

Waste Oil Fired Equipment



Manufactured by **EconoHeat**

Waste Oil Fired Boiler

Installation, operation and service instructions

OWB-9, OWB-15 120v Manual



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PRECAUTIONS

Waste oil may contain many foreign materials. Waste oil may also contain gasoline. Therefore, specific precautions on the handling and storage of waste oils are to be observed when using, cleaning, and maintaining this heater. **Use a screen in a funnel when pouring oil into storage tank to catch foreign material, i.e., gasket material and sealant fibers, etc.** **WARNING: This appliance is not designated for use in hazardous atmospheres containing flammable vapors or combustible dust, or atmospheres containing chlorinated or halogenated hydrocarbons. Do not expose this unit to rain or moisture. If installed in high moisture atmosphere, a special cover for the integrated air compressor must be obtained from factory to avoid rusting of internal raw metals. If this occurs, see trouble-shooting guide for remedy.** OMNI burns the widest range of used and new oils including, but not limited to: used motor oils up to 90 weight, transmission and hydraulic fluid, used synthetic oils, crude oil, vegetable, fish, and mineral oil, all diesel fuel and many more. Do not use old, contaminated oils that have been stored in underground tanks or outside barrels for long periods of time. Excessive water and sludge may be present, causing quick filter plugging.

NOTES: The instructions contained in this manual apply to the installation, operation, and service of OMNI Waste oil fired boiler. The following instructions should be carefully followed for obtaining the best possible installation, operation, and service conditions. Specifications are subject to change without notice. This product was designed to provide an economical disposal of waste oil. Proper operation depends on the consistency of the oil. Any water or foreign material in the oil may cause the unit to shut down. If a continuous stream of oil cannot be guaranteed at the burner, the main system should be set above freezing which will prevent any building damage if the waste oil heater were to become inoperative during subfreezing weather, i.e. supply tank empty, filter plugged, etc.

UNCRATING: Immediately upon uncrating units, check rating plate for certainty of electrical and mechanical characteristics. Also, check the unit for any damage that may have been incurred in shipment, if any damage is found, file a claim with the transporting agency. The unit has been tested and inspected at the factory prior to crating and was in perfect condition at that time. If anything is missing, check packing slip for indications of possible backorder of those parts or components. Otherwise, a claim must be filed for those missing parts.

IMPORTANT

Notice to the owner and installer

To enjoy the long-term benefits of burning your used oil in an OMNI Waste Oil Burning appliance, it is necessary to become familiar with the correct installation operation and maintenance of your new furnace. Before installing or operating this appliance, make sure you read and understand this manual.

IMPROPER INSTALLATION, ALTERATIONS, OR LACK OF MAINTENANCE WILL VOID THE WARRANTY.

The most critical sections of this manual are in order of importance as follows:

- **Basic Operation Knowledge**
- **Oil Suction Line Installation**
- **Correct Draft Over Fire**
- **General Maintenance Requirements**

Identical to any gas or oil furnace, without adequate draft over the fire, the combustion gases cannot escape the furnaces. The flame will lengthen resulting in an overheated combustion chamber. Even if the boiler is installed correctly and adequate draft achieved, a flue passage blockage will affect the draft. Burning used oil is similar to burning wood. A fine gray ash accumulates in the chamber and flue passage. This accumulation of ash will eventually affect the draft. It is important to remove this ash before the draft is affected.

These topics are discussed in detail on the pages listed above. Please familiarize yourself with these sections of your manual. Spending a few minutes to review this material will assure that you receive the return on investment that you expect from your OMNI boiler.

Note: All illustrations and specifications contained herein are based on latest information available at the time of publication. EconoHeat reserves the right to make changes at any time without notice.

Oil Burner

WARNING

Installation and use of this used oil burning appliance shall be in accordance with the standard for the Installation of Oil Burning Equipment – ANSI/NFPA 31 – 1987, and National Electric Code – ANSI/NFPA 70 – 1990 and the requirements of the inspection authorities having jurisdiction.



Figure 1 - Oil Burner (Back View Closed)

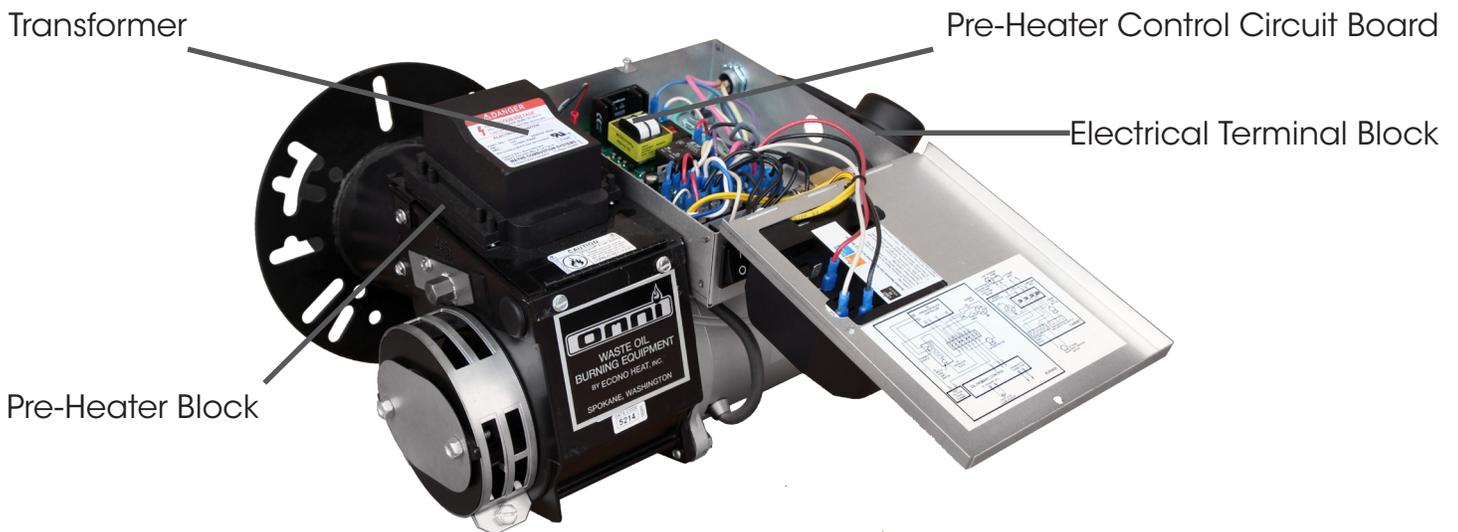


Figure 2 - Oil Burner (Back View Opened)

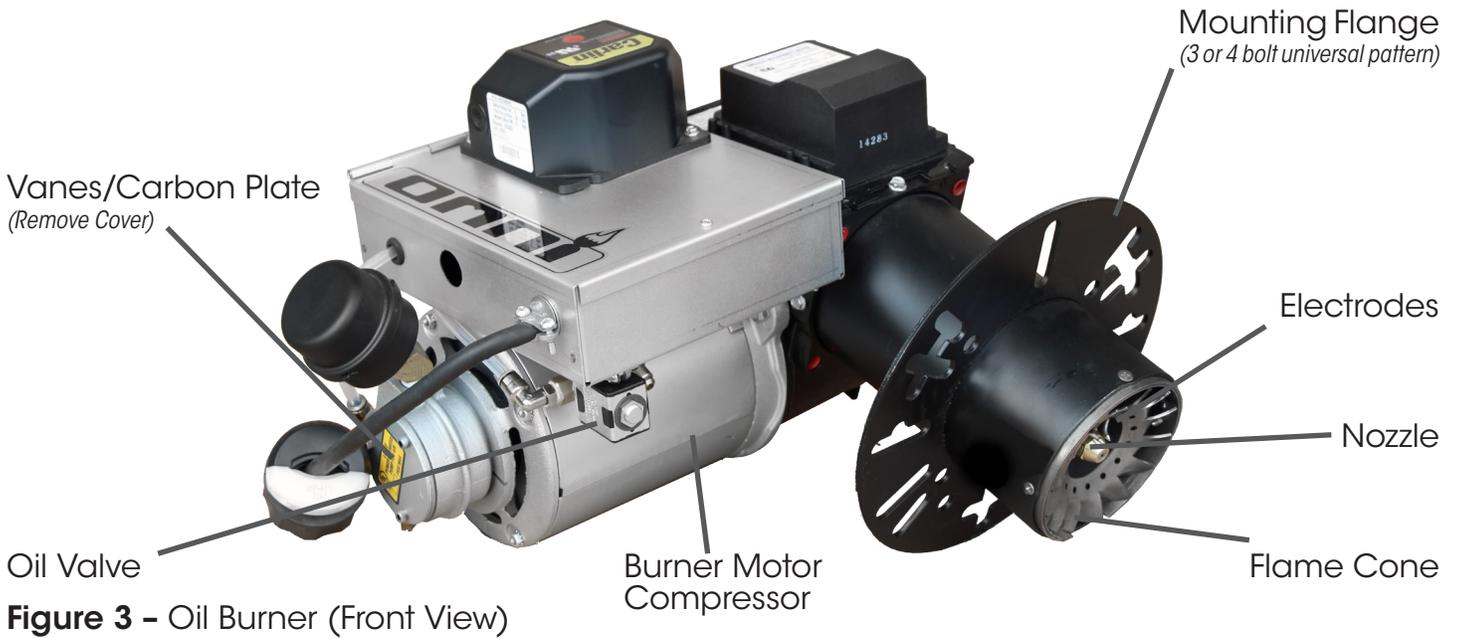


Figure 3 - Oil Burner (Front View)

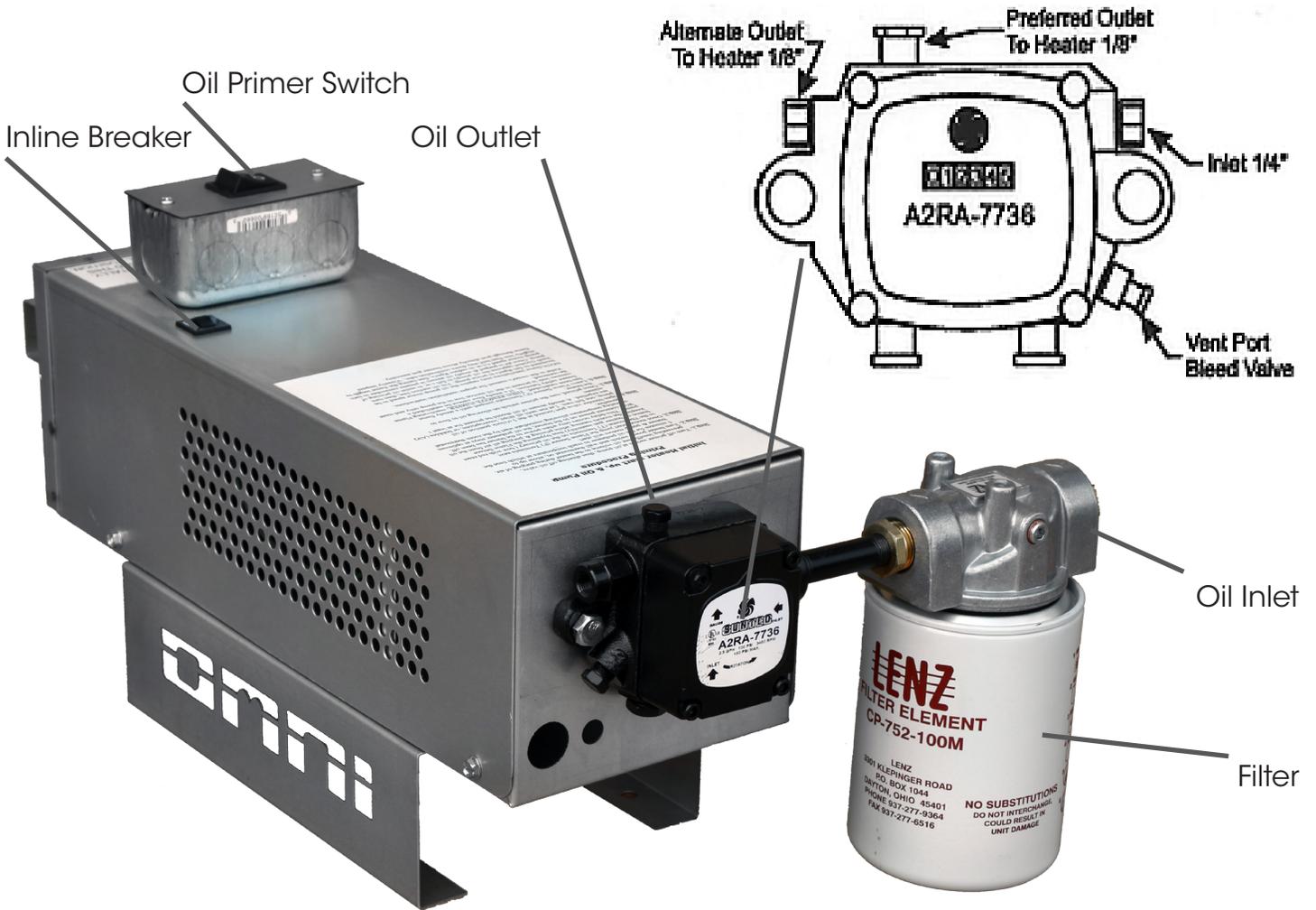


Figure 4 - Oil Pump Diagram
OMNI by EconoHeat

Oil Flow Control Supply Pump has the ability to control flame even when various viscosities are used- furnace or stove oil to 90 weight straight- flame remains stable

Oil Shut-off Valve
(Eliminates start delays due to possible drain back)

Inline Breaker

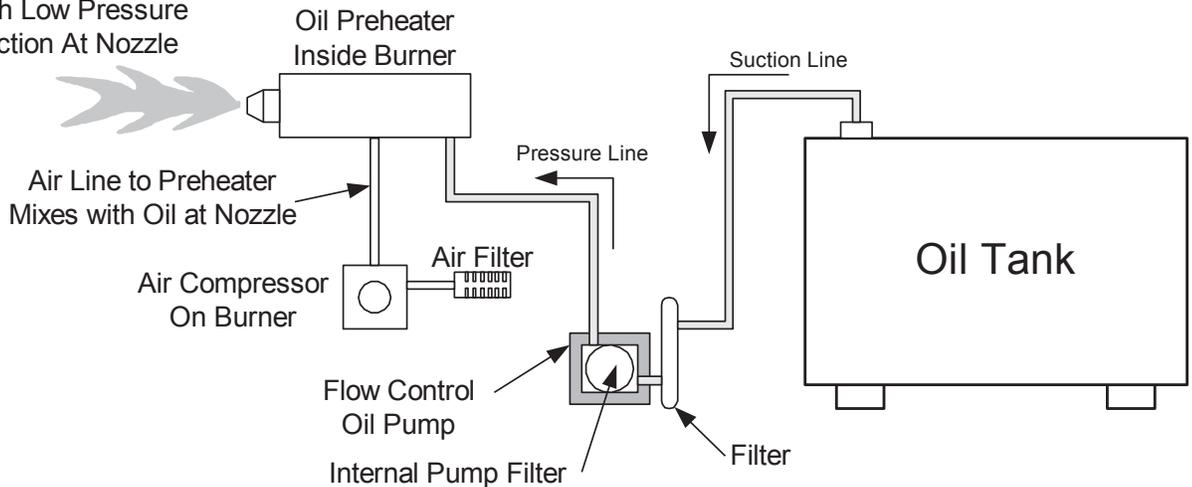
Oil Primer Switch
(Solenoid valve, on/off)



Figure 5 - Oil Pump Assembly

Oil Burner Technology

Atomization Through Low Pressure
Preheat & Air Induction At Nozzle



OMNI's patented burner technology improves the efficiency of the oil burn process by continuous stabilization of the oil viscosity. Optimum atomization (spray) is accomplished by precisely pre-heating the oil and air prior to introduction to the combustion chamber. The waste oil enters into the Oil Pre-Heater Block (figure 4) and is pre-heated to operating thermo set-point, then compressed air from the air compressor (figure 3) is mixed with the oil prior to spraying out the nozzle similar to fuel injection, by breaking up the oil droplets into a finer mist or spray (atomization). Electrodes mounted just above the nozzle (figure 5) provides continuous electrical arc across electrode to electrode igniting the fine oil mist as it sprays out of the nozzle. Once ignited the flame is forced into a swirl caused by the burners blower and specially designed flame cone (figure 5) providing a very efficient and thorough burn of the waste oil.

Burner Components

- **Igniter Transformer:** (figure 3) Supplies high voltage to the electrodes generating electrical arc igniting the oil.
- **Oil Valve:** (figure 5) energizes when burner is running and de-energizes when burner is not running eliminating bleed back of oil out of the Pre-heater block.
- **Air Band:** (figure 3) Adjusts amount of air introduced into the combustion chamber. Air band is adjusted at the factory for optimum performance, approx. ½ to ¾ inch open. **NO FIELD ADJUSTMENT REQUIRED** unless in high altitudes application where minor adjustment may be required.
- **Oil Primary Control:** (figure 3) Controls the oil burner ignition. Checks for flame in the combustion chamber, if no flame is detected within 45 seconds, the oil primary will shutdown the oil burner. To restart the unit, reset the red button on the oil primary.
- **Oil Pre-Heater Block:** (figure 4) Pre-heats the oil and air before entering combustion chamber.
- **Photo Eye:** (figure 4) Senses flame in combustion chamber and signals oil primary when no flame is present.
- **Igniter Springs:** (figure 4) Transfers the high voltage from the igniter transformer to the electrodes (when door is closed)
- **Air Pressure Gauge:** (figure 3) Displays air pressure supplied by on-board air compressor.
- **Air Compressor:** (figure 3) Supplies air used within pre-heater block to aid in atomization of the oil.
- **Air Muffler/Filter:** (figure 3) Filters air and muffles the sound generated by the compressor.
- **Pre-Heater Control Circuit Board:** (figure 4) Precisely controls temperature of the Oil Pre-Heater Block and controls safety feature of not allowing burner to energize until oil has established operating thermo set-point or shutdown burner if Pre-Heater Block temperature falls below shutdown thermo set-point.
- **Electrodes:** (figure 4 and 5) Provides continuous high voltage electrical arc from electrode to electrode igniting the waste oil as it is being sprayed out of the nozzle.
- **Nozzle:** (figure 5) Low-pressure nozzle for oil spray pattern.
- **Flame Cone:** (figure 5) Specially engineered flame cone forces the flame into a swirl pattern improving the burn thoroughness.
- **Burner Motor:** (figure 5) Multi-task motor turns the burner blower and integrated air compressor.
- **Air Pressure Adjuster:** (figure 3) Adjusts the air pressure going to the pre-heater block. Should be adjusted between 12 PSI and 13PSI as indicated on the Air Pressure Gauge on the burner for thorough burn of the waste oil. **Note: In order to insure proper air adjustment, air gauge must read 0 when burner is cycled off or powered down.**
- **Oil Pressure Adjustment:** Adjust flame length in the heater combustion chamber viewed through the inspection port located directly above the burner gun assembly by increasing CW or decreasing CCW the adjuster located on the oil delivery pump (figure7). The adjuster increases or decreases the pump motors RPM, which increases or decreases the delivery of fuel to the burner. When you increase or decrease the fuel to the burner, you will notice the flame length will increase or decrease. Adjust flame length so flame is just slightly less than halfway down main combustion chamber tube.

IMPORTANT:

- **Power Indicator:** (figure 3) Indicates when power is present at the burner.
- **Run Indicator:** (figure 3) Indicates that the burner is ready for operation after the initial pre-heat time of approx. 5 minutes from initial power up.

Oil Burner/Pump Specifications

Burner Assembly Performance Ratings

Voltage	115 VAC
Cycles	60Hz
Total Operating Amperage (Burner Only)	8.4 Amps
Total Operating Amperage (Burner and Oil Pump)	10.5 Amps
Electrical Operating Consumption (Burner Only)	970 Watts
Electrical Operating Consumption (Burner and Oil Pump)	1,212 Watts
Weight	36.5 Lbs.
Oil Primary	0.2 Amps
Oil Valve	0.075 Amps
Pre-Heater Block	4.2 Amps
Pre-Heater Controller Board	0.011 Amps
Igniter Transformer	0.3 Amps
Burner Motor	3.6 Amps

Pump Assembly Performance Ratings

Voltage	115 VAC
Cycles	60Hz
Total Operating Amperage (Pump Assembly Only)	2.1 Amps
Electrical Operating Consumption (Pump Assembly Only)	241.5 Watts
Weight	16 Lbs.
Oil Valve	0.075 Amps
Pump Motor	2.0 Amps

Boiler Specifications

Boiler Manual	CSA Input (kW)	CSA Output (kW)	Net AHRI Rating (kW)	A.F.U.E (%)	Boiler Dimensions (D x W x H) <i>Includes Burner</i>	Approx. Dry Weight (Lbs)	Vent Connect Diameter (Inches)	Water Content Gallons	Max Water Working Pressure
OWB-9	41	36	31	86.8	43" x 19.75" x 52.75"	447	5	11.6	30PSI
OWB-15	72	63	55	86.9	46.5" x 22.5" x 59.5"	725	6	19.3	35PSI

Notes:

1. Combustion results are based on 11.0% to 13.5% CO₂ with fuel oil #2 and a hot water heating system supply temperature of 167° F (75° C), return 140° F (60° C).
2. Max. operating pressure is 45 psig in all Canadian provinces where a CRN is not required, and in the U.S.A.
3. Measured flue gas temperature with combustion air temperature of 68° F (20° C).
4. A 5" vent pipe adapter is shipped with models OWB-9. The vent pipe adapter is not supplied with boiler model OWB-15.

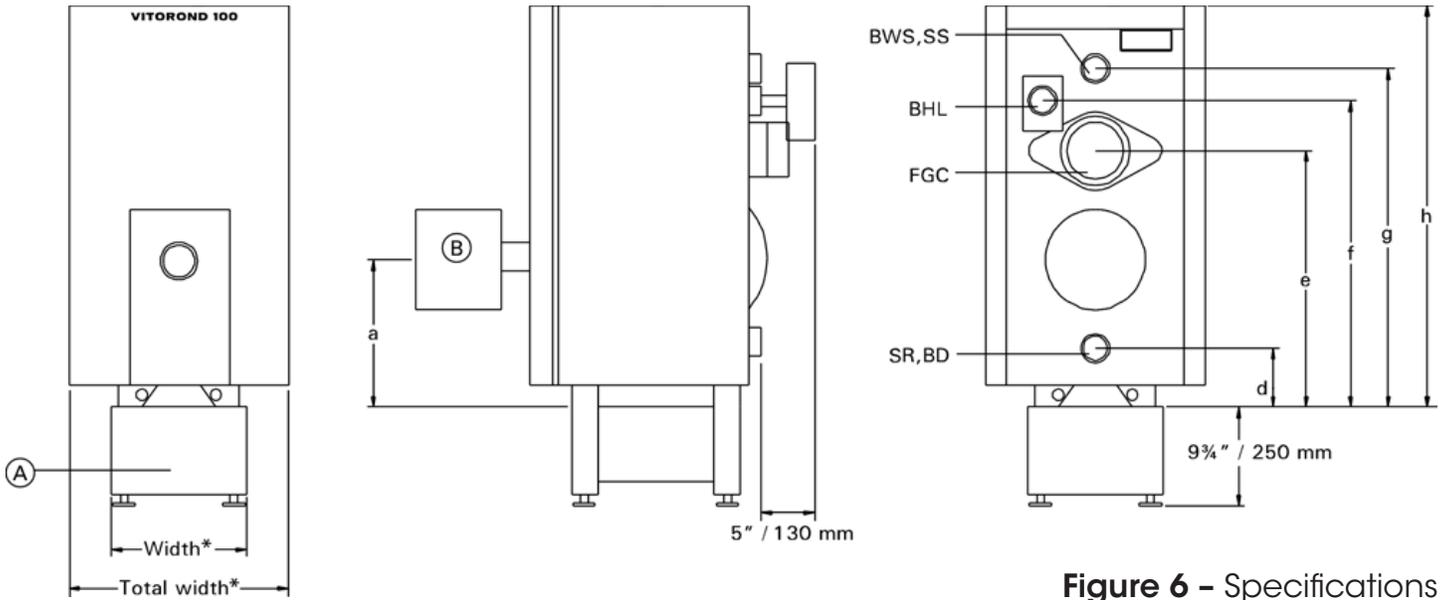


Figure 6 - Specifications

Legend

- BD** Boiler Drain
- BTS** Boiler Temperature Sensor
- BWR** Boiler Water Return
- BWS** Boiler Water Supply
- FGC** Flue Gas Collar
- SR** Safety Return
- SS** Safety Supply
- BHL** Boiler High Limit (with outdoor reset module)
- (A) Boiler Stand
- (B) Burner

Boiler Model	OWB-9	OWB-15
Measurement a:	13.25"	13.75"
Measurement b:	3"	3"
Measurement c:	12.5"	9.5"
Measurement d:	5.5"	4.25"
Measurement e:	23"	27.75"
Measurement f:	26.25"	32.25"
Measurement g:	28.5"	34.75"
Measurement h:	33"	39.75"
Measurement k:	5.5"	6.5"

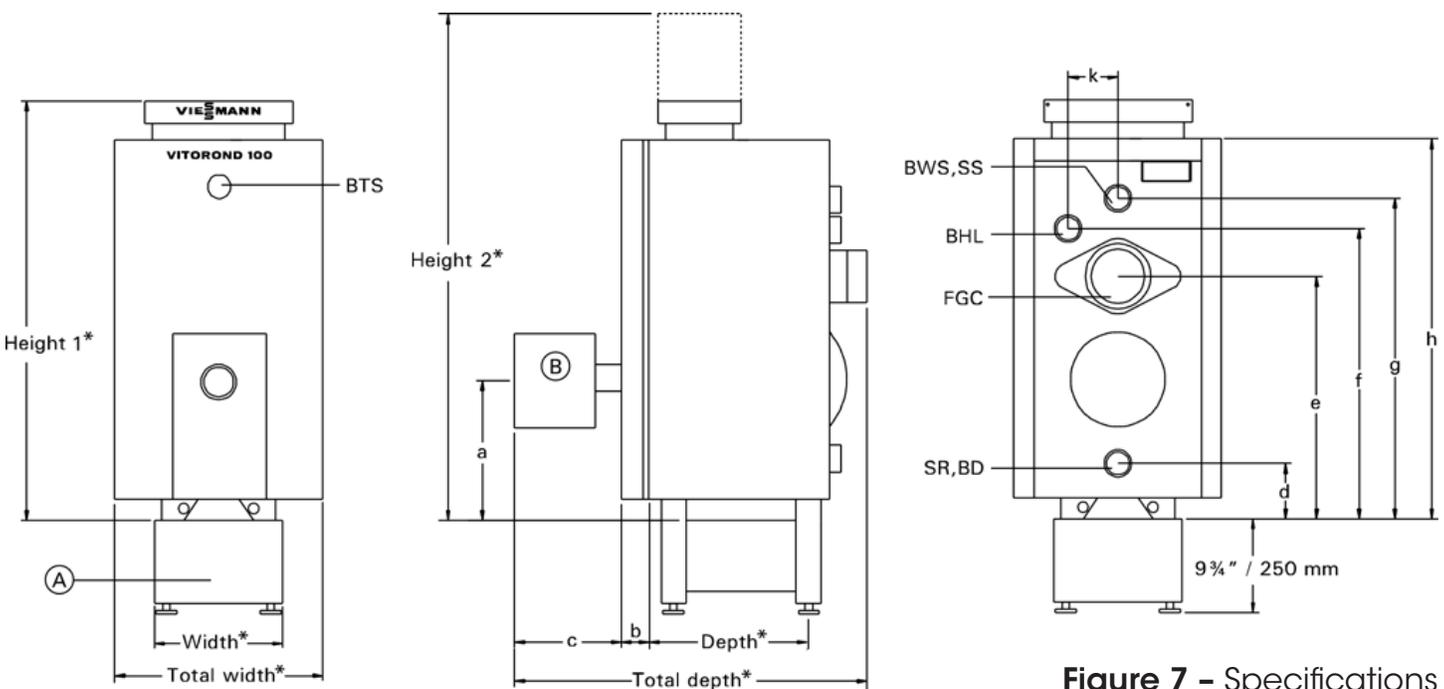


Figure 7 - Specifications

Clearances

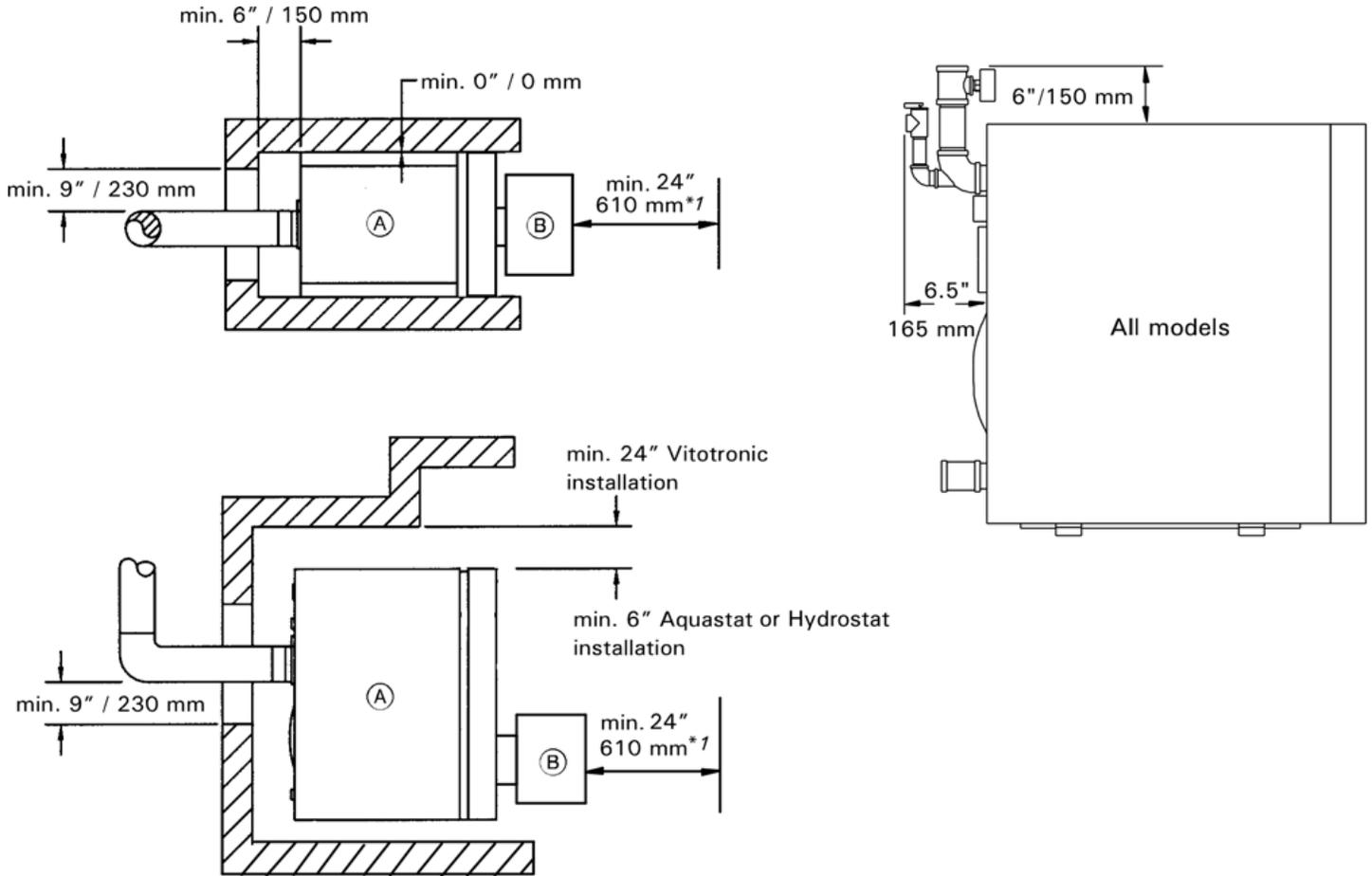


Figure 8 - Clearances

Standard Installation:

Boiler Model	OWB-9	OWB-15
Rear	6"	6"
Sides	0"	0"
Flue	9"	9"
Floor	Combustibles	

Alcove Installation:

Boiler Model	OWB-9	OWB-15
Rear	6"	6"
Sides	0"	0"
Flue	9"	9"
Top	6"	6"
Floor	Combustibles	

Burner (chimney & direct vent application)

Boiler Model	OWB-9	OWB-15
Pump pressure	175 psig	175 psig
Oil nozzle flow rate	1.0 @ 175	1.75 @ 175
Air tube length	7"	9"
Air tube insertion	3.625"	7.25"

System Design Considerations

Chimney

For proper operation of the Vitorond boiler, all products of combustion must be safely vented to the outdoors, while ensuring that flue gases do not cool prematurely. It is critical that the chimney system be properly designed to handle the flue gas temperatures which the Vitorond boiler produces.

Flue gases which cool too quickly and produce condensation lead to damages if the chimney diameter is too large and the chimney system is not well insulated. If a calculated chimney diameter lies between two values, the larger diameter should be selected.

Intermediate section

The intermediate (vertical and horizontal) section of venting between the boiler vent pipe collar and the chimney must be of the identical diameter as the vent connection of the boiler. Use the shortest possible path between the boiler and the chimney. A maximum of two elbows may be installed in the intermediate section. Avoid the use of two level 90° elbows.

The intermediate section must be sealed pressure tight at the boiler vent pipe collar and at the chimney connection. Ensure any test port for combustion values is sealed as well. The chimney connection length between the boiler vent pipe collar and the chimney may be installed with insulation. We recommend consulting a reputable chimney installer for advice in project-specific circumstances. Barometric damper must be used!

Note: Direct Vent exhaust system operates under a positive pressure developed by the burner. Make sure all vent connections and observation ports on the boiler are sealed air tight by tightening screws and using high temperature silicone sealant if necessary.

The vent components must be supplied without any alteration except for the length of the flex pipe which can be cut to the desired length.

Warranty

Our warranty does not cover damages resulting from the following:

- installation or service by unqualified and not licensed personnel
- corrosion caused by flue gas condensation due to low boiler water and/or return water temperatures
- operation with contaminated fill and supplementary feed water

For detailed warranty information, please read warranty sheet supplied with product.

Combustion air supply

The boiler must not be located in areas or rooms where chemicals containing chlorine, bromine, fluorine, or other corrosive chemicals are stored. Examples include refrigerants, bleach, paint, paint thinner, hair spray, cleaning solvents, water softener salt, etc. The combustion air must not be contaminated with the above mentioned, or other aggressive or corrosive chemicals. Boiler should never be installed in areas where excessive dust, high humidity, or risk of frost exist. Ensure adequate ventilation and supply of fresh combustion air. Consult Viessmann with uncertainties in regard to a suitable boiler installation location.

This boiler/burner unit needs clean fresh air for safe operation and must be installed so that there are provisions for adequate combustion and ventilation air. For oil-fired boilers, use the "Installation Code for Oil Burning Equipment CAN/CSA-B139" (Canada), or NFPA 31 (USA) and/or provisions of local codes. The sizing methods outlined in the above codes should be used when installing a round duct to supply combustion air from the outside. Observe local jurisdictional requirements.

System layout

The boiler water temperature limit is factory set to 167° F (75° C) (Vitoltronic only). The boiler water temperature limit can be increased by altering the adjustable high limit to increase the supply water temperature. To minimize piping losses of the system however, we recommend that the radiation and domestic hot water production in the system be designed for a 158° F (70° C) boiler supply water temperature (new systems).

Water quality

Treatment for boiler feed water should be considered in areas of known problems, such as where a high mineral content and hardness exist. In areas where freezing might occur, an antifreeze may be added to the system water to protect the system.

Please adhere to the specifications given by the antifreeze manufacturer. Do not use automotive silicate based antifreeze. Please observe that an antifreeze/water mixture may require a backflow preventer within the automatic water feed and influence components such as diaphragm expansion tanks, radiation, etc. A 40% antifreeze content will provide freeze-up protection to -10° F (-23° C). Do not use antifreeze other than specifically made for hot water heating systems.

System also may contain components which might be negatively affected by antifreeze. Check total system frequently when filled with antifreeze. Advise system operator/ultimate owner that system is filled with a glycol mix. The heating contractor must provide an MSDS (Material Safety Data Sheet) for the antifreeze used to the system operator/ultimate owner.

Oxygen diffusion barrier underfloor tubing

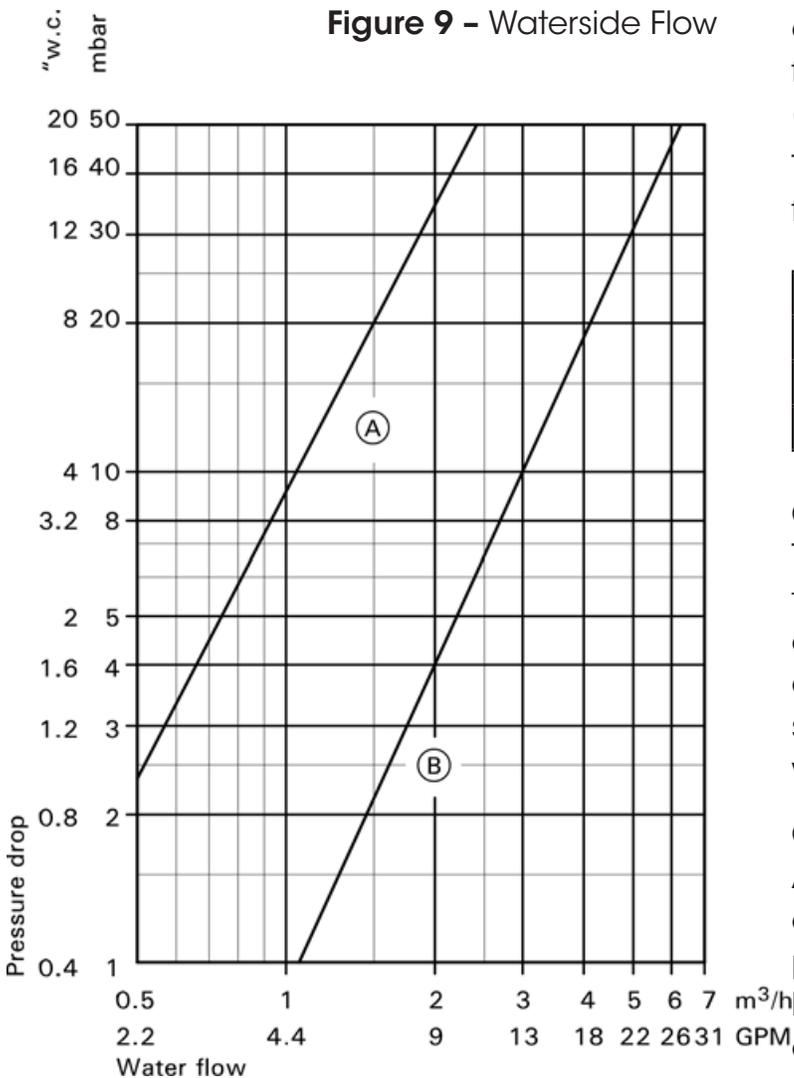
The boiler warranty does not cover leaks resulting from corrosion caused by the use of underfloor plastic tubing without an oxygen diffusion barrier. Such systems must have the non-oxygen diffusion barrier tubing separated from the boiler with a heat exchanger. Viessmann recommends the use of underfloor plastic tubing with an oxygen diffusion barrier.

Low water cut-off

A low water cut-off may be required by local codes. If boiler is installed above the radiation level, a low water cut-off device of approved type must be installed in all instances. An approved type low water cut-off device must be provided by the, heating contractor. Do not install an isolation valve between the boiler and the low water cut-off. Hydrostat control model 3250 PLUS is equipped with low water cut-off.

System Design Considerations *(continued)*

Waterside flow



Flow rates

The relationship between boiler flow rate and temperature rise is according to the formula: Boiler output (Btu/h) = 500 x flow (USGPM) x Rise (°F)

The following chart lists typical flow rates for the boiler:

Boiler Model	OWB-9	OWB-15
20° F rise	12.2	21.5
30° F rise	8.1	14.3
USGPM	✓	✓

General

The schematics on the following pages are to be seen as guidelines only. They further do not display all system varieties, safety devices, or concepts possible. Specific system layouts may be further discussed with the sales representative office.

Clearances

A minimum of 2" circumferential clearance from non-insulated hot water pipes to combustible construction must be maintained. In cases where the pipes are insulated with pipe insulation of appropriate and sufficient thickness and

insulation values, the above clearance may be reduced to 0".

Legend: (A) OWB-9; (B) OWB-15

Important Code Requirements

Installations must comply with all state, local, and utility codes, laws, regulations, and ordinances, and CSA standard B139. Where required by the authority having jurisdiction, the installation must conform to American society of Mechanical Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers, No. CSD-1.

All electrical wiring must be done in accordance with the National Electrical codes latest edition and all state and local codes.

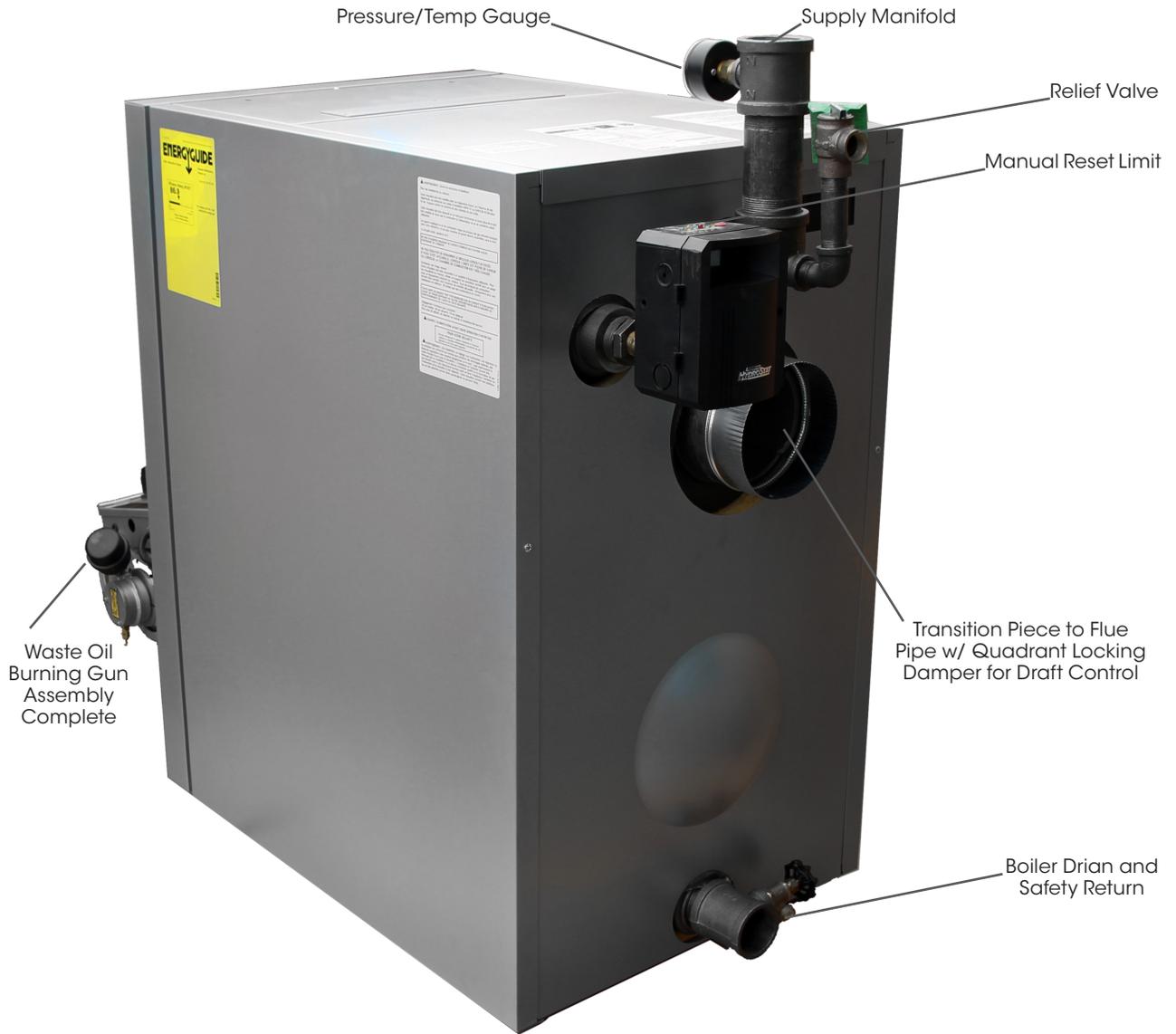
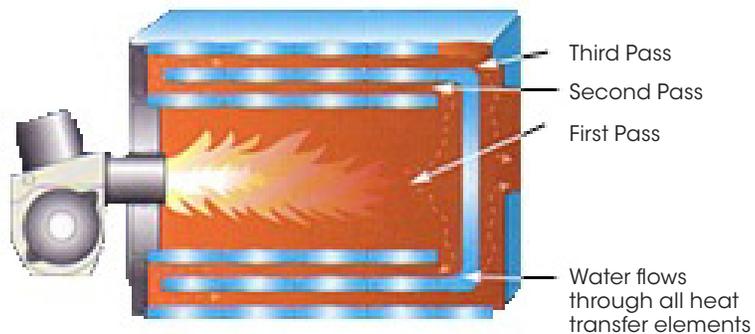


Figure 10 - Boiler (OWB-9 & OWB-15)

OWB series boilers are three pass Scotch Marine design with fully water backed transfer surfaces. Boilers are designed for use in forced hot water heating systems. Heating is supplied by a Waste Oil Burner that burns all petroleum products any weight combination up to SAE 90W as well as fuel oils. Boiler-Burner units operate with no less than 0.01WC or greater over fire and may be vented using a conventional chimney.

OMNI Three Pass Design



Combustion Air Supply

WARNING

Failure to provide an adequate supply of fresh air for combustion will result in hazardous operating conditions. If you use a fireplace or a kitchen or bathroom exhaust fan, you should install an outside air intake. These devices will rob the boiler and water heater of combustion air.

1. In unconfined spaces in buildings infiltration may be adequate to provide air for combustion and ventilation. However, in buildings of unusually tight construction, additional air must be provided as described in Item 2. (b) below.
2. Boiler located in confined space: [Note: Confined space may be defined as a space whose volume is less than 50 cubic feet per 1000 Btuh of total input of all appliances installed in that space.]
 - a) All air from inside of building: Providing infiltration in the rest of the building is adequate, the confined space may be provided with two permanent openings communicating directly with another room or rooms of sufficient volume that the total volume of all spaces meets the criteria for unconfined space. One opening must be within 12 inches of the bottom of the enclosure. See Figure 11.
 - b) All Air From Outdoors:
The confined space shall be provided with two permanent openings, one within 12 inches of the top and another within 12 inches of the bottom of the enclosure. The openings shall communicate directly, or by ducts, with the outdoors or crawl or attic spaces which communicate freely with the outdoors.

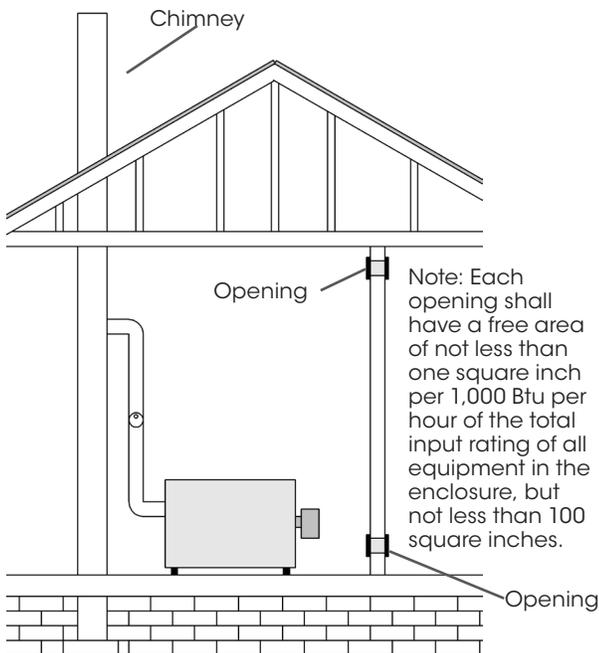


Figure 11 - Air from inside
OMNI by EconoHeat

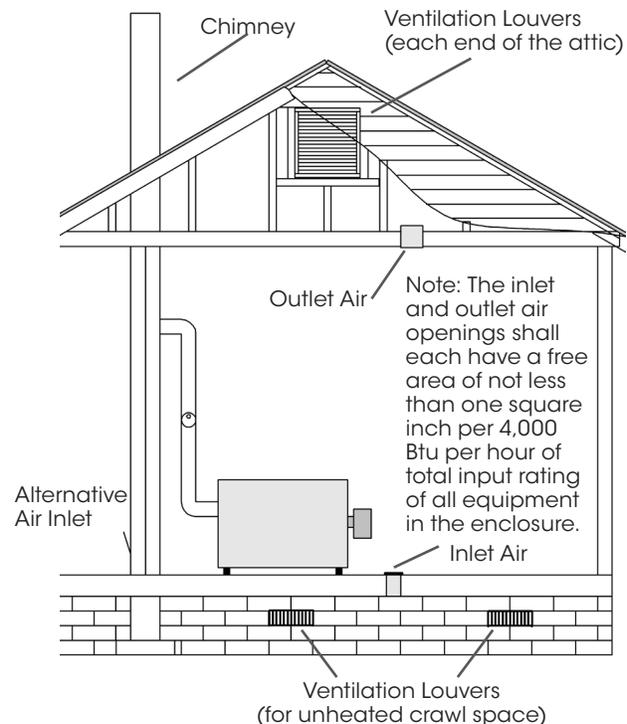


Figure 12 - Air from outdoors

NOTE: All wall openings directly to outdoors must be screened to prevent entry by birds or small animals.

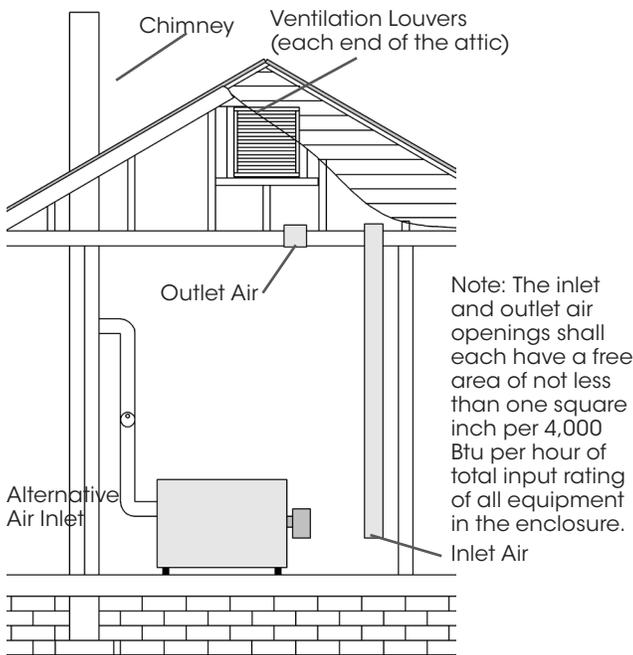
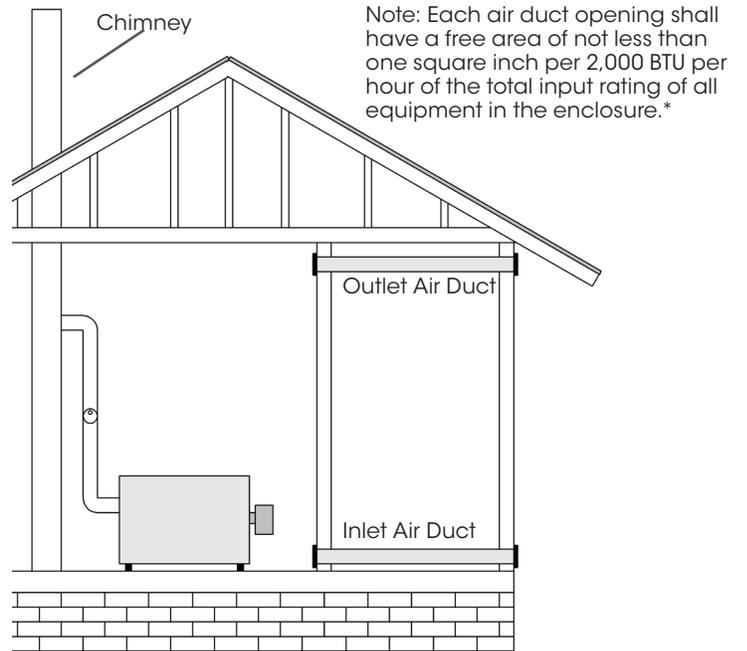


Figure 13 - With vertical ducts



*If the equipment room is located against an outside wall and the air openings communicate directly with the outdoors, each opening shall have a free area of not less than one square inch per 4,000 BTU per hour of the total input rating of all equipment in the enclosure.

Figure 14 - With horizontal ducts

Chimney or Vent Requirements

WARNING

Inspect existing chimney to make sure it is clean, the right size, properly constructed and in good condition before installing boiler. Failure to do so may cause a hazardous operating condition.

Table 1: Minimum Recommended Breaching and Chimney Size

Boiler Model	Minimum Breaching Diameter (inches)	Minimum Recommend Chimney Diameter (inches)	Minimum Recommend Chimney Height (feet)
OWB-9	6"	7"	15'
OWB-15	7"	8"	15'

NOTE: Venting must conform with applicable local codes and National Board of Fire Underwriters.

1. Chimney must be a Class A chimney.

2. This is a high efficiency boiler which operates with a low stack temperature which may be subject to condensation in a cool or improperly designed chimney. Accordingly, the right vent or liner is very important.
 - Masonry chimney with three walls exposed to outdoors may require the use of a 316 stainless steel liner.
 - Masonry chimney with all inside walls—use a tile liner.
3. Breaching
 - See Table 1 for minimum recommended breaching and chimney sizes.
 - Keep run boiler to chimney as short as possible.
 - Use as few elbows as possible.
 - Slope upward towards chimney at not less than 1/4" per foot.
 - Use a sealed-in thimble for the chimney connection.
 - Connect together all sections and fittings with sheet metal screws and seal with silicone sealant.
4. When more than one appliance is connected to the same chimney, the chimney's internal cross-sectional area must be at a minimum equal to the area of the largest vent plus 50% of the area of each additional vent.
5. Clearances—vent pipe between boiler and chimney must be a minimum of 6" from any combustible material.
6. An oil-fired unit shall be connected to a flue having sufficient draft at all times, to assure safe proper operation of the unit.

SIDE-WALL VENTING---IMPORTANT NOTE

Two problems arise when side wall venting any oil appliance;

1. There can be an accelerated rate at which soot builds up on the cad-cell, spinner, etc.
2. There is the potential for severe soot damage to the side of the structure in the event that the boiler operates at a high smoke level. This can happen for many reasons, some of which are out of the control of both the installer and appliance manufacturer.

EconoHeat recommends the use of a chimney to vent our residential oil boilers. If a power venter must be used, it is the responsibility of the installer and power vent manufacturer to "engineer" the power vent system.

ECONOHEAT WILL ASSUME NO RESPONSIBILITY FOR SOOT DAMAGE TO SIDING FROM A POWER VENTED OIL BOILER. THIS APPLIES REGARDLESS OF THE CAUSE OF THE SOOTING.

Installing the Boiler

Hydrostat

Boiler in a heating/cooling application

Cooling season starts: close valve v1 and open valve v2

Heating season starts: close valve v2 and open valve v1

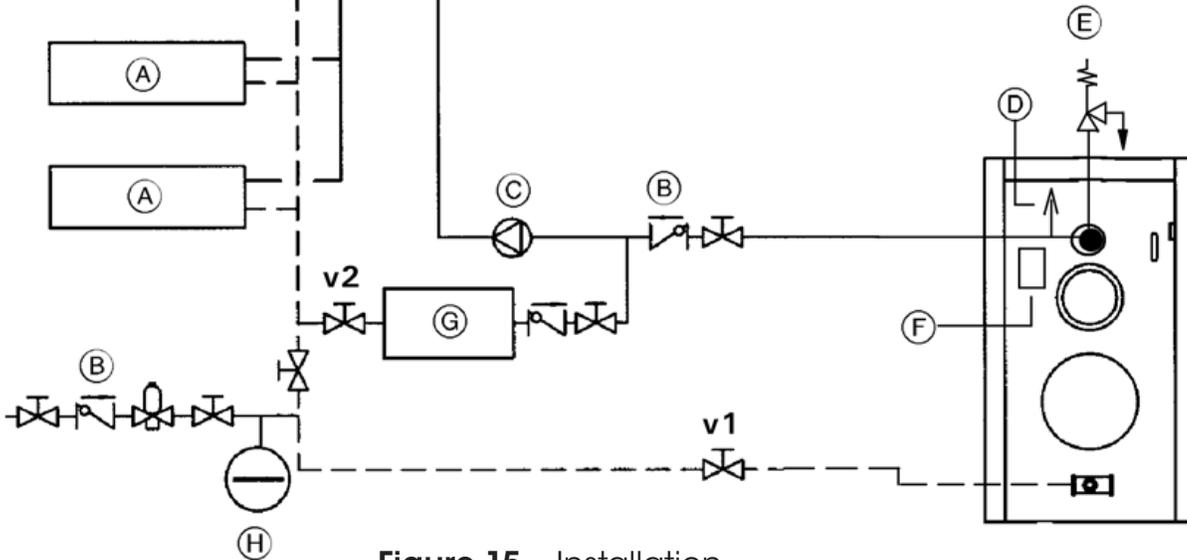


Figure 15 - Installation

Legend

- A Heating/Cooling unit
- B Spring-loaded flow check valve
- C Circulation pump
- D Automatic air vent,
- E Pressure relief valve
- F Hydrostat 3250-Plus (with low water cut-off)
- G Water chiller
- H Expansion tank

IMPORTANT

We strongly suggest that the valves be labeled "v1" and v2."

Description

Hydrostat model 3250-Plus is equipped with a low water cut-off feature in combination with 'electro well' sensor well. The function can be set to operate in automatic (default) or manual reset mode. Do not disable this function it may be required by local codes.

Legend

- A Heating circuit
- B Spring-loaded flow check valve
- C Circulation pump
- D Automatic air vent,
- E Pressure relief valve
- F Hydrostat 3250-Plus (with low water cut-off)
- G Expansion tank

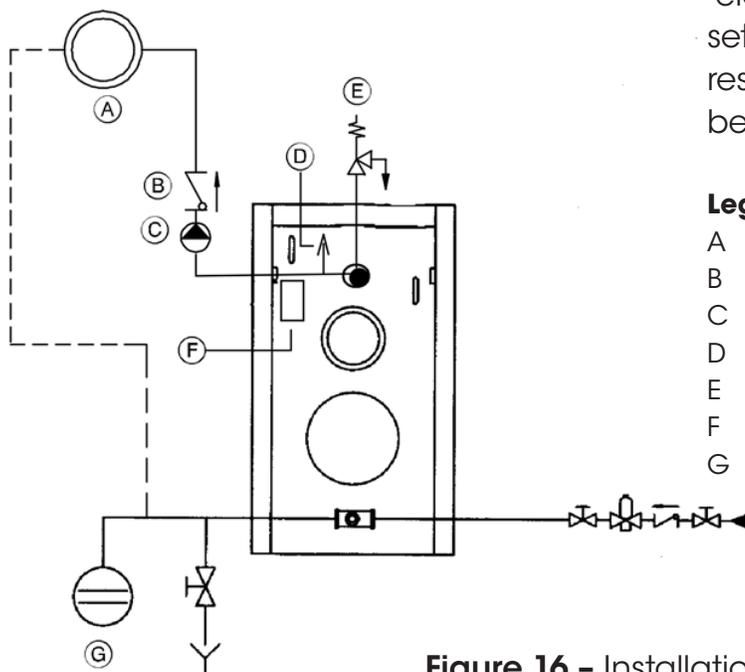
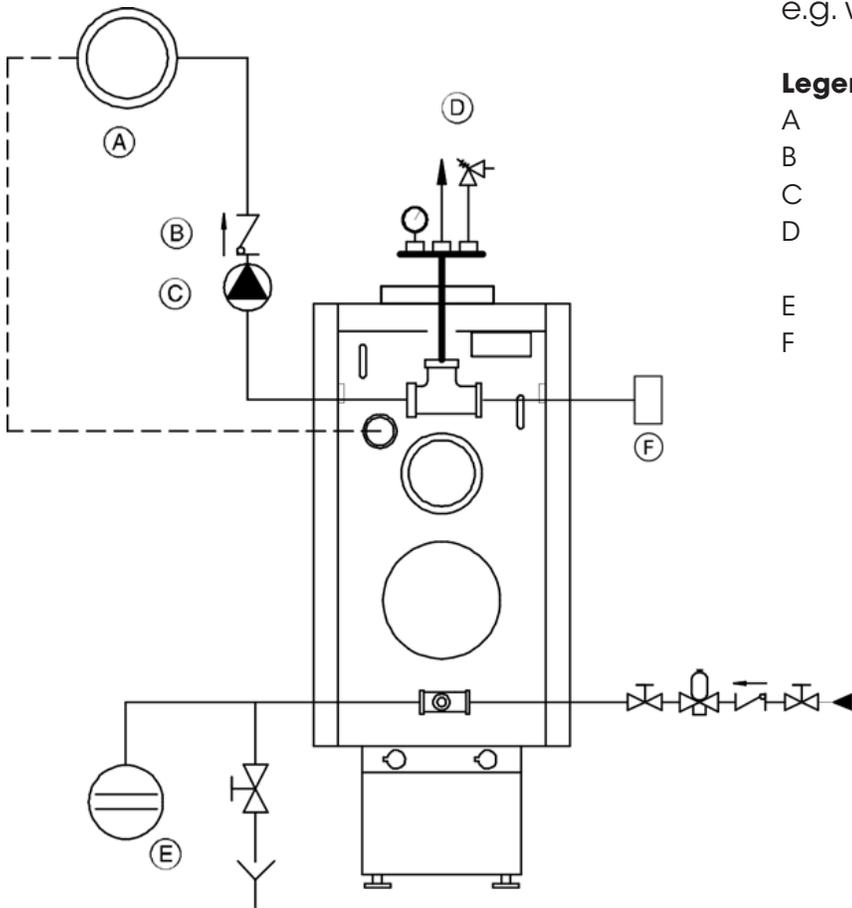


Figure 16 - Installation

Vitotronic



Without mixing valve

e.g. with Vitotronic 100, Model KW10B

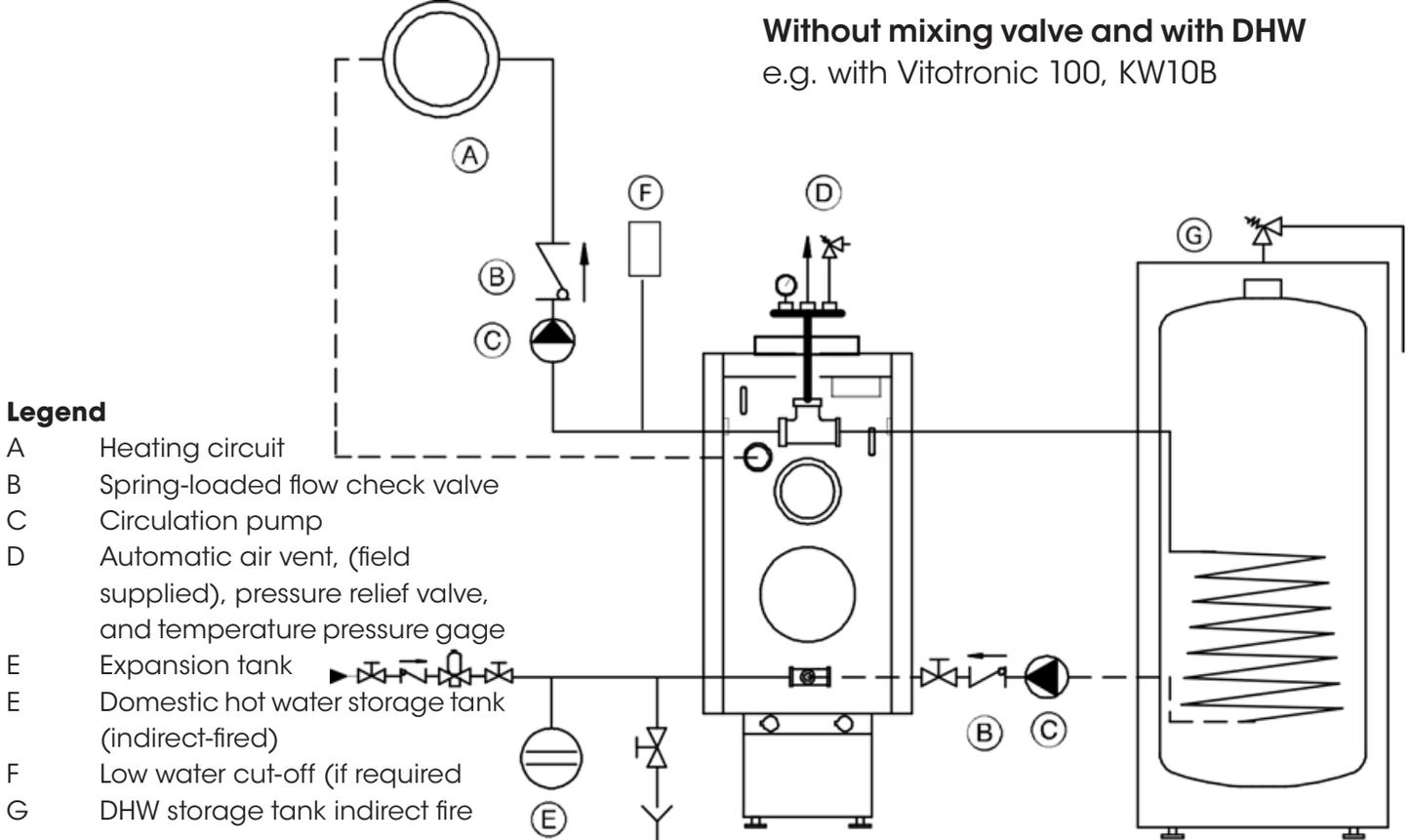
Legend

- A Heating circuit
- B Spring-loaded flow check valve
- C Circulation pump
- D Automatic air vent, (field supplied), pressure relief valve, and temperature pressure gage
- E Expansion tank
- F Low water cut-off (if required)

Figure 16 - Installation

Without mixing valve and with DHW

e.g. with Vitotronic 100, KW10B



Legend

- A Heating circuit
- B Spring-loaded flow check valve
- C Circulation pump
- D Automatic air vent, (field supplied), pressure relief valve, and temperature pressure gage
- E Expansion tank
- E Domestic hot water storage tank (indirect-fired)
- F Low water cut-off (if required)
- G DHW storage tank indirect fire

Figure 17 - Installation

Vitotronic (continued)

With one low-temperature circuit with 4-way mixing valve, and with domestic hot water production.

e.g. with Vitotronic 200, Model KW2 combined with one mixing valve actuator accessory kit

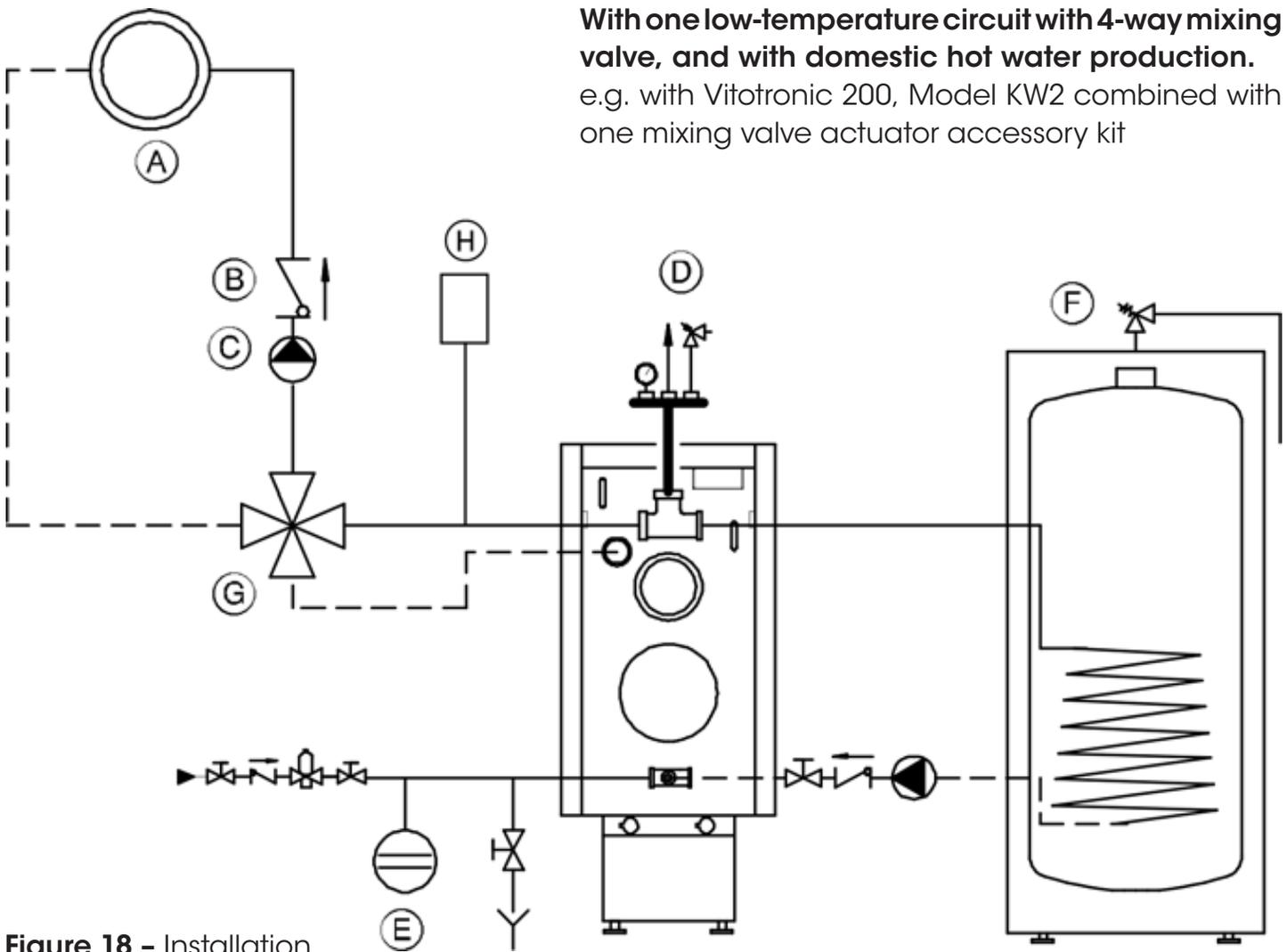
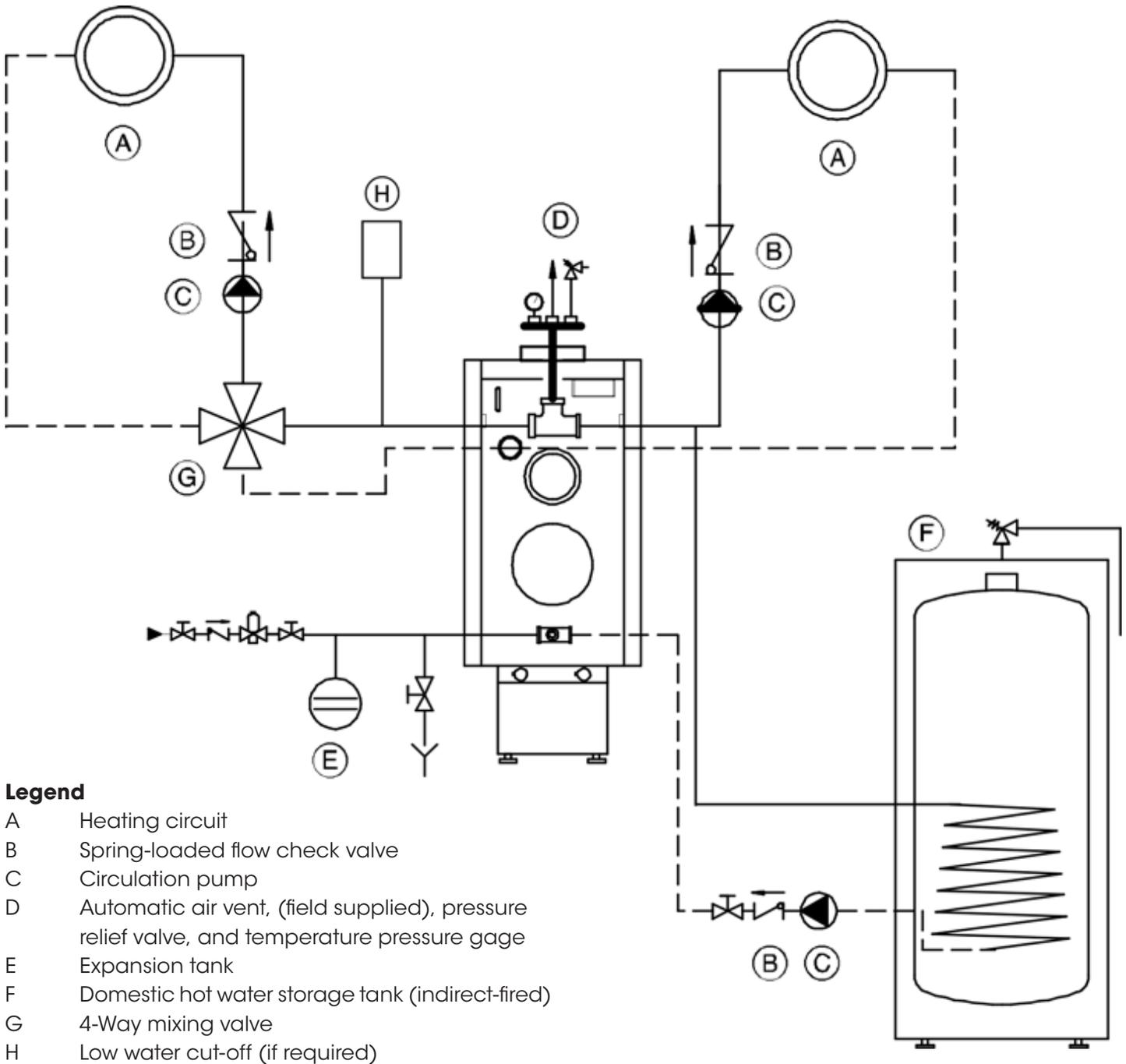


Figure 18 - Installation

Legend

- A Heating circuit
- B Spring-loaded flow check valve
- C Circulation pump
- D Automatic air vent, (field supplied), pressure relief valve, and temperature pressure gage
- E Expansion tank
- F Domestic hot water storage tank (indirect-fired)
- G 4-Way mixing valve
- H Low water cut-off (if required)

Vitotronic (continued)



Legend

- A Heating circuit
- B Spring-loaded flow check valve
- C Circulation pump
- D Automatic air vent, (field supplied), pressure relief valve, and temperature pressure gage
- E Expansion tank
- F Domestic hot water storage tank (indirect-fired)
- G 4-Way mixing valve
- H Low water cut-off (if required)

With one low-temperature circuit with 4-way mixing valve, one high temperature circuit, and with domestic hot water production.
 e.g. with Vitotronic 200, Model KW2 combined with one mixing valve actuator accessory kit

Figure 19 - Installation

Burner Mounting

Burner mounts easily on the swing out chamber door of the boiler with four (4) metric M8x20 HEX bolts and four (4) M8x24 fender washers.

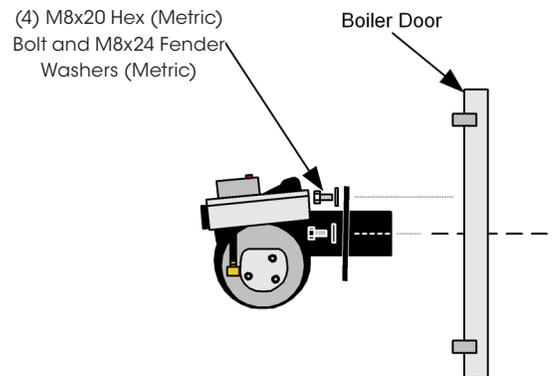


Figure 20 – OWB-9 and OWB-15 chamber swing door burner mounting

Boiler Jacket Assembly

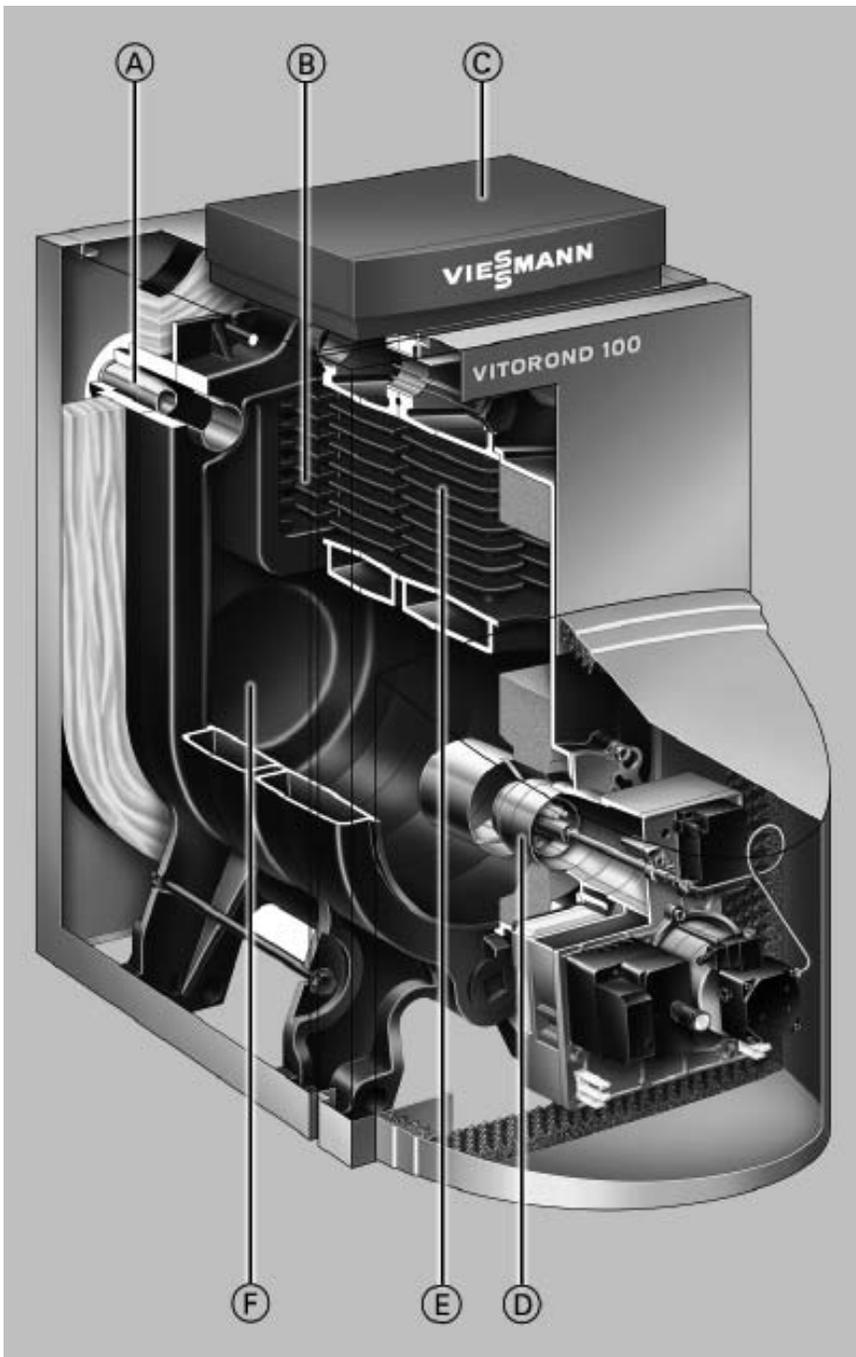


Figure 21 – Boiler Jacket

- A** Special return water flow control injector
- B** Eutectoplex heat exchanger surface of special homogeneous gray cast iron
- C** Vitotronic 100 - indoor/outdoor digital boiler and heating system control
- D** Oil burner
- E** Third pass
- F** Combustion chamber*¹

*¹ Stainless steel combustion chamber insert not shown. Boiler/burner and controls combination may not be exactly as illustrated.

Wiring

WARNING

All wiring and grounding must be done in accordance with the authority having jurisdiction or, in the absence of such authority, with the National Electrical Code (ANSI/NFPA70).

1. 120 Volt Wiring—The boiler should be provided with its own 20A branch circuit with fused disconnect. All 120 volt connections are made inside the L8148A aqua-stat relay as follows (also see Fig. 31 or 32):
 - Hot (“black”)- Terminal “L1”
 - Neutral (“white”)- Terminal “L2”
 - Ground (“Green” or bare)- Ground screw on case of L8148A
2. Thermostat Wiring—Follow thermostat manufacturer instructions. To insure proper thermostat operation, avoid installation in areas of poor air circulation, hot spots (near any heat source or in direct sunlight), cold spots (outside walls, walls adjacent to unheated areas, locations subject to drafts). Provide Class II circuit between thermostat and boiler. Connect thermostat wire leads to terminals “T” and “T” inside L8148A aqua-stat relay.

Wiring Variations

1. Multiple Circulator Zones—Figure 22 shows wiring for two or more circulator zones using Honeywell R845As. One R845A is required for each circulator zone. Circulator terminals “C1” and “C2” on the L8148A are not used. A DPST Honeywell RA832A may be substituted in place of the R845A using the “X” and “X” terminals in place of the “5” and “6” terminals on a R845A. A call for heat from any thermostat will energize the DPST relay in that zone’s R845A. When this relay is energized, electrical continuity is created between terminals 3 and 4, energizing the circulator for that zone. At the same time, electrical continuity is created between terminals 5 and 6 on the R845A, creating a current path from terminal “T” to “T” on the L8148A. Assuming that the supply water temperature is below the high limit setting, the normal ignition sequence will be initiated.
2. Multiple Zones using Zone Valves—Figure 21 shows wiring for multiple zones using Honeywell V8043F zone valves. This wiring diagram may be used for other 24-volt zone valves as long as they are equipped with end switches. Do not attempt to use the transformer on the L8148A to power the zone valves; use a separate transformer. Up to five V8043Fs may be powered by one 48VA transformer, such as the Honeywell AT87A. A call for heat from a given thermostat will result in the application of 24 volts across the TH and TR terminals on the corresponding zone valve, energizing the zone valve motor. The zone valve opens and the end switch contacts are then made. The end switches are connected in parallel with each other and to the “T” and “T” thermostat connections so that any zone valve that opens will also start the circulator and fire the boiler (assuming the high limit is not open). Zone valve terminal TH/TR has no internal connection on the zone valve; it is merely a “binding post” used to connect two or more wires.

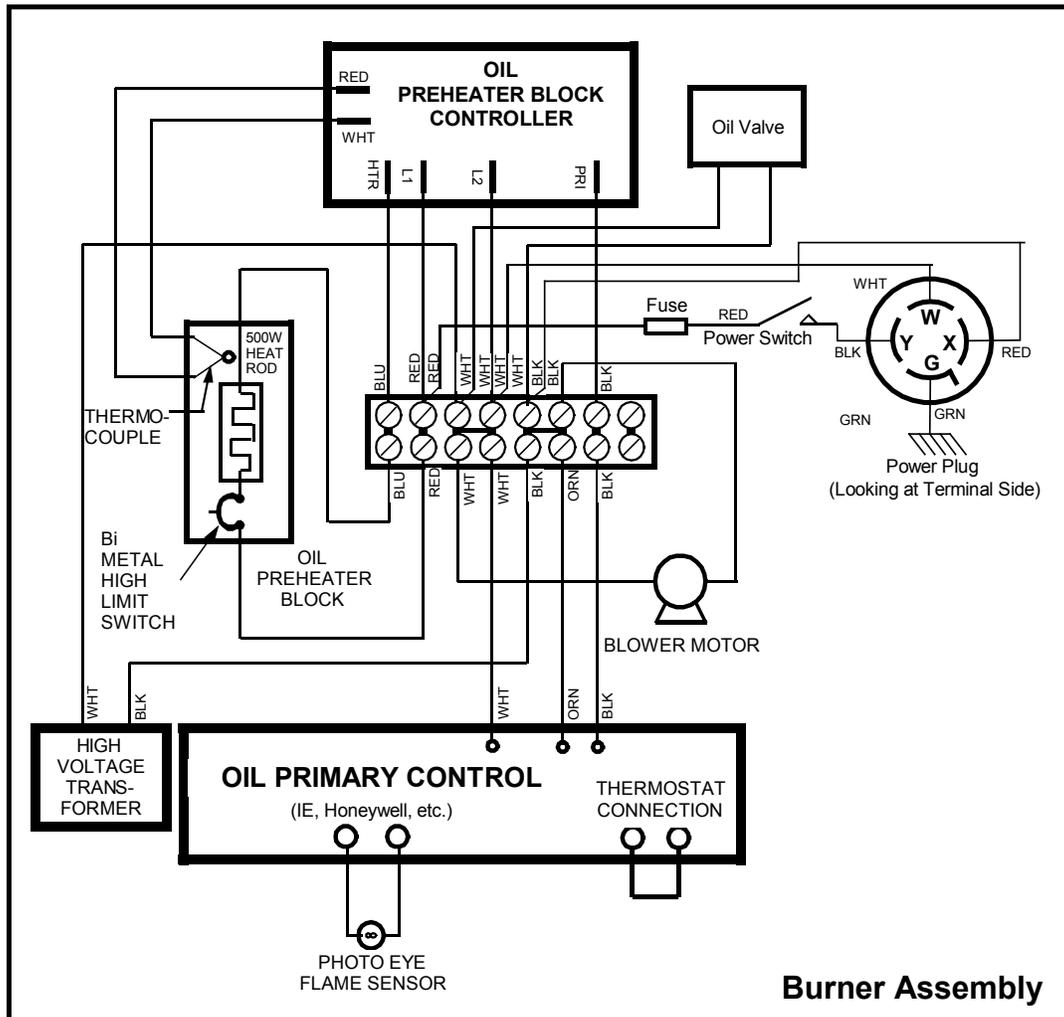
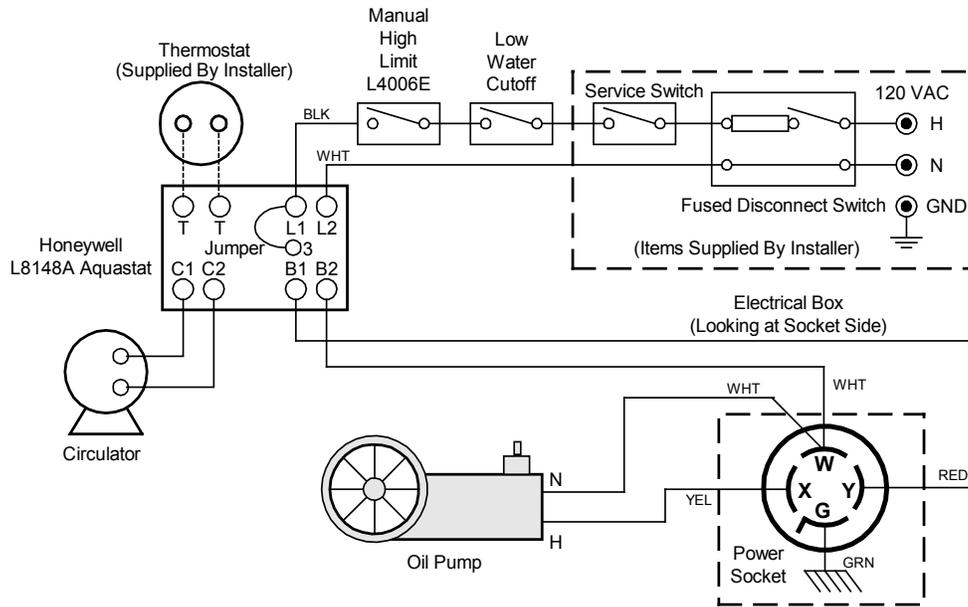


Figure 21 - Wiring diagram, single heat zone only, OWB-9 and OWB-15

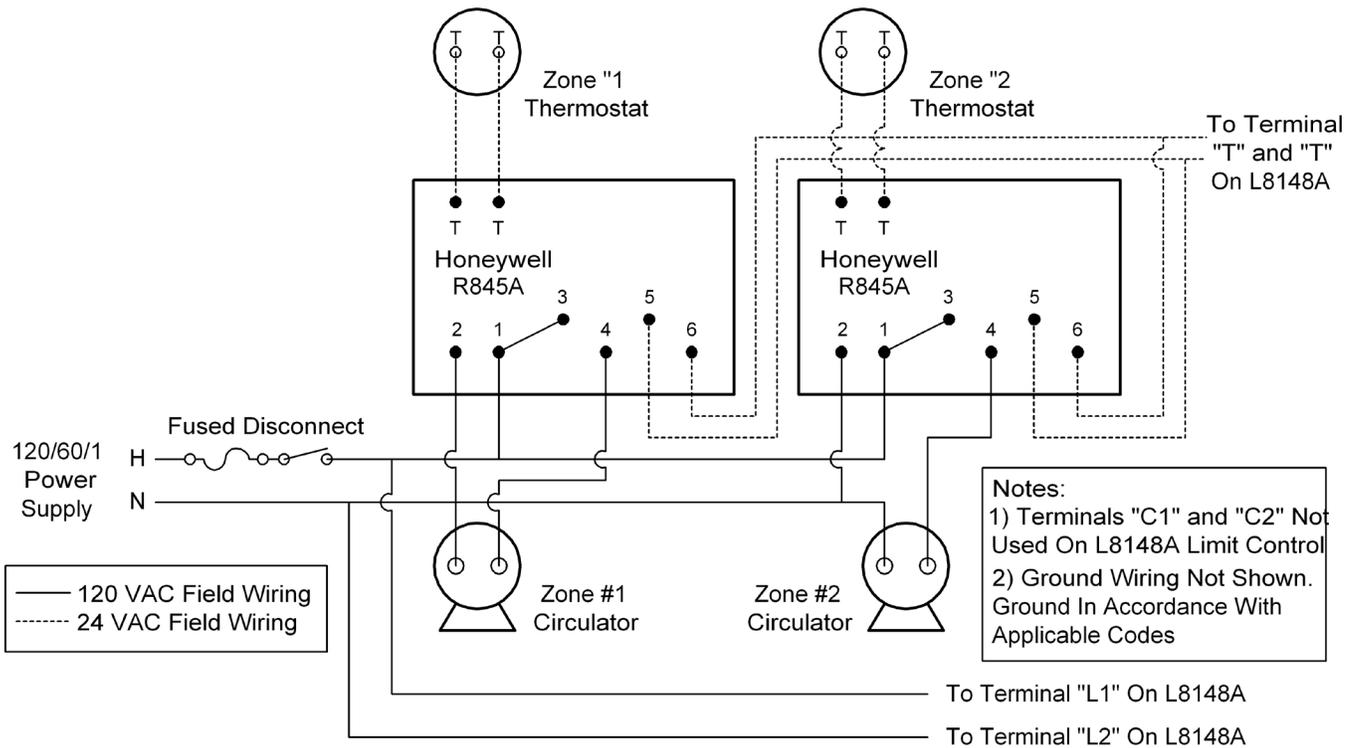


Figure 22 – Wiring diagram, zone wiring using Honeywell V8043F valves (factory boiler wiring not shown here – see figure 21)

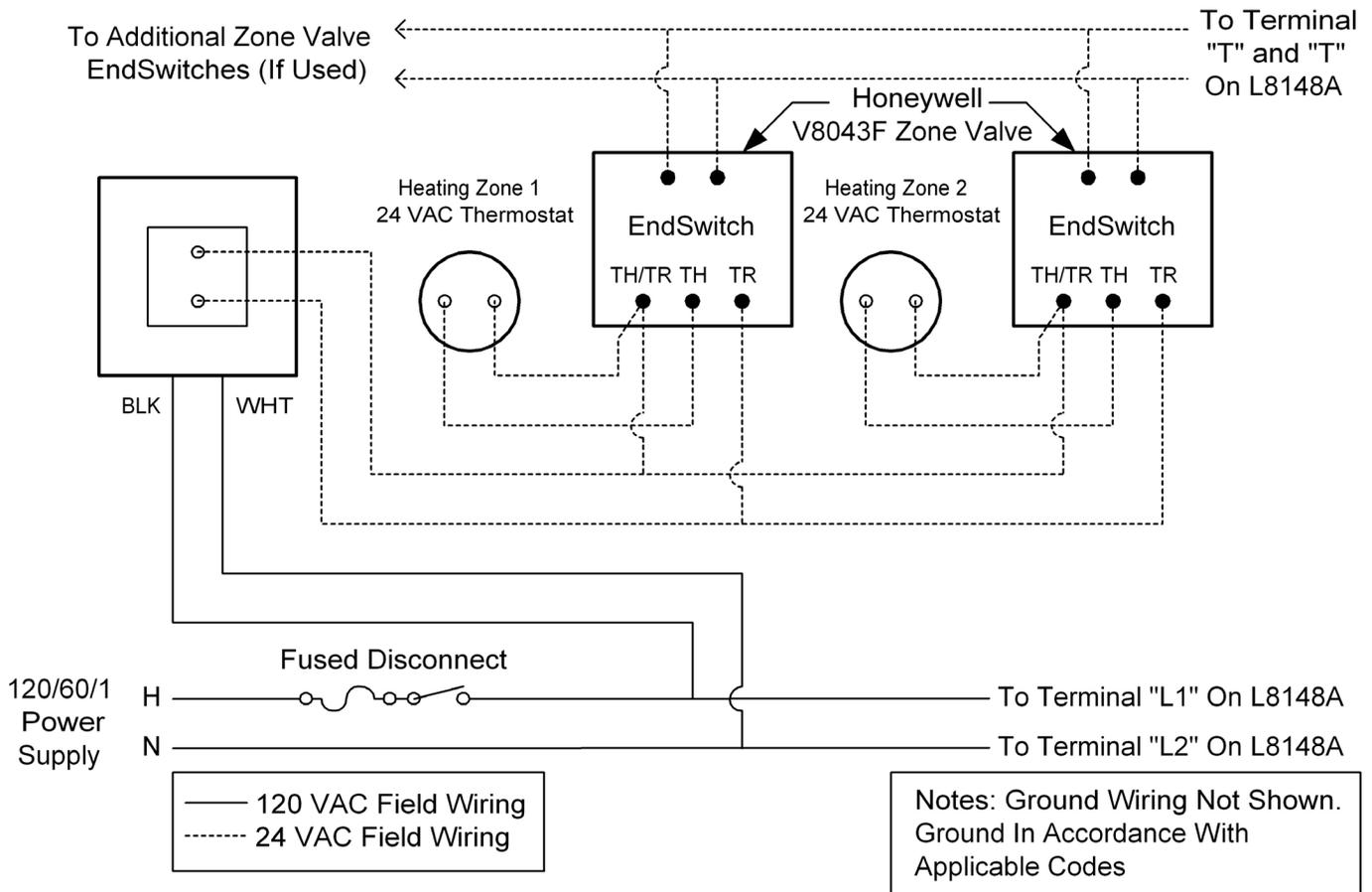


Figure 23 – Wiring diagram, circulator zone wiring using Honeywell R845A valves (factory boiler wiring not shown here – see figure 21)

Boiler Start-up and Adjustments

FILL SYSTEM

1. Close manual air vents (if used) and automatic air vents. Attach hose to boiler drain on return connection and run to a drain or to outdoors. Open drain cock and close shutoff valve on boiler supply pipe.
2. HEATING ONLY – SINGLE ZONE SYSTEM – Open manual valve in cold water feed line and set the fill valve to fast fill. Allow water to flow through the system and out the hose until there is a steady flow of water through the hose with no air bubbles. Next, open the shutoff valve in the drain until air bubbles cease. Then take the fill valve off fast fill, close the drain cock, remove the hose and open all automatic air vents. Also open all manual air vents one at a time and close when water squirts out. Observe the temperature/pressure gauge. System pressure with a cold fill should be in the 12 to 14 psi range.
3. MULTI-ZONE SYSTEMS-HEATING ONLY OR HEAT & DOMESTIC HOT WATER WITH ZONE VALVES – To ensure good circulation through all zones with no air pockets, each zone should be purged of air individually. With all zone valves in the manual open position let water flow through the system by opening the drain cocks so water can exit the system through a hose as in 1 above. When the system seems to be full and free of air, close the drain cock, and the shutoff valve on the boiler supply pipe, leaving the manual valve on the cold water feed open. Now release the manual openers to close all but one zone valve. Open the drain cock and put the fill valve on fast fill. When the flow through hose becomes steady with no air bubbles, take the fill valve off fast fill and then close the drain cock. Repeat this procedure with each zone until all zones have been purged. Open the shutoff valve on the boiler supply pipe. Then open all manual air vents one at a time. When water sprays out of the air vents should have the cap loosened so it can vent air.
4. MULTI-ZONE SYSTEMS ZONED WITH CIRCULATORS – Following the same procedures as in 3 above using the manual shutoff valves to isolate a zone instead of zone valves.
5. Check system pressure on the temperature/pressure gauge on the boiler. Pressure should be in the 12 to 14 psi range. If pressure is over 14 psi drain a little water out with the drain cock. Watch gauge for a few minutes to ensure pressure does not build back up. If pressure is too high with system cold there is a good possibility the relief valve will blow off when the system is brought up to temperature. Too high a pressure with the system cold indicates a faulty fill valve.

Waste Oil Burner Start-up Procedure

1. **IMPORTANT** – Prior to starting the unit, pre-fill the filter and fuel line with oil to assist priming procedure. Oil pump motor turns at low RPM's and would take significant time to complete priming process if not pre-filled. Make sure the oil supply line fittings are air tight. Vacuum leaks are notoriously hard to find. Pressurizing the line with oil in it can help to locate leaks.
2. Proper draft. Draft is the gases traveling through the heater and out the stack or flue. If exhaust fans are present in your building, chances are a draft inducer will be needed. Call our factory or see our website for help, www.econoheat.com
3. During the initial power up process the burner is locked out from energizing until the oil has been properly pre-heated to operating thermo set-point, approx 3 to 5 minute duration. Once the oil has been pre-heated, power is then applied to burner components and oil pump.
4. Making sure the thermostat is turned off, apply power to the burner. Switch burner main power switch to ON position. After allowing the oil pre-heater time to establish temperature set-point, approximately 5 minutes. Jump the "T" terminals on the Oil Primary Control (figure 3). Once the burner is running, temporarily jump the "F" terminals on the Oil Primary. This will allow the burner to run during the pump priming process.
5. Priming the oil pump: Open bleeder valve one turn until all air is expelled (figure 6). This may need to be done twice to insure all air is removed. **IMPORTANT:** When fully purged and flame is established remove temporarily jumpers on "F" terminals of the Oil Primary to allow safety features of the unit to operate properly.
6. Adjust air supply of integrated air compressor to 12–13 P.S.I. This is factory preset, however, due to freight handling settings may be compromised.
7. Combustion air band (figure 3) should be open approximately 1/2" or until flame is clear yellow, not orange. Opening the air band too far may cause delayed in starting or even prevent the flame from starting.

Inspect flame length through inspection door located above burner gun assembly. End of flame should reach **no further than ½ way down combustion tube**. To accomplish this flame length, use adjustment knob on opposite side of oil pump. **NEVER ATTEMPT TO START HEATER WHEN COMBUSTION CHAMBER IS HOT AND A DELAYED START.**

Water Treatment

Generally no water treatment will be required. Care should be taken to ensure that the system does not lose water from leaks, or continual relief valve operation since continual make-up water will reduce boiler life.

Maintenance Schedule

WEEKLY

- Drain water from storage tank.

MONTHLY

- Check your ash accumulation for best performance, remove if excessive (the size of unit, type of oil and run time are all contingent factors).
- Change or Replace Spin-On Filter or Filter screen located in the pancake style housing (figure 14 below). **NOTE:** every application is different and may vary depending on contamination of oils being used.

ONCE EACH SEASON (or more often, depending upon usage or contamination of oil)

- Open the burner side clean-out door to access and clean flame cone (figure 5 above, and figure 8 below).
- Open the swing out doors on both sides of the furnace. The swing out door opposite of the burner assembly requires the removal of the access panel allowing simple entry to the combustion chamber and heat exchanger(s) to vacuum out the accumulated ash & soot (hepafilter recommended) (figure 12 below).
- Clean Suntec pump filter. Remove pump cover for access (figure 13 below). **CAUTION:** Be careful of gasket.
- Clean air compressor filter element.

YEARLY

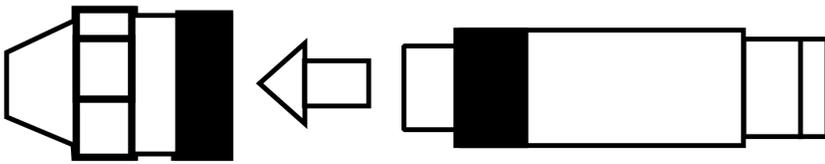
- Clean flue pipe stack-to loosen soot remove stack at top of heater and tap thoroughly. Then vacuum upper heat exchanger(s).
- Inspect electrode adjustment (figure 10 below). Due to erosion, adjustment may change.
- Replace nozzle every 3-5 years depending on usage (figure 5 above, and figures 9, 10 and 11 below). Will lose efficiency due to erosion. This can be accessed by swinging the burner clean out door open (figure 8 below).
- **IMPORTANT:** TO TURN POWER OFF, Remove electrical plug from heater cabinet to burner. Remove 9/16" burner door securing nuts, swing open the burner side clean-out door. Remove nozzle with 5/8" socket (figures 8 and 9 below).

BOILER

1. Clean Boiler using procedure below.
2. Check all water system piping for leaks. Repair any found.
3. Check pressure relief valve operation by opening with manual lever. If it fails to relieve, replace immediately.
4. Check operation of safety controls, low water cutoff and manual reset high limit (if provided).
5. Check breeching connections to ensure there are no flue gas leaks. Seal any leaks found with High Temperature Silicone Sealant.
6. Check flue gas temperature at the test point in the breeching. If gross flue gas temperature is 550 degrees F or above, suspect that cleaning of the boiler flue-ways is required.

BOILER CLEANING

Turn off the power with the line switch. Disconnect the electrical plug at the J-Box by the Aquastat Relay. Remove the four hex head bolts from the outer corners of the burner mounting plate and swing open the burner door with burner mounted to provide access to the boiler flue-ways. Remove sludge and deposits from Stainless Steel Insert. When all deposits are removed, close burner door, and plug in the electrical lead, restore the power and turn burner on. If a boiler is to be shut down and taken out of service for a period of time, the boiler should be cleaned immediately upon shut down while the flue-ways are still warm. When the boiler gets cold, the deposits harden making cleaning difficult. Further, hardened deposits will absorb moisture and cause corrosion.



When cleaning, inspect all three pieces thoroughly. When disassembling and reassembling nozzle, keep facing up as shown.

Figure 24 - Nozzle Assembly Detail

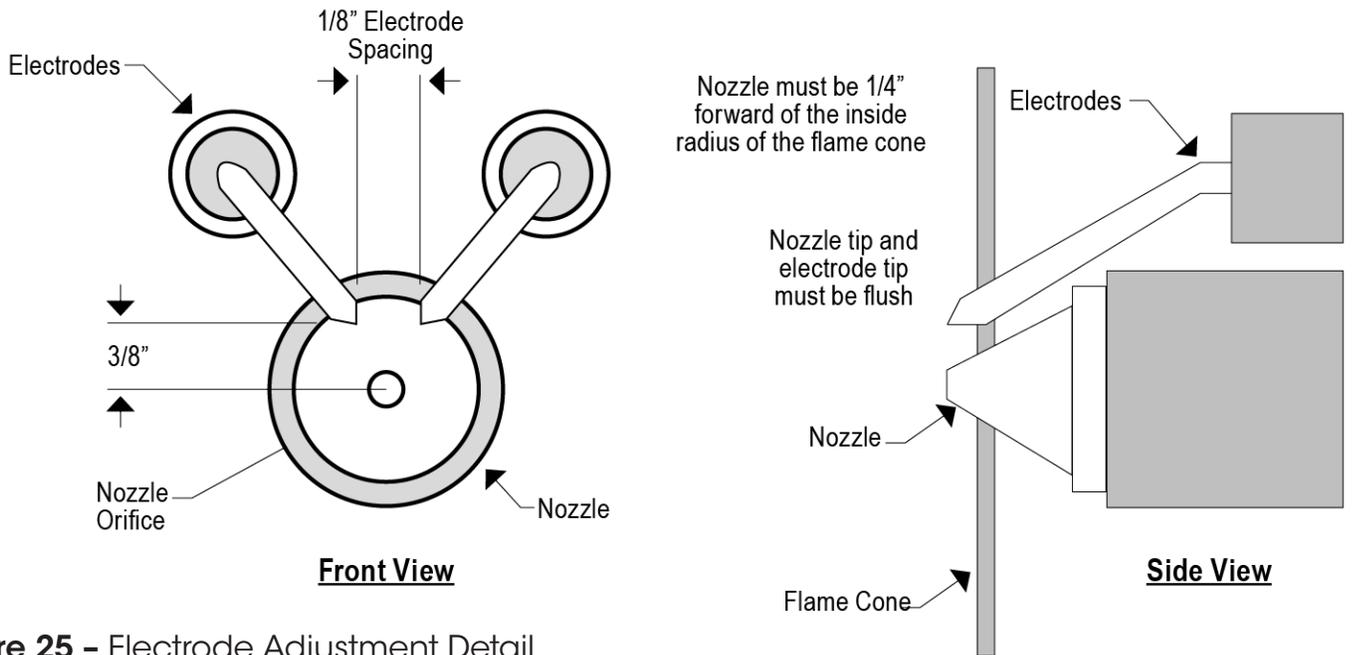


Figure 25 - Electrode Adjustment Detail

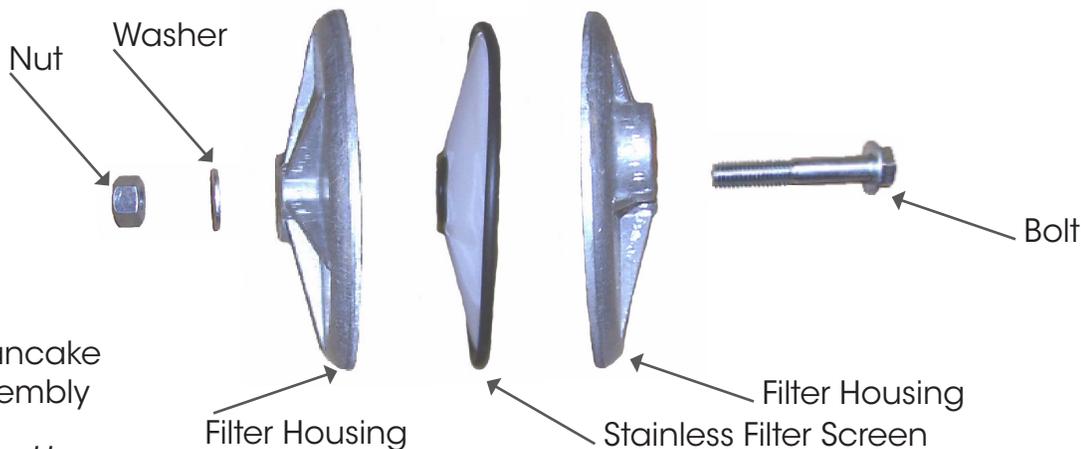


Figure 26 - Pancake Style Filter Assembly

OMNI by EconoHea

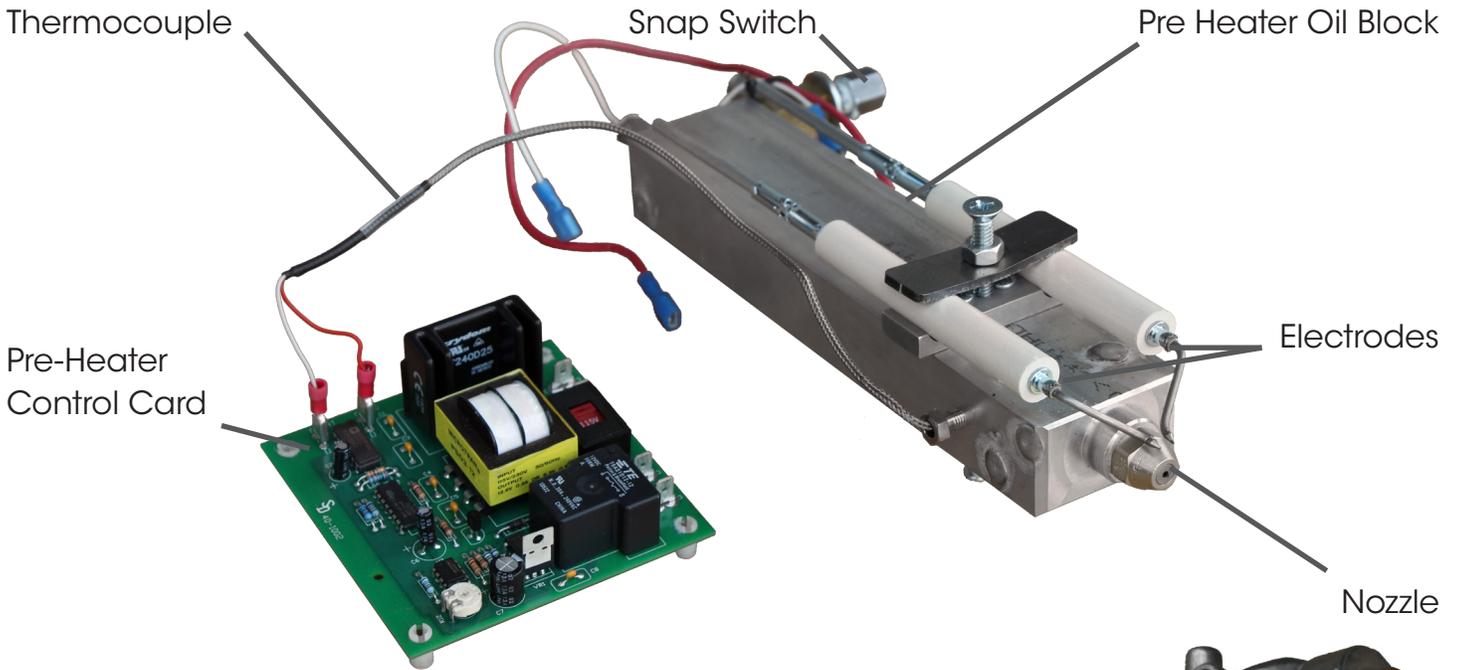


Figure 27 - Pre-Heater Block Detail (Removed From Burner for Clarity)

Remove 4 bolts for access to strainer filter.
CAUTION: must be careful not to destroy the inner gasket during removal of the housing.



Figure 28 - Pump Strainer
 OMNI by EconoHeat



Figure 29 - Oil Filter (Spin-On Filter above, Pancake Style Filter below)

Freeze Protection

Quick Reference

°C	°F	°C	°F	°C	°F
-40	-40	0	+ 32	+ 10	+ 50
-35	-31	+ 1	+ 34	+ 12	+ 54
-25	-13	+ 2	+ 36	+ 14	+ 57
-20	-4	+ 3	+ 37	+ 16	+ 61
-18	0	+ 4	+ 39	+ 18	+ 64
-16	+ 3	+ 5	+ 41	+ 20	+ 68
-14	+ 7	+ 6	+ 43	+ 25	+ 77
-12	+ 10	+ 7	+ 45	+ 30	+ 86
-10	+ 14	+ 8	+ 46	+ 35	+ 95
-9	+ 16	+ 9	+ 48	+ 40	+ 104
-8	+ 18			+ 50	+ 122
-7	+ 19			+ 60	+ 140
-6	+ 21			+ 70	+ 158
-5	+ 23			+ 80	+ 176
-4	+ 25			+ 90	+ 194
-3	+ 27			+ 100	+ 212
-2	+ 28			+ 110	+ 230
-1	+ 30				

Figure 30 – Celsius vs. Fahrenheit

Where freeze protection is required use antifreeze made especially for hydronic systems such as inhibited Propylene Glycol. DO NOT use automotive type antifreeze. Follow antifreeze manufacturer's directions for quantity. A 50% solution provides protection to -30 degree F. For boiler water content see page 11.

Troubleshooting

NO HEAT:

- Check burner power switch and make sure power is available to the whole control system.
- If included in system, check low-water cutoff and/or manual reset high limit.
- Check room thermostat(s) and zone valves or pump relays (if used).
- Make sure there is oil in tank.
- Inquire if reset button on burner oil primary control has been tripped. If reset button continues to trip then **DO NOT ATTEMPT TO START BURNER**. Open burner door by disconnecting the plug-in lead and remove the four hex head bolts. Examine the combustion chamber for unburned oil and oil vapor. If present, clean up oil. With burner door open check cad cell for soot or dirt deposits, check nozzle and if clogged, replace with nozzle of identical make and style. Check electrodes for proper gap and for soot or oil deposits. Also check porcelains for cracks. Close burner door and re-connect electric cord. Press reset button while watching through the observation port. If burner fires immediately and flame looks good, cycle several times. If burner does not fire immediately, or if it fires but flame looks ragged and/or smoky, shut burner down and check the fuel delivery system. The problem may be air in the intake line so tighten all fittings and tighten the unused intake port plug. Also check the filter cover and gasket. Also check the pump filter and clean it with a brush and fuel oil or kerosene if it looks dirty.

INADEQUATE HEAT:

- Check thermostat and heat anticipatory setting. A wrong setting can cause short cycling and inadequate heating.
- Check to see if the distribution system is air-bound. If pump and boiler are running and the pipe connection to the boiler supply port is hot, check the pipe temperature at the inlet to the first radiator. If it is cool or only lukewarm, then the problem is lack of circulation. Look for air in the system, a valve partially closed, a zone valve failed in the closed position, a pump failure. The most common fault is air in the system.

RELIEF VALVE LEAKS CONSTANTLY:

- Check system pressure. With system hot, pressure should be in the 20 psi to 25 psi range, not to exceed 25 psi. With system cold, pressure should be in the 12-14 psi range. If pressure is over these ranges, then suspect the pressure reducing fill valve or the expansion tank. A diaphragm tank may be too small, may have a ruptured diaphragm (this would cause a very sharp rise in pressure as system water heats up and a sudden opening of the relief valve) or may be over-pressurized. A closed type expansion tank may be undersized, may be improperly piped to the boiler, may be water logged.
- Relief valve may be defective, or it may have foreign material lodged on the seat.

OMNI Waste Oil Boiler Limited Warranty

EconoHeat (manufacturer) warrants to the purchaser of Unit Heaters listed above will be free from defects in materials and workmanship for the durations specified below, which duration begins on the date of delivery to the customer. Customer is responsible for maintaining proof of date of delivery.

If return is deemed necessary for warranty evaluation and determination of repair or replacement, unit heater is to be sent to the factory with freight prepaid. EconoHeat reserves the right to determine appropriate action for repair or replacement.

No parts will be accepted by EconoHeat without RA# (return authorization number) clearly marked on outside of shipping package. Obtaining RA# requires model and serial numbers, description of part being replaced and nature of defect. Call factory to receive RA#.

Warranty Covers:

- Boiler cast iron jacket, one (1) year (parts only)
- Stainless steel combustion tube Insert, five (5) years limited (part only)
- Oil heater block, twenty (20) years (parts only)
- Oil heater block controller PCB, three (3) years (parts only)
- All other components, one (1) year (parts only)

This warranty is void if:

- **Warranty registration card is not returned within sixty (60) days of purchase**
- Any part or component subject to abuse or altered from original manufactures specifications
- Installation not in accordance with instructions
- Has not been properly maintained, operated or has been misused
- Wiring not in accordance with diagram furnished with unit heater
- Unit heater is operated in the presence of chlorinated vapors
- Air through unit heater is not in accordance with rating plate and specifications
- Target plate or clean out door warped/discolored from excessive heat

Warranty is limited to the original purchaser and is non-transferable.

The above warranty is in lieu of all other warranties expressed or implied. EconoHeat does not authorize any person or representative to make or assume any other obligation or liability that is not in accordance with above warranty. **EconoHeat is not responsible for any labor and/or shipping cost, unless prior authorization in writing has been obtained.**

Warranty Card

Please fill out, tear off and return to manufacturer within sixty (60) days of purchase, or warranty will not be valid. Please print or type.

Date of Purchase: _____

Serial #: _____

Model #: _____

Customer (Company) Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Dealer: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Installed By: _____