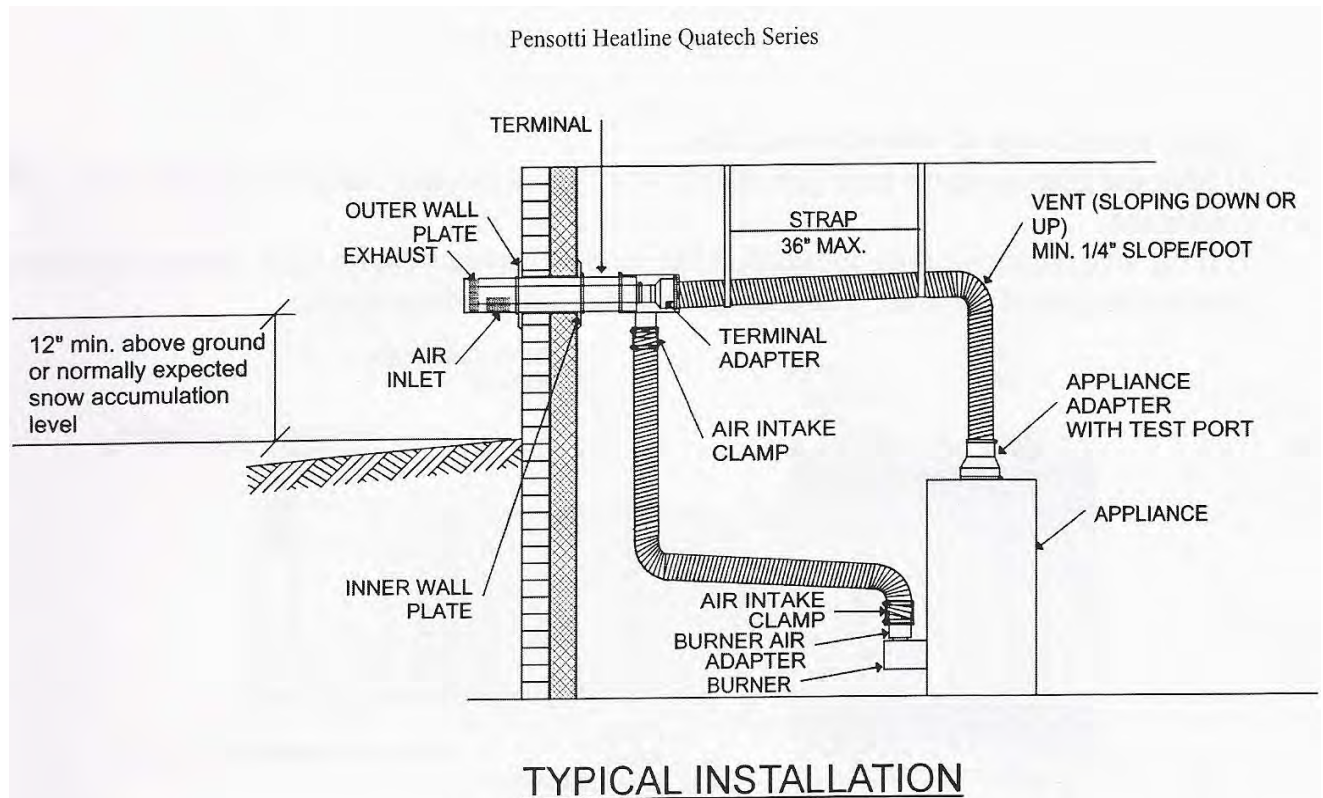


Figure 11

- Maximum wall thickness should not exceed 14 inches. Contact Pensotti North America for options if your wall is thicker than 14 inches.
- The Pensotti-Z Flex system is designed for single appliance use only. It is not designed for common venting unless specific approval is obtained.
- An appliance adapter test port must be used as required by Z Flex for combustion testing.
- All local, state, and national codes must be followed for the installation of oil burning equipment. In the USA refer to NFPA 31; in Canada refer to CAN/CSA-B139 and other local regulations.

-Clearances from Combustibles

- **Concentric Vent Termination (with combustion air pipe connected) 0"**
- **Z-Flex Exhaust Pipe 1"**

JOINT ASSEMBLY INSTRUCTIONS

Figures 12 and 13 below provide a visual representation of the joint assembly. Follow the instructions below the figures.

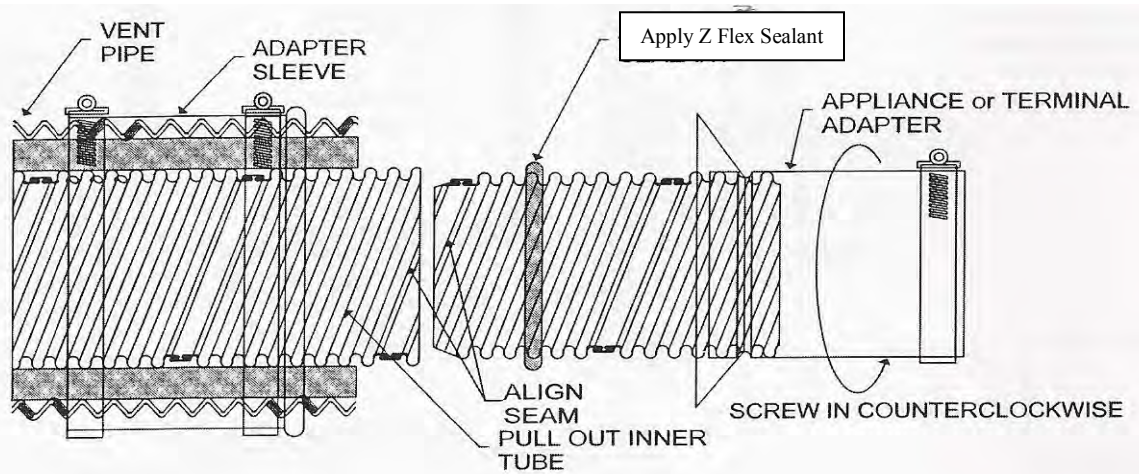


Figure 12

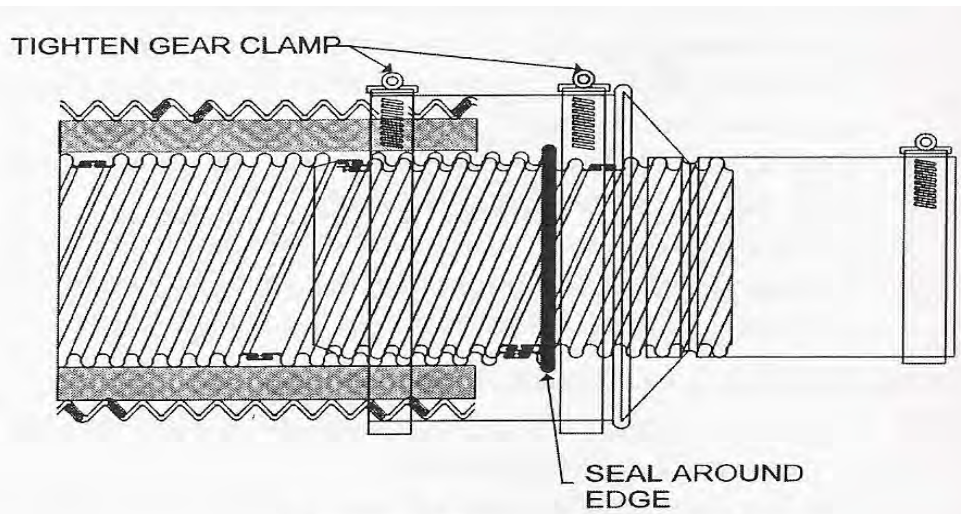
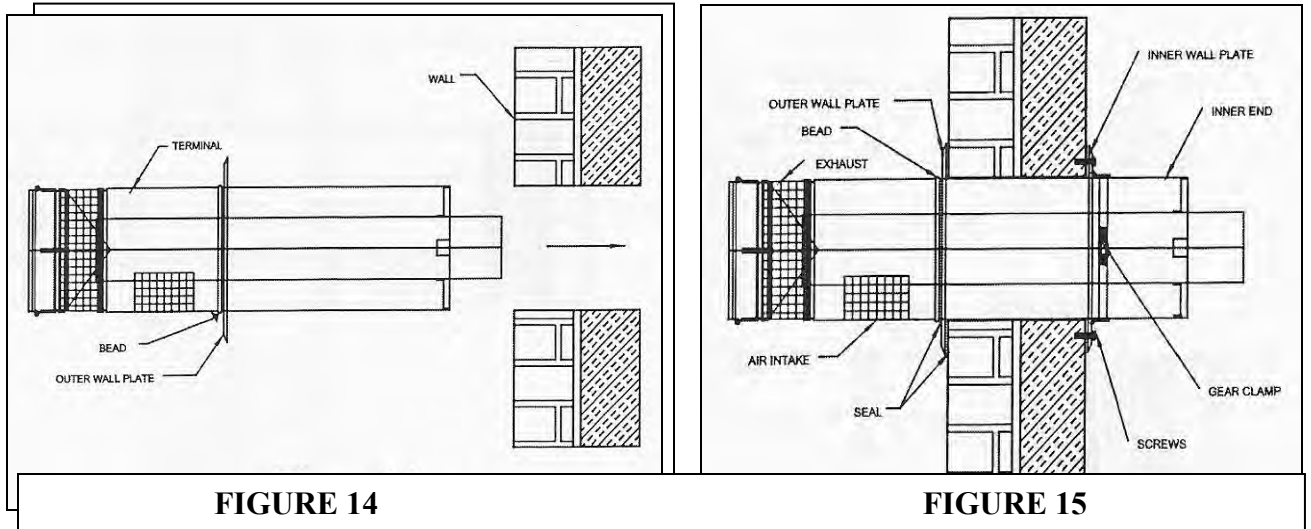


Figure 13

- Loosen the gear clamps attached to the adapter sleeve and slide the adapter over the vent pipe.
- Pull the corrugated inner tube out of the vent pipe for easy access for adapter insertion.
- Apply sealant around the corrugated end of the adapter.
- Align the flat seams at the end of both corrugated tubes and insert the adapter into the vent tube. Screw the adapter into the vent pipe with a counter clockwise motion. The adapter should be fully inserted into the inner vent tube until it is tight. The seams of both tubes must be aligned for ease of insertion. If the adapter does not completely screw into the vent pipe unscrew it and repeat the same process.
- Seal around the edge of the vent pipe inner tube.
- Slide the adapter sleeve back onto the adapter and tighten the gear clamps to complete the connection.
- If cutting to length for the vent is required, a fine toothed hacksaw can be used. Remove burrs and flare out the end of the inner vent tube for easy installation of the adapter.

INSTALLING THE OUTSIDE TERMINAL

Figures 14 and 15 show the installation of the outside terminal. Follow the instruction below the figures to successfully complete this task.



- Determine the terminal location.
- Cut an 8 1/4 in diameter hole through the wall. This is slightly larger than the O.D. of the terminal. Prior to cutting make sure you have the proper ground clearances.
- Separate the inner and outer terminal sections.
- Slide the outer wall plate over the outer section of the terminal until it rests against the bead.
- From outside the building insert the outer section of the terminal through the hole until it rests against the outer wall.
- From inside the building slide the inner wall plate over the outer terminal section and secure using (4) screws.
- Position the outer section so that the seam on the flue collar is on top of the air intake on the bottom. Secure the outer section by tightening the gear clamp around it. The gear clamp is factory welded to the inner wall plate.
- Seal around the bead and edge of the outer wall plate with a weather proof sealant to prevent water infiltration.

CONNECTIONS TO THE OUTSIDE TERMINAL

FIGURES 16 and 17 Provide an illustration of the steps outlined below to connect to the outside terminal. Follow the steps outlined here to accomplish this task.

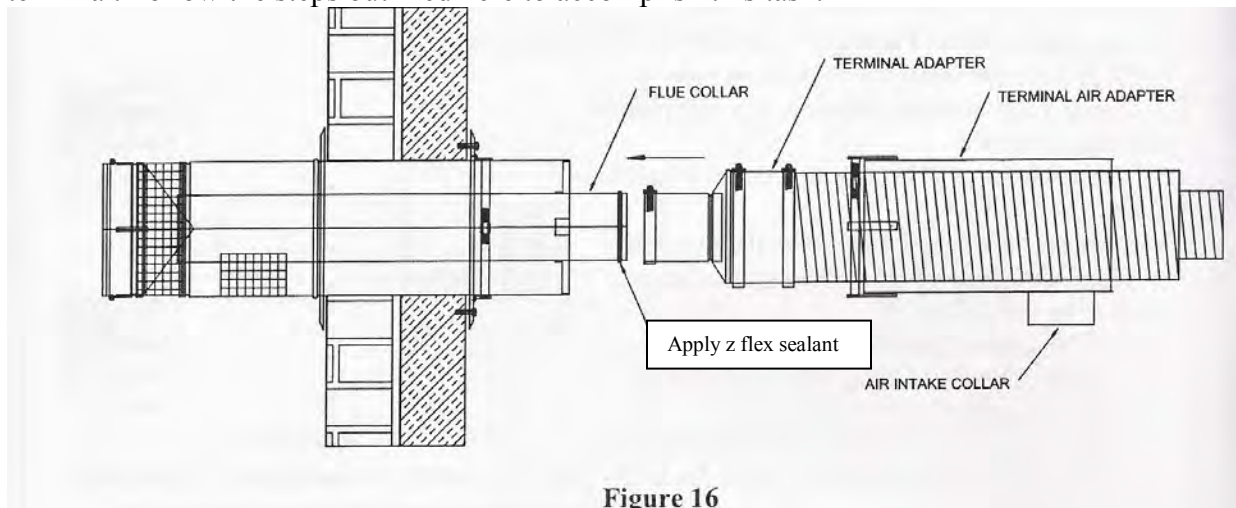


Figure 16

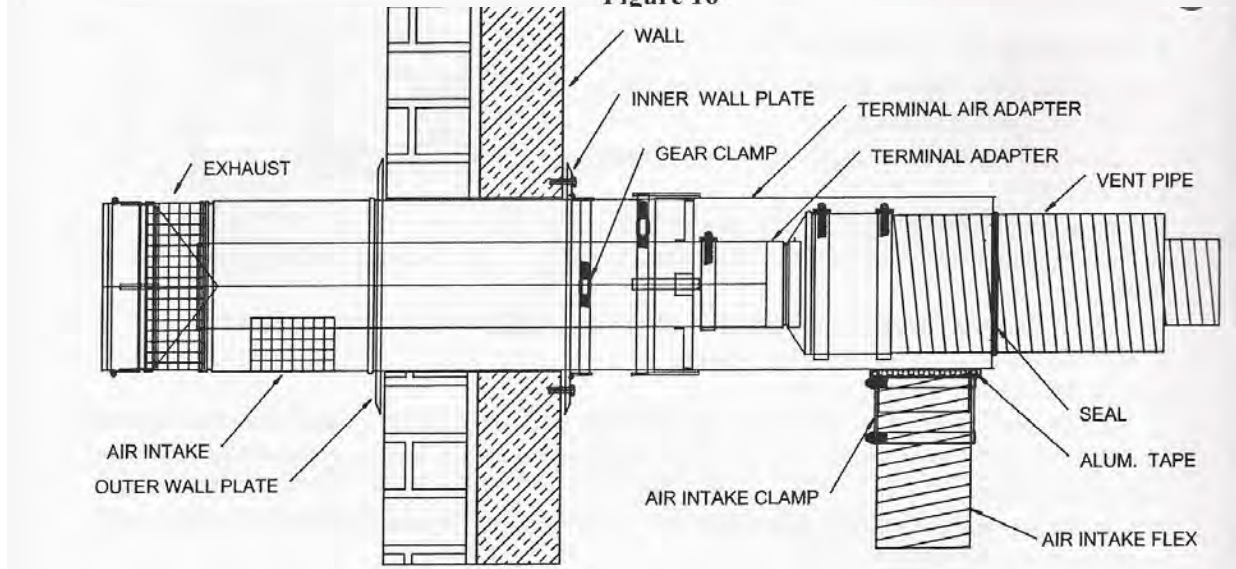
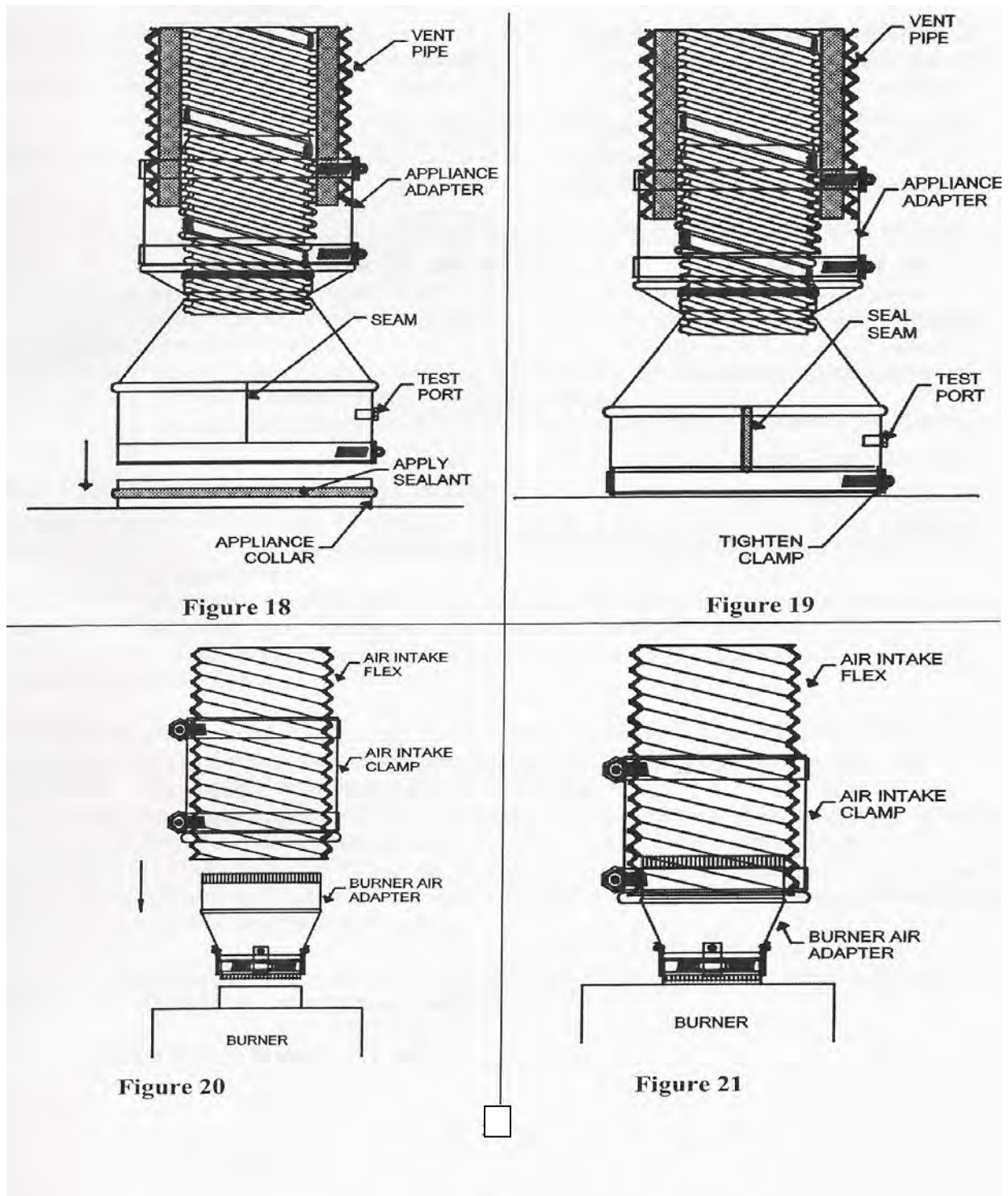


Figure 17

- Slide the inner section over the vent pipe.
- Connect the terminal adapter to the vent pipe directed in the joint assembly section of this manual
- Apply a bead of sealant around the terminal flue collar.
- Slide the appliance adapter over the flue collar.
- Tighten the terminal adapter gear clamp around the flue collar.
- Seal the adapter seam with sealant.
- Slide the inner section over the outer section and secure by tightening the gear clamp.
- Stretch the air intake flex to the desired length and slide it over the air intake collar. Seal the connection with aluminum tape and secure it using the air intake clamp. The beaded end of the air intake clamp should go first over the air intake collar.
- Seal the gap between the vent pipe and the inner section with silicone sealant.

CONNECTING TO THE APPLIANCE

The following series of figures, 18, 19, 20, & 21 provide a pictorial view of the appliance connection. Follow the steps below to accomplish this task.



- Connect the appliance adapter to the vent pipe as shown in the joint assembly section.
- Apply sealant around the appliance flue collar.
- Slide the appliance adapter over the appliance flue collar.
- Tighten the gear clamp of the appliance adapter around the flue collar.
- Seal the adapter seam with sealant.

- Install the burner air adapter.
- Slide the end of the air intake flex over the burner air adapter. Seal the connection with aluminum tape and secure with the air intake clamp. The beaded end of the air intake clamp should go first over the burner adapter.
- The Pensotti Quatech Direct vent system does not require a vacuum relief valve or a post purge control on the Riello BF Series burner per UL 726 test criteria.

Z FLEX COMPONENTS AND PART NUMBERS

COMPONENTS – 4in. diameter system	Part Number
Z Flex Vent Pipe 10ft. length	ZFV104
Z Flex Vent Pipe 15ft. length	ZFV154
Z Flex Vent Pipe 20ft. length	ZFV204
Z Flex Appliance adapter w/Pt 6in. to 4in.	ZFA64P
Z Flex Vent Terminal 4in.	ZFDV0
Z Flex Terminal Adapter 4in. – 4in.	ZFAT44
Z Flex Air Intake Flex 10ft. by 4 in.	L10-04
Z Flex Air Intake Flex 15ft. by 4in.	L15-04
Z Flex Air Intake Flex 20ft. by 4in.	L20-04
Z Flex Air Intake Clamp 4in.	7H372XX
Riello BF Burner Air Adapter 3in. – 4in.	4RA43
Z Flex Sealant 3 oz.	23ILUC

Other components may be available. Check with Pensotti with any needs.

DANGER	Never Burn Gasoline, Waste Oil, or Crankcase Oil in this appliance.
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FUEL SYSTEM

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

- The quality of your fuel is of great importance. For most instances your burner is designed to burn clean water free #2 fuel. Where outside tanks are subject to temperatures below 0degreesF #1 fuel is recommended.
- The oil supply line should be constructed of seamless heavy wall copper tubing with flared fittings. Only oil resistant pipe dope should be used on threaded connections. The use of Telfon Tape will void manufacturers' warranty. Lines must be airtight, clean and free of kinks. All joints and threaded fittings must be checked for leaks. A vacuum gauge should be employed when testing the installation. It is recommended that older fuel lines be replaced.
- A two pipe system should only be used when the oil supply is well below the pump. A return fuel line may be used on installations where the tank level is below the level of the burner. The return line must be equal in diameter to the suction line. The minimum size for the oil line is 3/8in. copper tubing.
- A Tiger Loop is recommended when the oil supply line is located 5 ft. below the burner.
- Double filtration is recommended to insure maximum pump and nozzle life. The Total Gear Suction Capacity (TGSC), will determine the filter size. The filter normally found in the tank should be left in place while adding a high quality paper throwaway cartridge type filter or line strainer to the fuel suction line. A 5 micron to 10 micron rating is recommended. The paper filter or strainer should be mounted on the casing of the boiler. Flexible fuel lines with adequate slack can thus be used allowing for easy removal of the burner or use of the swing door without having to disconnect the fuel lines.
- Shut off valves must be installed in the supply line at or near the oil storage tank and at the burner in compliance with all codes. Inspect the shut off valve spindle packing for tightness to insure that there are no air leaks. The valve must always be shut off if the burner is shut down for an extended period of time. The burner should be tagged to indicate that the fuel supply has been closed off. The electrical circuit to the burner must be cut off by removing the fuse or circuit breaker to insure that no operation of the burner will occur while the fuel supply is shut off.
- Only fuel storage tanks bearing the Underwriters Laboratories label and accessories approved as prescribed by local code may be used.
- Never burn paper or garbage in the unit and check to insure that all rags, debris, stored flammable liquids, or products producing flammable vapors are removed from the area of the boiler.

**GASOLINE, CRANKCASE OIL,
OR WASTE OIL MUST NEVER
BE USED!**

Pensotti Heatline Quatech Series Burner Specifications

Appliance Model	No. of Sections	Length (inches)	Weight (pounds)	Water Content (us/gal)	Supply Outlet (inches)	Return Outlet (inches)
DK2-3	3	18-7/8"	370	5.5	1-1/4"	1-1/4"
DK2-4	4	22-1/2"	437	6.9	1-1/4"	1-1/4"
DK2-5	5	26-3/4"	503	8.2	1-1/4"	1-1/4"
DK2-6	6	31-1/8"	569	9.5	1-1/4"	1-1/4"
DK2-7	7	35-1/2"	639	10.8	1-1/4"	1-1/4"
DK2-8	8	39-3/4"	705	12.2	1-1/4"	1-1/4"

Appliance Model	IBR Burner Capacity - Oil Input		DOE Heating Capacity MBH	IBR Net Water Rating MBH	AFUE %	Minimum Vent Size
	GPH	MBH				
DK2-3NES	0.70	98	83	74	86	5" x 18"
DK2-3	0.60	84	73	63	87	5" x 18"
DK2-4NES	1.00	140	121	106	86	6" x 18"
DK2-4	0.80	112	97	84	87	6" x 18"
DK2-5	1.25	175	151	131	87	6" x 18"
DK2-6	1.39	194	167	148	87	7" x 18"
DK2-7	1.60	224	195	171	87	7" x 18"
DK2-8	1.80	252	222	193	88	7" x 18"

Pensotti Heatline Quatech Series Burner Specifications

PENSOTTI HEATLINE QUATECH SERIES / RIELLO SPECIFICATIONS

Appliance Model	Burner Model	Nozzle Size	Pump Pressure (psi)	Turbulator Setting	Air Gate Setting
DK2-3NES	40 F3	.55 X 70° B	160	0.0	3.6
DK2-3	40 F3	.50 X 70° B	165	0.0	3.4
DK2-4NES	40 F5	.85 X 60° B	140	2.0	2.8
DK2-4	40 F5	.65 X 60° B	165	0.0	2.8
DK2-5	40 F5	1.00 X 60° W	156	3.0	3.0
DK2-6	40 F5	1.10 X 60° W	160	2.0	4.8
DK2-7	40 F10	1.35 X 45° B	145	1.0	3.0
DK2-8	40 F10	1.50 X 45° B	145	2.0	3.0

PENSOTTI HEALINE DIRECT VENT SERIES / RIELLO BF SPECIFICATIONS

Appliance Model	Burner Model	Nozzle Size	Pump Pressure (psi)	Turbulator Setting	Air Gate Setting
DK2-3 DV	40 BF3	.55 X 70° B	160	2.0	4.6
DK2-4 DV	40 BF5	.85 X 60° B	140	1.0	4.4
DK2-5 DV	40 BF5	1.00 X 60° W	156	2.0	5.6

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

- Prior to start up make sure the service switch is in the **OFF** position
- Check all fittings and wiring.
- Insure that the boiler and the entire heating system are completely filled with water and that all air has been purged from the system resulting that proper system pressure is achieved. The minimum PSIG is 12.
- Check to insure that clean quality #1 or #2 heating oil has been used to fill your storage tank.
- Open all manual shutoffs throughout the system.
- Set operating controls to the recommended settings.
- Follow the burner manufacturer's instructions for proper light off and setting. Using accurate combustion test equipment set the burner for proper "steady state" operation. The use of accurate instruments is necessary to achieve maximum efficiency and lowest fuel costs.
- Place this manual, the control manual, and the burner manual along with related consumer information in an easily accessible location. Installers should make the consumer aware of the content and location of this information.

MAINTENANCE, SERVICE, AND CONTROL TESTING

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

HOMEOWNER SERVICE CAUTION

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

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

CAUTION	Line voltage present care must be used when testing controls.
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TESTING SAFETY AND CONTROL DEVICES

Prior to initial startup and whenever maintenance is performed the following testing procedures should be implemented.

- Set controls with the burner service switch in the off position.
- Set room thermostat at least 10 degrees F above room temperature.
- Set **operating limit** to maximum.
- Turn on the burner. After the burner has started and the boiler reaches a temperature of at least 140 degrees F turn down the **operating limit** and make sure that it shuts off the burner. Then adjust the operating limit as required to satisfy system demands.

Test the **thermostat** by raising and lowering the thermostat.

- Check the **primary control** safety features in accordance with the manufacturers recommendations outlined in the instructions furnished with the control and burner assemblies. The following tests should be performed: 1) Safe start safety check 2) Ignition failure 3) Flame failure 4) Power failure.

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

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

CLEANING OF THE BOILER SECTIONS

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

- Remove the front casing by sliding it upwards to release and then pull to remove.
- Open the front swing door by removing the four bolts, this will expose the chamber area as well as the second and third passes.
- Remove the stainless steel baffles. With a cleaning brush clean the boiler section, second and third passes.
- Remove the insulation and smokehood cleaning cover from the rear section. Remove any soot that may have collected in the smokehood. Replace insulation on the rear section.
- Replace swing door and tighten bolts.
- Refit the front casing.

FUEL SYSTEM AND BURNER CLEANING

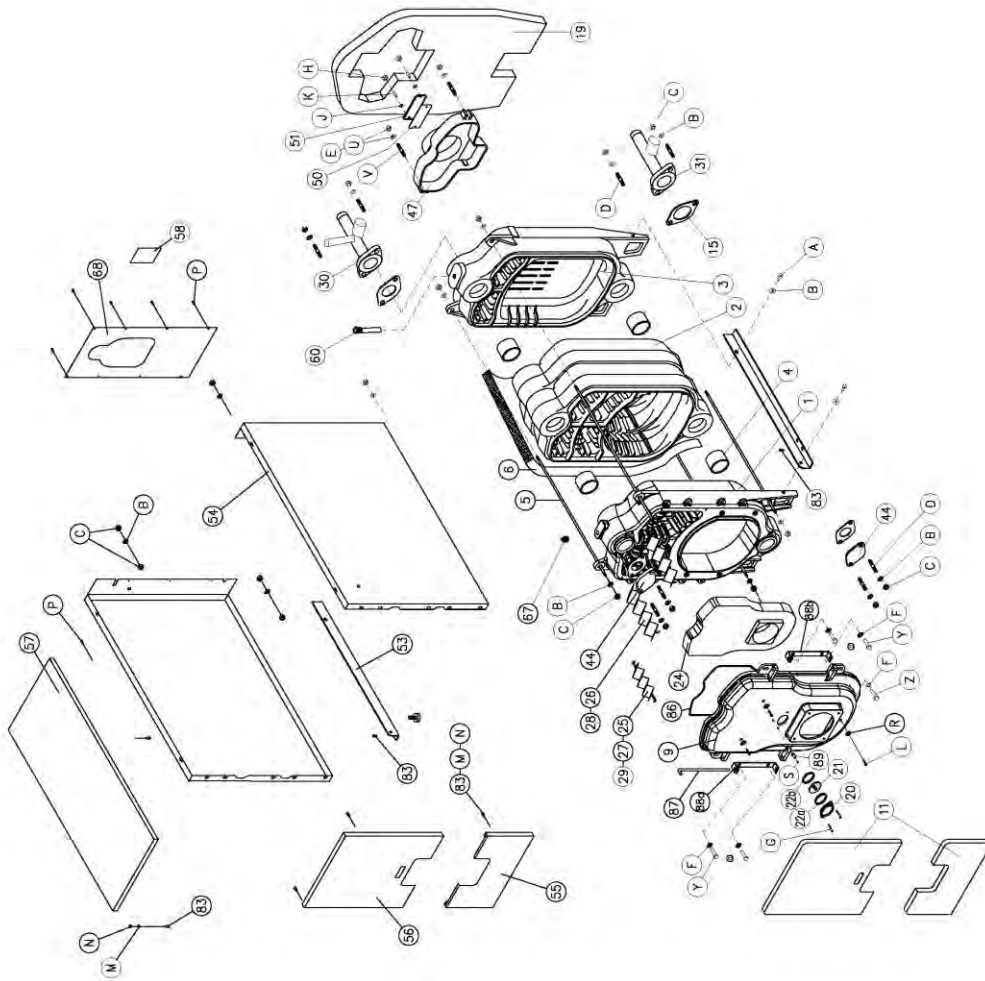
Your burner manufacturer has supplied instructions for servicing and maintenance should be performed as instructed. In addition the following fuel and related items should be serviced on a regular basis.

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

PERFORM COMBUSTION TEST

The burner must be adjusted to insure proper CO₂ and O₂ levels with no more than True Zero Smoke. Continue adjustments until the proper level is achieved.

PARTS LIST AND BOILER DIAGRAM



Number	PART NAME	Number	PART NAME
1	DK2 FRONT SECTION	60	QUATECH PNA - POCKET FOR SENSING BULBS
2	DK2 INTERMEDIATE SECTION	67	TAPPING WITH AIR RELIEF VALVE
3	DK2 REAR SECTION	68	REAR CASING
4	NIPPLE	83	SPECIAL PIN FOR CASING ASSEMBLY
5	STAYBOLTS	86	FIBRE-GLASS ROPE DIA. 10
6	BODY INSULATION	87	HINGE PIN
9	FRONT DOOR (MONOBLOCK)	88a	HINGE - LEFT HAND SIDE
11	FRONT INSULATION	88b	HINGE - RIGHT HAND SIDE
15	RUBBER GASKET	89	OUTLET FOR PRESSURE MEASUREMENT
19	REAR INSULATION	A	SETSCREW M10 X 30
20	SIGHTGLASS FRAME	B	WASHER A10.5
21	SIGHTGLASS	C	NUT M10
22a	SIGHTGLASS FRAME INSULATION	D	STUD M10 X 40
22b	SIGHTGLASS INSULATION	E	NUT M8
24	FRONT DOOR REFRACTORY	F	WASHER A8.4
25 / 27 / 29	2ND PASS RETARDERS	G	SETSCREW M5 X 15
26 / 28	3RD PASS RETARDERS	H	NUT M6
30	DELIVERY STUB PIPE	J	WASHER A6.4
31	RETURN STUB PIPE	K	STUD M6 X 22
44	BLANK FLANGE	L	SELF TAPPING SCREW S6.3 X 30
47	SMOKEHOOD DIA.150 MM	M	SERRATED WASHER A4.3
50	SMOKEHOOD CLEANING COVER INSULATION	N	NUT M4
51	SMOKEHOOD CLEANING COVER	P	SELF TAPPING SCREW S4.8 X 9.5
53	CHASSIS - LEFT/RIGHT HAND SIDE	R	WASHER A6.4
54	SIDE CASINGS - LEFT/RIGHT HAND SIDE	S	SETSCREW M3 X 6
55	FRONT CASING LOWER PART	U	WASHER A9
56	FRONT CASING UPPER PART	V	STUD M8 X 50
57	ÜST SAC	Y	SETSCREW M8 X 16
58	BOILER DATA PLATE	Z	SETSCREW M8 X 30

Pensotti Heatline Quatech Series

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