

**M3 Through M6
INSTALLATION AND OPERATOR'S MANUAL**

Keep these instructions with the boiler at all times for
future reference

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Be Aware of Hazard Definitions

- Danger** Denotes presence of a hazard which, if ignored, will result in severe personal injury, death or property damage
- Warning** Denotes presence of a hazard which, if ignored could result in severe personal injury, death or substantial property damage.
- Caution** Denotes the presence of a hazard, which if ignored, could result in minor personal injury or property damage
- Notice** Intended to bring attention to information, but not related to personal injury or property damage.

Danger This equipment must be installed, adjusted, serviced and started only by a qualified service agency – an individual or agency, licensed and experienced with all codes and ordinances, and who is responsible for the installation and adjustment of the equipment. The installation must comply with all local codes and ordinances and with the latest revision of the National Fire Protection Standard for Oil Burning Equipment, NFPA 31 or the Standard for the Installation of Domestic Gas Conversion Burners, ANSI Z21.8, and the National Fuel Gas Code, ANSI Z223.1,

Read all instructions before proceeding. Follow all instructions completely. Failure to follow these instructions could result in equipment malfunction causing severe personal injury, death or substantial property damage.

Do not alter this boiler in any way. The manufacturer will not be liable for any damage resulting from changes made in the field to the boiler or its components or from improper installation. Failure to comply could result in severe personal injury, death, or substantial property damage.

Your oil fired boiler is designed to burn No. 1 and No. 2 heating oil only. Never use gasoline or a mixture of gasoline and oil.

Do not store gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

The area around the boiler should be kept free and clear of combustible materials.

Never burn garbage or refuse in your boiler.

Never try to ignite the burner by tossing burning papers or other material into your boiler.

Do not attempt to start the burner when excess oil has accumulated or the boiler is full of vapors.

Do not operate boiler if the heat exchanger is damaged.

Do not jumper, attempt to bypass or override any of the safety limit controls.

Do not use this boiler if any part has been under water. Immediately call a qualified service technician to inspect the boiler and replace any part of the boiler, control system or burner that has been under water.

All installations must conform to the requirements of the authority having jurisdiction. Such applicable requirements take precedence over the general instructions of this manual.

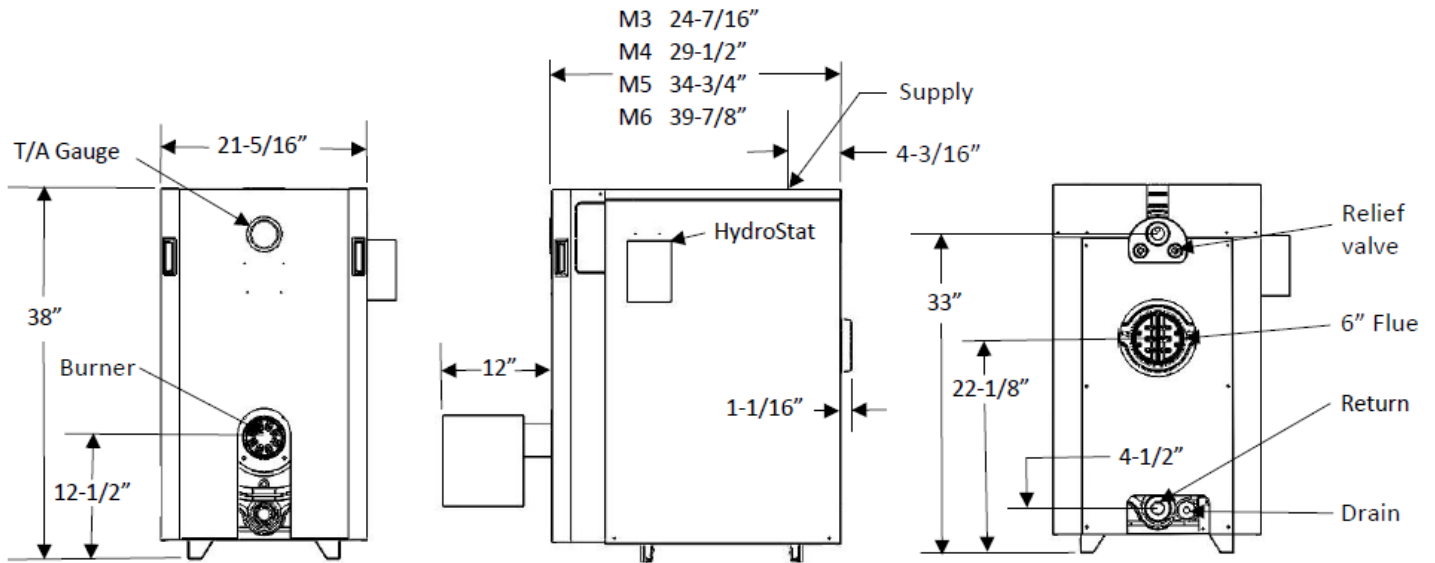
Where required by the authority having jurisdiction, the installation must conform to the American Society of Mechanical Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1.

NOTICE Concealed Damage- If you discover damage to the burner, boiler or controls during unpacking, notify the carrier at once and file the appropriate claim. When calling or writing about the boiler please have the following information available: the boiler model number and serial number which is located on the upper left front of the unit. Record the model and serial number for future reference in the space provided in this manual.

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Ratings and Data



Boiler Model No.	M3	M3H	M4	M4H	M5	M5H	M6
Firing Rate - #2 Fuel	1.00	1.15	1.25	1.40	1.50	1.70	1.75
Oil Input BTU/HR	140,000	161,000	175,000	196,000	210,000	238,000	245,000
DOE Capacity BTU/HR	123,000	140,000	154,000	171,000	185,000	208,000	216,000
Net IBR Rating BTU/HR	107,000	122,000	134,000	149,000	161,000	181,000	188,000
Net Rating Sq. Ft.	713	813	893	993	1073	1206	1253
Water Capacity Gallons	11.3	11.3	14.2	14.2	17.0	17.0	19.8
Cabinet Height	38"	38"	38"	38"	38"	38"	38"
Cabinet Width	21-5/16"	21-5/16"	21-5/16"	21-5/16"	21-5/16"	21-5/16"	21-5/16"
Cabinet Length	24-7/16"	24-7/16"	29-1/2"	29-1/2"	34-3/4"	34-3/4"	39-7/8"
Supply Outlet Height	38"	38"	38"	38"	38"	38"	38"
Return Outlet Height	4 1/2"	4 1/2"	4 1/2"	4 1/2"	4 1/2"	4 1/2"	4 1/2"
Flue Outlet Diameter	6"	6"	6"	6"	6"	6"	6"
Flue Outlet Height.	20 3/4"	20 3/4"	20 3/4"	20 3/4"	20 3/4"	20 3/4"	20 3/4"
Coil Connection	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"
Approx. Shipping Weight	440	440	530	530	620	620	710

Installation Clearances

WARNING Boilers in rooms shall be installed with the clearances from combustible materials not less than indicated below. Combustible materials are those made of or surfaced with wood, compressed paper, plant fibers, plastics, or other material that will ignite and burn, whether flame proofed or not, or whether plastered or not.

The boiler must not be installed on combustible flooring. The boiler is approved for installation on non combustible flooring only. The boiler must not be installed on carpeting or vinyl flooring

Minimum clearances to combustible construction are as follows:

TOP - 6 IN.

FRONT - 12 IN.

FLUE CONNECTOR SINGLE WALL VENT PIPING - 9 IN.

FLUE CONNECTOR DOUBLE WALL INSULATED DIRECT VENT PIPING – 2”

REAR - 2 IN.

SIDES - 2 IN.

Consult NFPA-31 for construction techniques where the above minimum clearances cannot be obtained

Minimum recommended clearances for service and access are as follows:

TOP - 24 IN.

FRONT - 24 IN. FROM BUNER

FLUE CONNECTOR - 9 IN.

REAR - 18 IN.

SIDES - 12 IN.

Note: When installed in a utility room, the door should be wide enough to allow the largest boiler part to enter, or to permit replacement of another appliance such as a water heater.

Ventilation and Combustion Air

Warning... Air openings to combustion area **MUST NOT BE OBSTRUCTED**. Adequate combustion air must be supplied at all times.

Ventilation of boiler room must be adequate enough to provide sufficient air for combustion.

When a boiler is located in an unconfined space in a building of conventional frame or masonry construction infiltration may provide adequate air for combustion and ventilation. If there is any doubt, install air supply provisions for combustion and ventilation in accordance with section 5.3, Air for Combustion and Ventilation, of the NFPA54 code, it is recommend that you follow, the applicable provisions of the local building codes as well.

When a boiler is installed in a confined space, in a building of unusually tight construction, air for combustion and room ventilation must be obtained from the outdoors or from spaces freely communicating with the outdoors. A permanent opening or openings having a total free area of not less than 1 square inch per 5,000 BTU per hour of total input rating of all appliances shall be provided. Ducts may be used to convey make-up air from the outdoors and shall have the same cross-sectional area of openings to which they are connected.

When air for combustion and room ventilation is from inside buildings, the confined space shall be provide with two permanent openings, one starting 12 inches from the top and one 12 inches from the bottom of the enclosed space. Each opening shall have a minimum free area of 1 square inch per one thousand (1,000) BTU per hour of the total input rating of all appliances in the enclosed space, but must not be less than one

hundred (100) square inches. These openings must freely communicate with the interior areas having adequate infiltration from the outside.

When the boiler is installed in a confined space and all air is provided from the outdoors, the confined space shall be provided with two permanent openings. One commencing within 12 inches from the top, and one commencing 12 inches from the bottom of the enclosure. The openings shall communicate directly, or by ducts, with the outdoors or spaces (crawl or attic) that freely communicate with the outdoors. One of the following methods must be used to provide adequate air for ventilation and combustion.

1. When directly communicating with the outdoors, each opening shall have a minimum free area of 1 square inch per 4,000 BTU per hour of total input rating of all equipment in the enclosure.
2. When communicating with the outdoors by means of vertical ducts, each opening shall have a minimum free area 1 square inch per 4,000 BTU per hour of total input rating of all appliances in the enclosed space.
3. If horizontal ducts are used, each opening shall have a minimum free area 1 square inch per 2,000 BTU per hour total input rating of all appliances in the enclosed space.
4. When ducts are used, they shall be on the same cross sectional area as the free area of the openings to which they connect. The minimum dimensions of rectangular air ducts shall not be less than 3 inches.

In calculating free area using louvers, grills or screens for the above, consideration shall be given to their blocking effect. Screens used shall not be smaller than $\frac{1}{4}$ inch mesh. If free area through a design of louver or grill is known, it should be used in calculating the size opening required to provide the free area specified. If the design and free area is not known, it may be assumed that wood louvers will have 20-25% free area and metal louvers and grills will have 60-75% free area. Louvers and grills shall be fixed in the open position or interlocked with the boiler so that they are opened automatically during boiler operation.

Boiler Assembly

LOCATE BOILER...in front of final position before removing crate.

PROVIDE A LEVEL SOLID BASE as near chimney or direct vent as possible and centrally located with respect to the heat distribution system as practical.

The boiler must be placed within distances from boiler room walls and ceilings that comply with existing building codes and for ease of service.

THE PACKAGED BOILER IS SHIPPED IN TWO PACKAGES.

- a. Boiler and Cabinet Assembled and Crated
- b. Burner/Parts Box – Includes burner, aquastat and trim piping

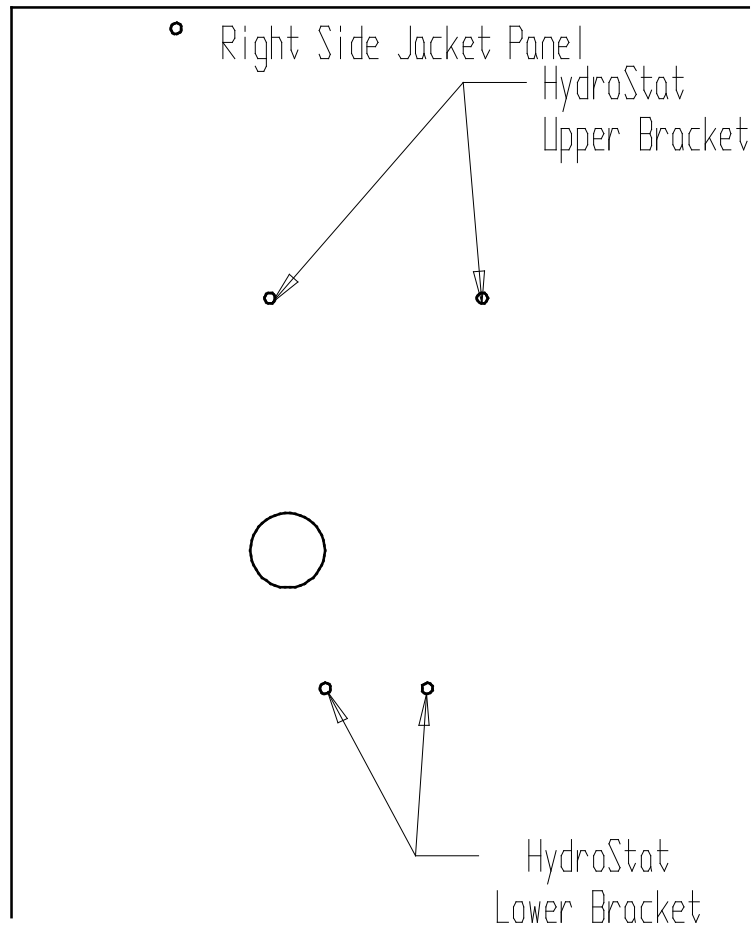
LOCATE THE BOILER in the position to be assembled and piped.

Remove crate, plastic protective wrapper and INSPECT FOR DAMAGE. All equipment is carefully manufactured, inspected and packaged by experienced workers. Our responsibility ceases upon delivery of the crated boiler to the carrier in good condition. ANY CLAIMS FOR DAMAGE OR SHORTAGE IN SHIPMENT MUST BE FILED IMMEDIATELY against the carrier by the consignee.

Temperature Controls Installation and Adjustment

1. Install the HydroStat remote mounting kit bottom bracket, included in the bag with the HydroStat, to the right side of the boiler as shown on next page.
2. Route the sensor wire and the green ground wire through the rear upper knockout of the control.
3. Insert the top mounting bracket into the slots on the back of the control and rotate the bracket upward.
4. Screw the upper bracket to the jacket side panel in the holes provided.
5. Attach sensor wires to the appropriate control connection.
6. Attach the ground wire to the equipment grounding terminal.
7. Connect burner wiring harness, line voltage and thermostat wires if applicable to the control. See electrical diagrams for proper connections.

8. The overall range of the High Limit is from 130°F to 220°F. Typically it would be set in the range of 180°F to 200°F. Do not set the high limit below 140°F as excessive condensation will occur.
9. The Low Limit is normally set to 160°F for with coil boilers and to the “Off” position on less coil boilers
10. The “Economy Setting” of the control should be set per the HydroStat recommendations.



IMPORTANT

In accordance with Section 325 (f) (3) of the Energy Policy and Conservation Act, this boiler may be equipped with a feature that saves energy by reducing the boiler water temperature as the heating load decreases. This feature may be equipped with an override which is provided primarily to permit the use of an external energy management system that serves the same function. **THIS OVERRIDE MUST NOT BE USED UNLESS AT LEAST ONE OF THE FOLLOWING CONDITIONS IS TRUE:**

- An external energy management system is installed that reduces the boiler water temperature as the heating load decreases.
- This boiler is not used for any space heating.
- This boiler is part of a modular or multiple boiler system having a total input of 300,000 BTU/Hr or greater.

HydroStat Control

The HydroStat model 3250 TC is programmed with the latest in rapid response smart hot water technologies to give you maximum fuel efficiency and hot water response.

When installed with the optional Smart H₂O Energy Manager and a wffi enabled smart outlet, or a timer it allows for the scheduling of domestic water to meet your demands to give you additional fuel savings. The Smart H₂O Energy Manager when installed into a smart outlet or timer and connected to the “C” and “OR” terminals in the HydroStat will allow you to disable the low limit of the boiler for those times when there would typically no be a demand for domestic water thereby reducing fuel consumption. An open switch between “C” and “OR” enables the low limit as programmed. A closed switch between “C” and “OR” disables the low limit.

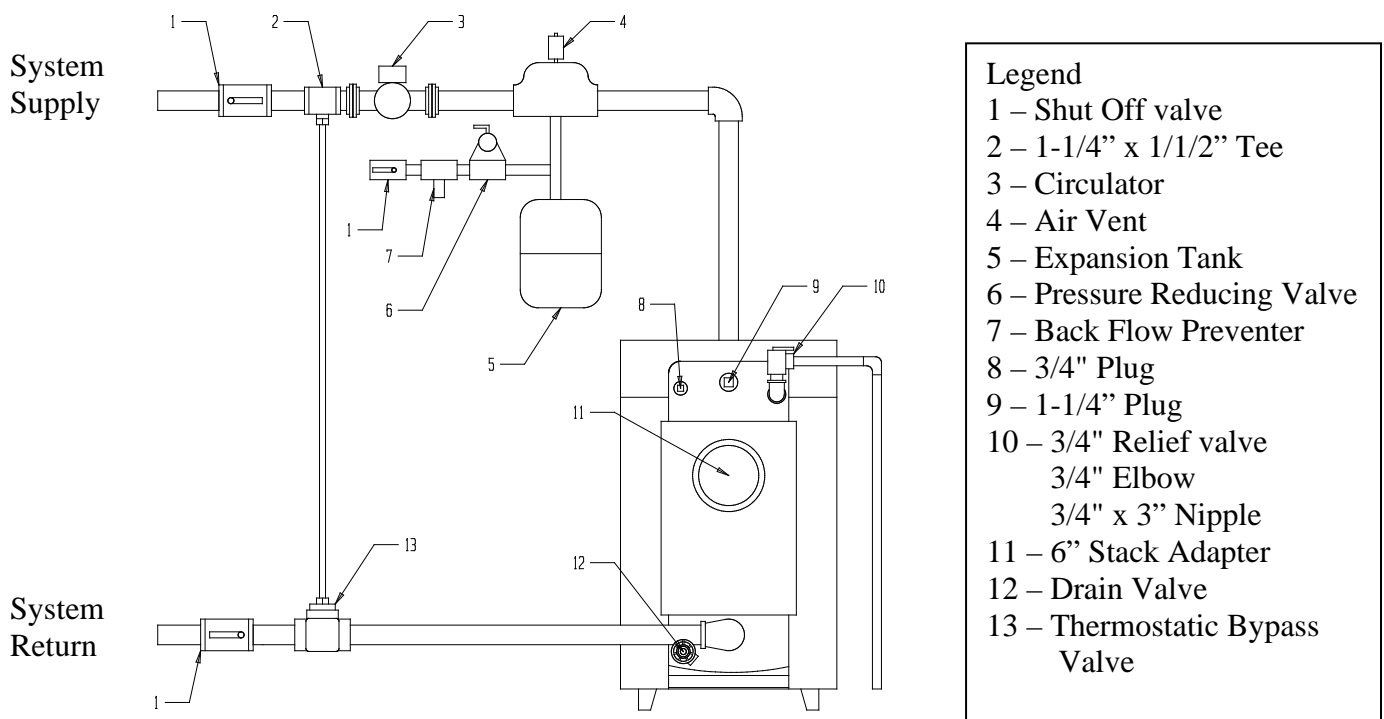
When the low limit is set and enabled, the low limit setpoint will have a fixed 10-degree negative differential to maintain the low limit temperature.

The software in the HydroStat when the low limit is active watches for a rate of change in the boiler water at a temperature of 10 degrees above the low limit setting and when in the idle state. A drop in temp of 3 degree in 18 seconds (or 2 degrees in 12 seconds) indicates a DHW demand. The burner will turn on immediately for a DHW demand. It will remain on for a minimum of 30 seconds to prevent short cycling or until the boiler temp reaches the high limit set point.

On a call for heat the circulator turns off at low limit minus diff and turns back on at low limit.

Boiler Trim Piping

1. Pipe in pressure relief valve with 3/4" elbow and with the 3/4" x 3" nipple in upper left side of the rear section. Relief valve discharge must be piped vertical and to a safe place of discharge.
2. Pipe in boiler drain in the lower left side rear section.
3. Install a 1-1/4" pipe plug in the upper portion of the rear section.
4. Install the 3/4" pipe plug in the upper right hand side of the rear section.



System Piping

Important... INSTALLATION MUST BE PERFORMED BY TECHNICALLY QUALIFIED SERVICEMEN

TRIO MAX BOILERS HAVE A MAXIMUM OPERATING PRESSURE OF 58PSI

NOTE: If normal operating pressures are greater than 30psi please contact the manufacturer for required trim.

Pipes that are connected to boiler fittings must be supported and placed so that they do not create stresses on the boiler fittings themselves.

BYPASS PIPING IS REQUIRED ON ALL BOILERS WHERE THE BOILER RETURN WATER TEMPERATURE COULD OPERATE BELOW 130°F FOR EXTENDED PERIODS OF TIME.

The Trio Max boiler is a highly efficient boiler in which care must be taken to ensure that high volumes of low temperature water are not introduced into the boiler. Operating at return water temperatures below 130°F for extended periods of time will allow for the accumulation of condensation, scale, and increased soot formation in the boiler. Corrosion and eventual heat exchanger failure will result. A thermostatic bypass valve is highly recommended on high water volume standing cast iron systems.

A thermostatic bypass valve will consistently ensure that return temperatures to the boiler always exceed 130°F. See Figure in Boiler Trim Piping section for thermostatic bypass valve piping.

Instead of using a thermostatic bypass, bypass piping may be accomplished by placing a 3/4" bypass line with a throttling valve for regulation between the supply piping and return piping. Boiler return water temperatures must exceed 130°F with the bypass properly adjusted.

Low water cut off

Hot water boilers installed above radiation level must be provided with a low water cut off device at time of the boiler installation.

Relief Valves

Relief valves are to be properly piped in to conform to code standards. Discharge piping from the relief valve must be piped to a drain or must terminate 6" above the floor to eliminate damage to the structure or personal injury. It must not be piped to a point where freezing may occur.

Expansion Tanks

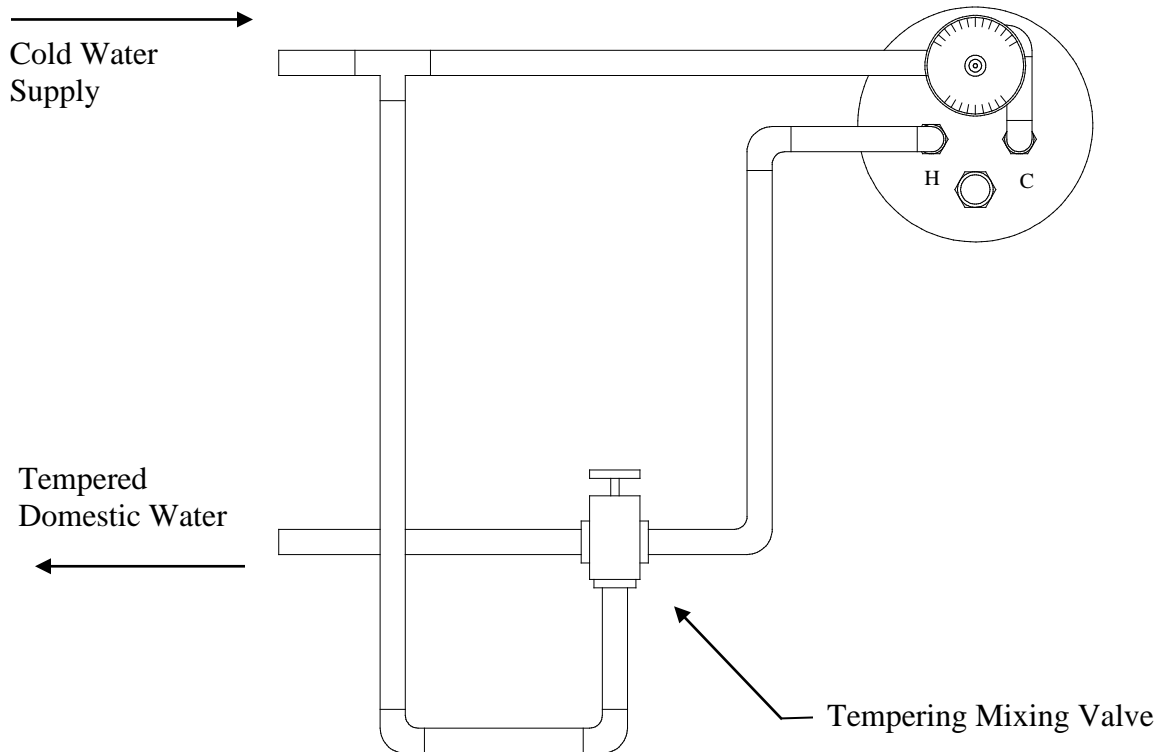
The expansion tank must be properly sized to the system requirements. An undersized expansion tank will cause system water to be lost through the relief valve and make up water to be introduced through the fill valve. Continual introduction of fresh water will cause boiler failure.

Boiler Coil Piping

WARNING Install automatic anti scald mixing valve at tankless heater outlet to avoid risk of burns or scalding due to excessively hot water at fixtures. Adjust and maintain the mixing valve in accordance with the manufacturer's instructions. DO NOT operate tankless heater without the antiscald device.

Knock outs are located on either side or the top of the jacket front panel to choose best location for the domestic water piping. Typical installation shown below. Installation must comply with the mixing/anti scald valve manufacturer's recommendations.

For ease of installation boilers with coil are supplied with 3/4" brass close nipples and elbows. These parts are tied to the lower jacket bracket.



Installation of an automatic mixing valve will lengthen the delivery of hot water by mixing some cold water with the hot. This prevents the possibility of scalding hot water along with savings of hot water since only the desired temperature water is available.

If flow through the coil is greater than its rating than its capacity, a supply of adequate hot water may not be able to keep up with demand. For this reason a flow regulator matching the coil output should be installed in the cold water line to the coil. Refer to manufacturers instruction for correct placement of a flow restrictor.

A water analysis is necessary to determine the hardness of your domestic hot water. An appropriate water softener should be installed based on the analysis and your dealer's recommendation to prevent lime build up.

All water contains some sediment which settles on the inside of the coil. Additional hose bib valves may be required to properly flush the coil.

Coil gasket must be checked yearly.

VENTING

WARNING Failure to follow all instructions can result in flue gas spillage and carbon monoxide emissions, causing severe personal injury or death. All chimneys must meet the requirements of NFPA 211 and NFPA 31 or NFPA 54

Chimney

The boiler must be connected to an adequate chimney or an approved venting system in accordance with these instructions. An adequate chimney or venting system is one that is sealed and lined with the capability of producing a -.03" W.C. flue draft and having the capacity to handle the amount of flue gas that is introduced.

Masonry and metal chimneys shall be constructed in accordance with applicable building code requirements. Masonry chimneys shall be lined with an approved clay tile liner, or a listed chimney lining system installed in accordance with manufacturers' instructions and also meeting the requirements of NFPA-211 Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances. Metal chimneys also shall meet the requirements of NFPA-211. Factory built chimneys shall be listed and shall be installed in accordance with their listing and NFPA-211.

Prior to installation of the boiler, the chimney or venting system shall be examined by the installer and determined to be in good condition. All joints of the chimney must be tightly sealed. The inside of the chimney should be free of all obstruction, such as loose brick, broken pieces of tile, or corroded metal. If chimney flues are divided or there are multiple flues within one chimney, make sure there are no openings in the partition separating the divided or individual flues. When a new appliance is connected to an existing chimney, that chimney shall be brought up to current requirements. Chimneys which are relined shall be done so with an approved liner that will resist corrosion, softening, or cracking from the flue gasses.

All chimney clean-out doors and flue connections must fit tightly so they will seal to avoid air infiltration.

The inside area of the chimney liner should equal, at a minimum, the area of the vent pipe exiting the furnace. If more than one appliance is installed, the area of both appliances shall be used in determining the required inside area of the chimney.

The flue gas exit of a chimney shall be at least 3 feet above the highest point where it passes through the roof of a building and at least 2 feet higher than any portion of a building within 10 feet of such chimney.

The chimney height will also be determined by the height of the surrounding trees, buildings, and terrain. When chimney downdraft conditions cause faulty operation that creates a hazard, corrective steps must be taken.

When altering the surrounding obstructions is not possible, a chimney cap can be constructed on the top of the chimney to avoid downdrafts. The chimney cap should be pyramid shaped on the top with a perfectly flat surface immediately above the chimney outlet. The hood should be attached by four (4) iron supports. The four iron supports should be equal in height to the width of the chimney opening. Four plates, flaring down, can be added to help ensure that the wind will pass straight over the chimney outlet.

Chimney Relining

A tile lined masonry chimney serving the boiler should comply with applicable building codes such as NFPA-211. An additional listed lining may be required to reduce transient low draft during startup and acid water condensation during cyclic operation. This is particularly true for high mass masonry chimneys serving furnaces of higher efficiency. For masonry chimneys, local experience can indicate how well construction has withstood the lower temperatures produced by higher efficiency furnaces.

Evidence of potential or existing chimney damage should be determined by visual inspection of the chimney and liner. Exterior indicators such as missing or loose mortar/bricks, white deposits on the brick or water

stains on the interior building walls should be investigated further. The operational flue temperatures for boilers range from 350°F to 450°F at the outlet of the boiler. These temperatures are further reduced before reaching the chimney due to heat loss through the vent connector and dilution from the draft regulator. The resulting flue gas temperatures may become low enough to form condensation on the chimney liner walls.

To prevent condensation, it is necessary that the internal chimney wall temperature always be kept above the dew point of the flue gasses. If the chimney is a masonry type, it may have to be lined with a flue liner, if the temperature loss is too great for the boiler. A liner will act as an insulator and reduce the flue gas temperature loss. Insulation may be added around the liner for further temperature stability.

Chimney Connector

The chimney connector pipe between the boiler and chimney shall be of equal diameter as the flue outlet of the boiler. Refer to boiler specifications in this manual for proper size flue pipe for your model boiler. Any reduction in size required for the chimney must be made at the chimney connector. The vent connector pipe must be made of 24-gauge (or thicker) corrosion-resistant steel. The vent connector pipe should be as short as possible and installed so that it has a continuous rise from the boiler to the chimney. Long horizontal vent runs can result in the possibility of condensation in the flue pipe or the chimney. All horizontal runs of vent connector pipe should be pitched upward a minimum of 1/4 inch per foot of run. The horizontal length of the vent pipe connector shall not exceed 10 feet. The chimney connector shall be installed so as to minimize the number of elbows and to avoid sharp turns or other construction features that would create excessive resistance to the flow of flue gasses. Tees may be used in a straight section in conjunction with a barometric draft regulator; however, they must not be used for a 90° turn. No device that will obstruct the free flow of flue gasses shall be installed in the chimney connector. This does not exclude the use of devices specifically designed for the use in chimney connectors such as automatic dampers. The vent pipe should be joined with metal screws and supported by straps. A thimble should be used to connect the vent connector pipe to the chimney so the pipe may be readily removed in case of inspection or replacement.

No chimney connector shall pass through any floor or ceiling. The vent connector pipe must not pass through a combustible wall or partition unless they are guarded at the point of passage by a ventilated metal thimble not less than 12 inches larger in diameter than the connector, on metal or fireclay thimbles adequate protection is provided at the passageway. An acceptable passageway could be either an approved, ventilated metal thimble which is at least 12 inches larger in diameter than the vent connector pipe, or brick work which is at least 8 inches thick constructed into the wall and surrounding the vent connector

Clearances from combustible materials or materials shall be in accordance with the clearances given. The vent connector pipe should extend only to (and not beyond) the inside wall of the chimney. A thimble should be used to connect the vent connector pipe to the chimney so that the vent connector pipe may be readily removed in case of inspection or replacement.

Connection to the chimney must be made above the bottom of the chimney to avoid blockage. Vent piping should extend just into the chimney far enough to expel flue gasses. Inserting the vent piping too far into the chimney will cause undue obstruction. Use a thimble or a slip joint where vent pipe enters the chimney to allow easy removal for cleaning.

After sufficient run time to heat up the chimney a minimum of -0.02" w.c. draft in the flue is required. A barometric draft control is not required as the boiler is designed to be pressure fired. The overfire draft should always be positive, however in high draft situations which exceed the flue gas resistance through the boiler, draft control is recommended. Under normal circumstances, there is no need for a barometric draft regulator, and one should not be installed. Call Boyertown Furnace Co. for help in resolving draft issues.

Two or more appliances each equipped with a safety control may be permitted to be connected to one common chimney if sufficient draft is available for the safe simultaneous removal of all products of combustion.

If two or more openings are provided into one chimney, they shall be at different levels on the same story of the building, with the smaller appliance entering at the highest possible level consistent with clearances to combustible materials.

Two or more connectors shall not be joined together unless the common connector, manifold and chimney are properly sized. Adequate draft must be available to safely remove all products of combustion simultaneously without leakage, or back flow.

Direct Venting Oil Fired Boilers

WARNING Failure to follow all instructions can result in flue gas spillage and carbon monoxide emissions, causing severe personal injury or death. **Direct vent systems are intended for oil fired boilers only and are not designed for gas fired boilers.** All installations must meet the requirements of NFPA31. Use only the ETL listed venting system components supplied with the packaged boiler. All vent connections must be securely fastened and sealed with high temperature sealant.

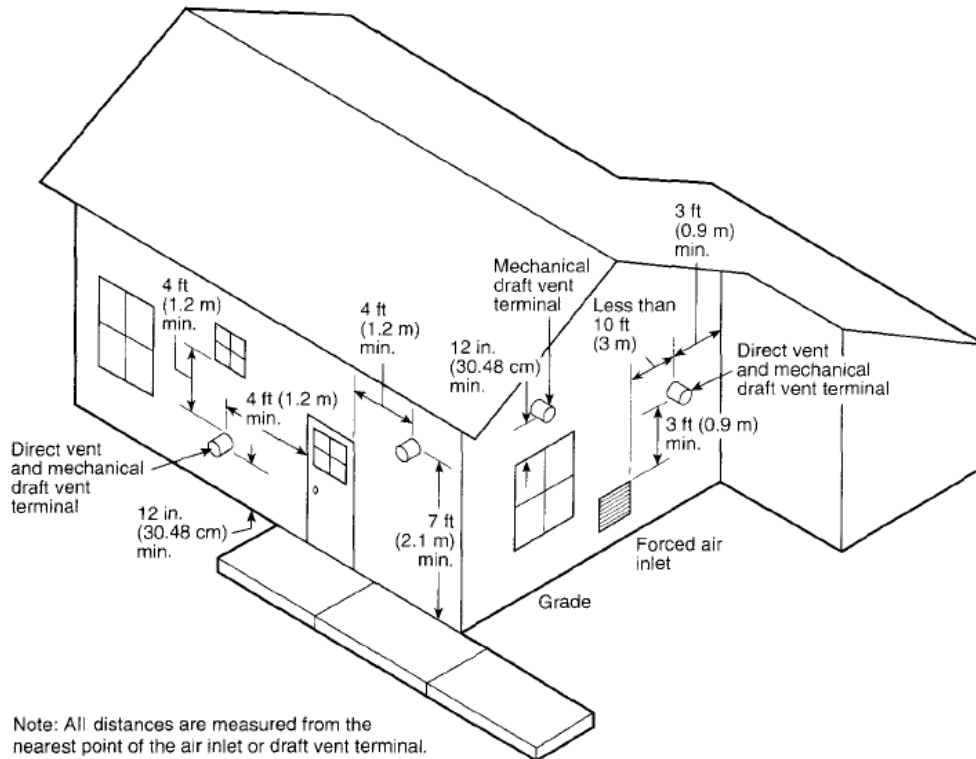
CAUTION External vent surfaces are hot. Surface discoloration of the building may occur due to improper burner or boiler adjustment. We will not accept any liability for such discoloration. Follow all instructions which are included with your specific direct vent kit.

1. Choose the vent location. The preferred location of venting system is on the opposite wall of the known prevailing winds.
2. The exit terminal of the system must conform to the following guidelines. See figure on following page.
 - a. The vent terminal shall not be less than 3 feet above any forced air inlet to the house.
 - b. The vent terminal shall not be less than 4 feet below, 4 feet horizontally, or 1 foot above any door window or gravity inlet into the building.
 - c. The vent terminal shall be installed at least 1 foot above ground. The vent must be maintained to keep the location 1 foot above any solid surface including snow, ice and landscape materials. The vent shall not be installed in a window well or any other fabricated depression.
 - d. The vent terminal shall not be less than 2 feet from an adjacent building.
 - e. The vent terminal shall not be less than 7 feet above grade when located adjacent to public walkways.
 - f. The vent terminal shall not be located so that flue gasses are directed to jeopardize people or overheat combustible structures, materials or enter buildings.
 - g. All joints in the vent system are to be sealed with Permatex high temperature sealant or equivalent to prevent the leakage of products of combustion into the building.
3. Combination air intake/vent system AIR INTAKE/VENT SYSTEM The vent system consists of 10 or 15 foot lengths of double wall insulated flexible stainless vent piping and an equal length of 4" air intake piping and a stainless steel intake/vent termination end.

Consult the Direct Vent manual included with the direct vent kit for more detailed installation instructions.

Install the vent termination thru the opening in the wall centering it in opening. Apply a bead of silicone caulking around the perimeter of the vent termination end. Attach the termination to the house by screwing it fast thru the holes in the termination end.

Install the flexible vent piping with the provided connector between the boiler and the termination end. The joints at the boiler, vent connectors, and termination end should be securely fastened and must be sealed with high temperature silicone to prevent leakage of flue gasses.



THE MINIMUM DISTANCE TO COMBUSTIBLE MATERIALS FROM THE DOUBLE WALL INSULATED VENT PIPING IS 2". CONSULT NFPA-31 FOR REDUCED CLEARANCES.

The air intake must be installed to the air inlet collar on the combination vent hood and to the burner.

The air intake kit consists of one 4" galvanized elbow, one 4" galvanized tee, one vacuum relief valve (barometric damper), and one length of 4" flexible piping.

The vacuum relief valve (barometric damper) is to be assembled and then installed in the 4" tee with the hardware provided. Install the fresh air intake duct tee and damper as close as possible to the burner.

The purpose of the damper is to act as a vacuum breaker in the event of a blockage in the air intake.

NOTE: The balance weight of the vacuum relief valve must be installed in a level position and adjusted to lightly close while burner is operating. Be sure to lock the balancing weight after adjustment.

ALL JOINTS IN THE AIR INTAKE ASSEMBLY MUST BE SECURELY FASTENED.

THE MAXIMUM LENGTH OF FLEXIBLE AIR INTAKE DUCT, WHICH CAN BE RUN TO THE BURNER, IS TWENTY FEET PLUS THE LENGTH THAT RESULTS FROM THE 4" TEE AND 4" ELBOW SUPPLIED.

Burner Installation

Before installing the burner place the fiber blanket material supplied with the burner onto the floor of the boiler towards the front of the boiler. The 5 and 6 section boilers are supplied with 2 blankets which are both to be placed on the floor.

The burner is mounted to the door with (4) 8mm studs, nuts, and washers (located in the burner trim bag). Thread the (4) studs in to the (4) M8 holes threaded to permit connection to the burner. Thread the shorter length of stud into cast door.

Check that the correct nozzle is properly installed in the burner as shown in the preliminary burner settings and that the burner electrodes are adjusted as per the burner manual.

Check that there is a complete seal between the door and the burner flange after installing ceramic fiber seal furnished with the burner.

Swing Door

Opening the Door

1. Turn off power to boiler.
2. Allow boiler to cool down.
3. Unplug the burner power cable at factory-supplied burner Molex plug electrical disconnect.
4. Lift the front jacket panel up and off the boiler.
5. Remove the four bolts from swing door.
6. Swing open burner door to the left while gently lifting to prevent rubbing of door studs.

Closing the Door

1. Swing burner door to right while lifting at the burner.
2. Install the bolts into the threaded openings in the front section.
3. Tighten the bolts evenly until a complete seal is made.

Door Hinge Reversal

WARNING:

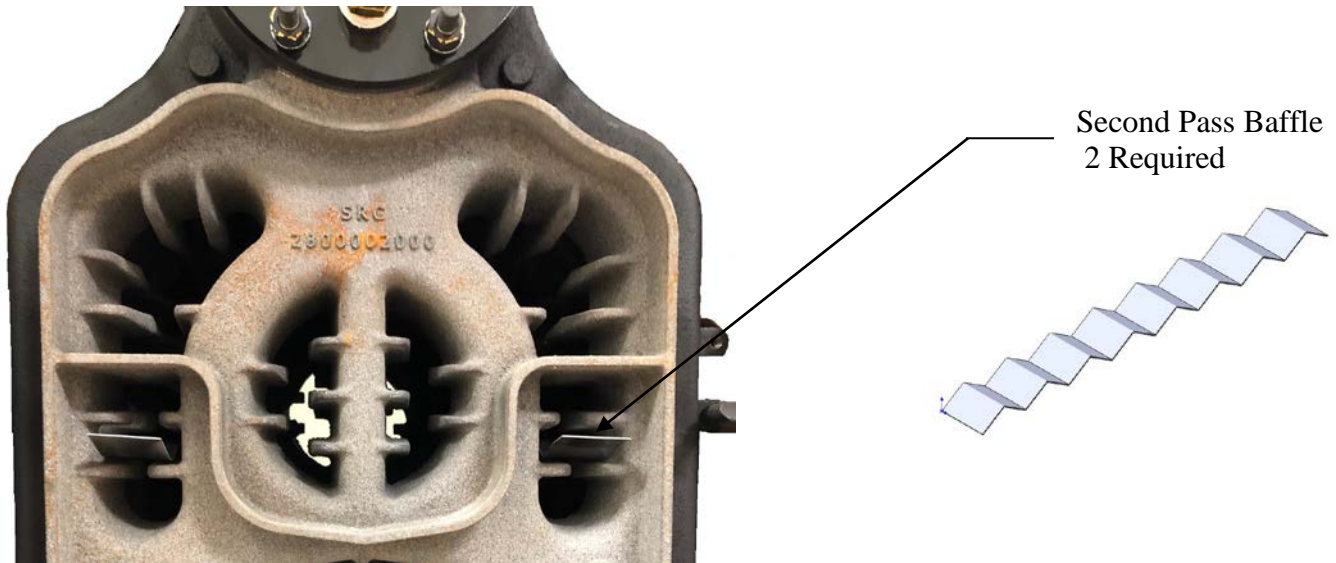
IN ORDER TO MOVE THE DOOR HINGES SAFELY TO THE RIGHT SIDE YOU MUST MOVE THE TEMPERATURE CONTROL TO THE LEFT SIDE CABINET PANEL. THIS IS TO ENSURE POWER IS SAFELY REMOVED FROM THE BURNER WHEN OPENING THE BURNER SWING DOOR. FAILURE TO DO SO MAY RESULT IN PROPERTY DAMAGE OR SERIOUS INJURY.

1. The knockout on the upper left side panel of the cabinet must be removed and a snap plug will have to be installed to close up the hole for normal HydroStat position on the right side jacket panel.
2. Install the temperature control on the boiler left side jacket panel.
3. Remove the hinges from the left side of the boiler.
4. Reinstall the hinges on the opposite side of the boiler.

Baffle Installation 3 Section Boiler

Combustion baffles required for the 3 section boilers are strapped to the front lower jacket bracket of the boiler and must be installed prior to firing the unit.

1. Open the swing door following the procedures on page 18.
2. Install the supplied stainless-steel baffles in the flue passages as shown extending just past the face of the casting.
3. Close the swing door following the procedures on page 18.



Oil Tank and Piping

Oil tanks and piping should be installed in accordance with the National Board of Fire Underwriters and local codes.

Connection of the oil line to burner must be positioned to permit easy opening of the burner swing door.

Use continuous heavy walled copper tubing with flare fittings only. Do not use compression fittings.

Do not run overhead fuel lines from tank to oil burner.

Fuel pump supply and return connections should be made according to instructions attached to the fuel pump.

An oil line filter and shut-off valve should be installed in the suction line.

On a two- pipe system you will need to supply a second approved flexible oil line in order to be able to swing the burner door open without disconnecting oil lines. An optional flexible oil line is available through your distributor.

Electrical Wiring

ELECTRICAL WIRING MUST CONFORM TO THE NATIONAL ELECTRICAL CODE, ANSI/NFPA No. 70-1990 AND LOCAL CODES.

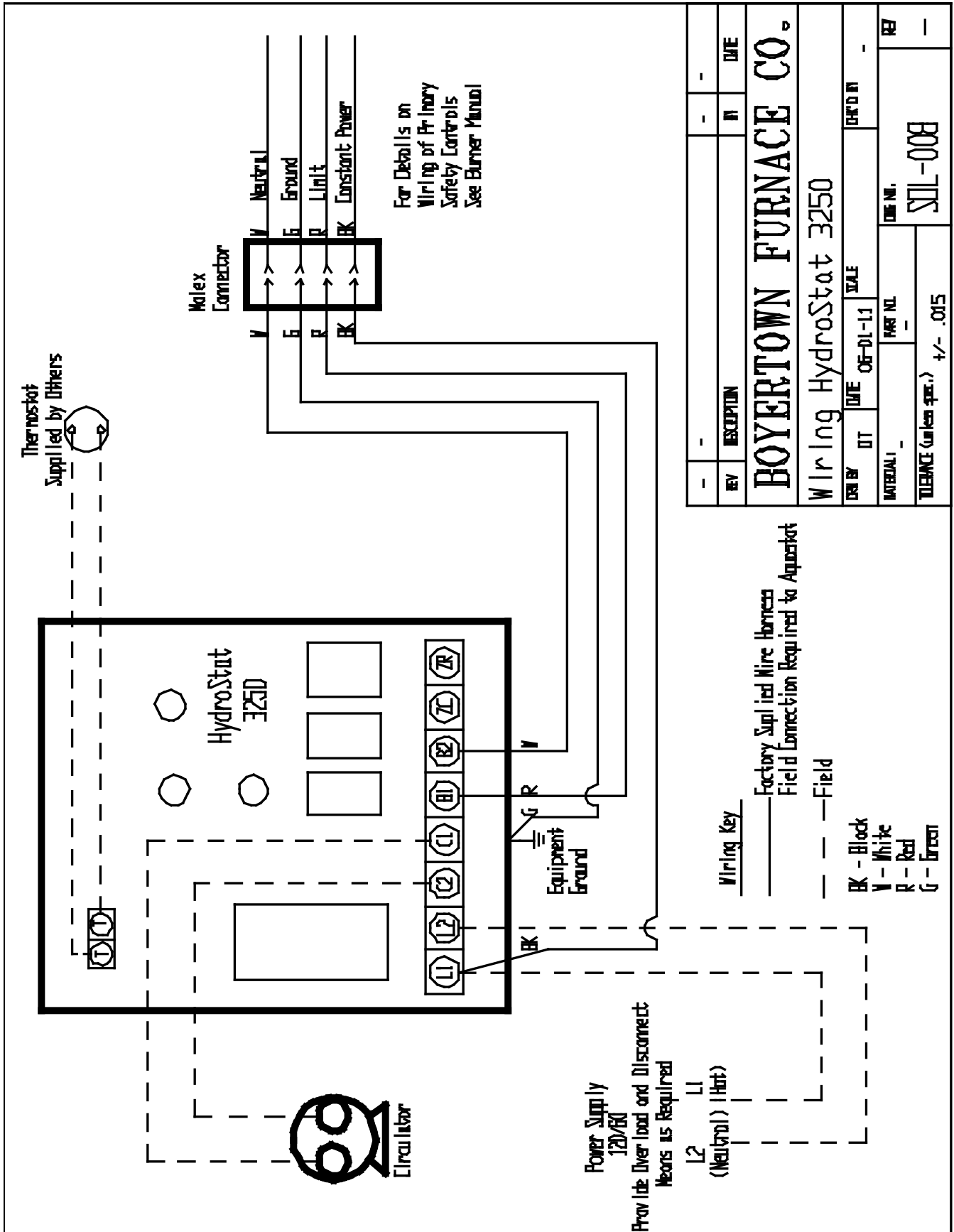
THE BOILER MUST BE ELECTRICALLY GROUNDED AND ON A SEPARATE FUSED DISCONNECT SWITCH.

ELECTRICAL SHOCK IS HAZARDOUS. TURN OFF ALL POWER SUPPLIES AT SERVICE ENTRANCE BEFORE STARTING TO MAKE WIRING CONNECTIONS OR REPAIRS.

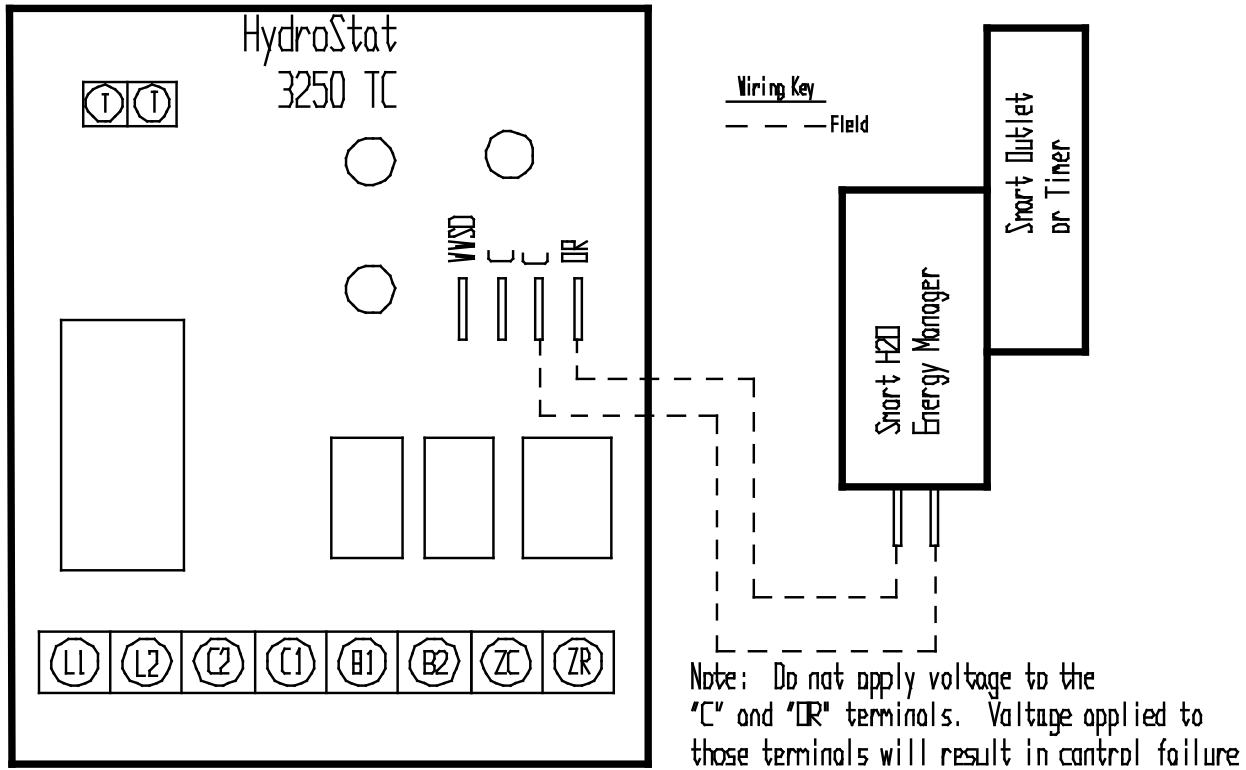
Refer to wiring diagrams in rear of manual for electrical connections. The boiler should be connected by a separate, permanently live electrical supply line with a 15-amp fused rating. Use No. 14 AWG wires rated for at least 90° C. Install a separate fused disconnect switch near the boiler so power can be shut off for servicing.

Caution: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

Install the room thermostat on an inside wall away from fireplaces, appliances or sunlight. Set the heat anticipator according to the instructions from the manufacturer. Connect the thermostat leads to the "TT" connections on the HydroStat control or system control.



Smart H₂O Energy Manager Wiring



The Smart H₂O Energy Manager functions by closing the circuit between the "OR" and "C" terminals on the HydroStat 3250 control when power is applied to the Smart H₂O Energy Manager. The Smart H₂O Energy Manager contains a normally open relay. When powered the relay closes and the low limit will be disabled and the boiler will run only when there is a call for heat.

When powering your Smart H₂O Energy Manager, it is important to remember that power on equates to low limit off.

Start-Up

Warning...Use only ... No. 2 fuel oils.

Note: Do not attempt to start the burner if excess oil has accumulated.

Note: Do not use gasoline, crankcase draining or any oil containing gasoline.

1. Make sure that normal water level has been obtained in the boiler and system.
2. Check that all safety devices are in place.
3. Check that thermostats are correctly connected and set.
4. Check that the inside of the boiler is free of any fuel residue or foreign materials and that the ceramic fiber insulation on the burner door has not been damaged.
5. Check oil burner nozzle to ensure that the right size and type is installed and tight in the adapter. See preliminary settings for proper nozzle size and type.
6. Check electrode settings, as they may have been jarred out of position during transportation. See burner instructions for nozzle and electrode setting
7. Check that the Burner mounting bolts are tight.
8. Lubricate burner motor and circulator motor if required.
9. Open all fuel valves.
10. Set room thermostat to call for heat.
11. Set HydroStat high limit between 180°F and 200°F
12. Turn service switch on. Burner should start. On one pipe fuel system only you may have to bleed the oil system. To bleed attach a clear plastic tube to the oil pump bleed port and allow oil to run until all the air is out of the oil suction line feeding the oil burner. See burner and fuel pump manufacturers recommendations for proper bleeding of the fuel system.
13. Turn "OFF" burner and install pressure gauge into the gauge port on the pump. See the burner manufacture's manual for location of ports.
14. Start burner again and check oil pressure for conformance to preliminary oil burner settings. Adjust if necessary. See oil burner manufacturer's instructions for pump adjustment.

Start-up Equipment

THE FOLLOWING PROPER COMBUSTION INSTRUMENTS ARE REQUIRED TO DETERMINE PROPER AIR ADJUSTMENTS AND DRAFT WHEN SETTING UP OR SERVICING THE BURNER.

1. CO₂ Analyzer
2. CO Analyzer
3. Draft gauge
4. Fuel pressure gauge
5. Stack thermometer
6. Smoke tester
7. Manometer

Do not attempt to make any adjustments or start the boiler without the proper equipment.

Oil Burner Adjustments

Preliminary oil burner settings shown below are approximate. The burner must be adjusted to actual field installed conditions.

- a. Begin to adjust the air to create a number 1 smoke as noted on the Bacharach or equivalent smoke tester scale.
- b. Take a flue gas sample and note the CO₂ reading. It will be between 13.5% - 14.5%
- c. Adjust the air to reduce the CO₂ by approximately 0.5% - 1%. The desired CO₂ setting for all units should be 13.0% - 13.5% CO₂
- d. Check for smoke. Should be "trace - 0"

The above procedure will give in a built in margin to ensure clean operation throughout the heating season.

Preliminary Oil Burner Settings

Boiler	Burner	Nozzle	Air Setting	Turbulator/ Head	Pump Press PSI
M3	Riello F5	0.75 x 60W	3.0	1	175
	Beckett AFG	0.85 x 60B	Shutter 9 Band 1	N/A	140
	Carlin EZ-1	0.85 x 70B	40%	2	150
M3H	Riello F5	0.85 x 60W	3.0	2	175
	Beckett AFG	0.90 x 60B	Shutter 9 Band 0	0	160
	Carlin EZ-1	0.90 x 70B	45%	2	160
M4	Riello F5	1.00 x 60W	3.5	3	160
	Beckett AFG	1.00 x 60B	Shutter 10 Band 0	0	140
	Carlin EZ-1	1.00 x 70B	45%	3	155
M4H	Riello F5	1.10 x 60W	3.8	3	160
	Beckett AFG	1.10 x 60B	Shutter 10 Band 2	3	140
	Carlin EZ-1	1.10 x 70B	50%	3	160
M5	Riello F5	1.25 x 60W	4.0	4	145
	Beckett CF375	1.25 x 60B	Shutter 9 Band 0	0	140
	Carlin EZ-1	1.25 x 60B	50%	4	150
M5H	Riello F10	1.35 x 45B	3.0	2	160
	Beckett CF375	1.35 x 60B	Shutter 10 Band 2	3	170
	Carlin EZ-1	1.35 x 60B	60%	4	170
M6	Riello F10	1.50 x 45B	3.0	2	170
	Beckett CF375	1.50 x 60B	Shutter 10 Band 2.	3	150
	Carlin EZ-1	1.50 x 45B	65%	5	150

Control Circuit Safety Checks

Check the safety controls on the boiler after completing the burner adjustments. A safety control check for satisfactory performance must be performed.

1. High limit control - Remove the temperature control cover as needed and note temperature setting. With the burner running reduce the high limit setting until the burner shuts off. Return the high limit to its original setting. Consult the manufacturers installation and operation instructions for
2. Check the burner primary control and flame sensor following the burner manufacturer's recommendations.

Maintenance

IMPORTANT

Escaping gasses are dangerous. A qualified serviceman should inspect the entire flue and venting system at least once a year.

Do not use the boiler if any part has been under water. Call a qualified service technician to inspect the boiler and replace any part of the control system, which has been under water.

Never operate this appliance with any safety switches altered or disabled. Never attempt to modify this appliance in any fashion.

Boiler

At the beginning of each heating season, the boiler flue passages, and the burner should be checked for cleanliness and if necessary, they should be cleaned. The following procedure is required for inspection and cleaning the boiler flue passages.

1. Turn off all electrical power to the boiler before inspecting and cleaning.
2. Disconnect the Molex plug at burner.
3. Remove the boiler front jacket panel by lifting vertically.
4. Open the swing door following previously described procedure.
5. If required remove any scale and soot deposits with a flexible flue brush. Vacuum all deposits from flue passages and chamber area. Be careful not to damage the door insulation.
6. Close swing door following previously described procedure. Check to ensure a proper seal between the door and the boiler has been made.
7. Eliminate any combustion gas leaks by replacing worn seals and gaskets.
8. Install jacket front panel.
9. Connect Molex plug for burner power.
10. Protect the heating system against freezing dangers with anti-freezes as required. Avoid intercommunications between domestic hot water and heating water since these antifreezes are toxic substances.
11. Check the piping system for leaks and repair as required. This will prevent water turnover with consequent risk of scale formation and corrosion in the boiler room.
12. Check for proper operation of the relief valve following the manufactures recommended procedure. Corrosion can build up rapidly at the valve seat and prevent its functioning as a safety device.

Burner

Refer to the burner installation and operation manual provided for maintenance procedures.

Vent System

Chimney Vent- Inspect the chimney and vent system to ensure its cleanliness and condition. Remove any accumulation that may have occurred at the cleanout door. Inspect and clean all vent piping and vent components replacing as necessary.

Direct Vent – Inspect and clean vent and air intake piping. Replace and reseal joints as required. Inspect vent hood air inlet and discharge for obstruction.

PurePro Trio Residential Cast Iron Boiler Warranty

First Year Limited Warranty for PurePro Trio Residential Cast Iron Water Boilers

Boyertown Furnace warrants that its residential cast iron water boilers are free from defects in material and workmanship under normal usage for one year from the date of original installation. If any parts are found to be defective in manufacture during this one-year period, Boyertown Furnace Company will supply a replacement for the defective part.

The Limited Lifetime warranty for the cast iron heat exchanger of its residential water boilers includes the heat exchanger only, not component parts.

Boyertown Furnace Company warrants that the cast iron heat exchanger of its residential water boiler is free from defects in material and workmanship under normal usage during the lifetime of the original owner at the original place of installation. If any sections are found to have a manufacturing defect in materials or workmanship Boyertown Furnace will repair or, at its option replace them.

If you are not the original owner and the cast iron sections are found to have a manufacturing defect in materials and workmanship Boyertown Furnace will repair or, at its option replace them up to 20 years from the manufacturing date represented by the serial number of the boiler.

This warranty does not extend to anyone except and only when the boiler is in the original installation.

Exceptions and Exclusions

1. The limited lifetime warranty covers only the cast iron heat exchanger assembly. The burner, jacket, controls and other equipment furnished by Boyertown Furnace Company but purchased from other manufacturers shall be limited to their warranties, if any.
2. This warranty does not cover expenses for removal or reinstallation. The homeowner will be responsible for the cost of removing and reinstalling the defective part or its replacement and all labor and material connected therewith. Replacement material will be invoiced to the distributor in the usual manner and will be subject to adjustment upon proof of defect.
3. This warranty in no way can be considered as a guarantee of workmanship of an installer connected with the installation of the Pure Pro Trio cast iron or as imposing on Boyertown Furnace Company liability of any nature in the installation which liability is expressly disclaimed.
4. This warranty will not be applicable if the boiler is used or operated over its rated capacity or installed for uses other than home heating; or is not maintained in accordance with Boyertown Furnace Companies recommended or accepted good practice as determined by industry standards.
5. This warranty will not be applicable if the boiler has been damaged as a result of being improperly serviced or operated, including but not limited to the following: operated with sufficient water; allowed to freeze, subjected to flood conditions: or operated with water conditions and or fuels or additions which cause condensation, unusual deposits, or corrosion in or on the cast iron sections.
6. This warranty applies only to boilers installed in the United States.
7. In order for this warranty to be effective a) The boiler must have been installed in a single or a two-family residential dwelling. This warranty does not apply to boilers installed in apartments or commercial or industrial installations. b) The boiler must have been assembled in strict compliance with the installation instructions furnished with the boiler. c) Boiler sections must not have been damaged in handling during shipment or installation.
8. The remedy for breach of this warranty is expressly limited to the repair or replacement of any part found to be defective under conditions of normal; and the remedy for incidental, special or consequential damages or loss such as loss of the use of the materials, inconvenience or limitation of incidental or consequential damages so the above limitations or exclusions may not apply to you.
9. The warranty is lieu of all others, and any and all express or implied warranties (including, without limitation any implied warranties of merchantability or fitness for a particular purpose), are expressly limited in duration to the period of the warranty as previously stated herein. Some states do not allow limitations on how long an implied warranty lasts so the above limitation may not apply to you.

Implied warranties of fitness for a particular purpose and merchantability shall be limited to the duration of the express warranty. Boyertown Furnace Company expressly disclaims and excludes any liability for consequential or incidental damages for breach of any express or implied warranty.

For prompt warranty service, notify the installer who in turn will notify Boyertown Furnace distributor from where the boiler was purchased. If this action does not result in warranty service, contact the Boyertown Furnace Customer Service Department, P.O. Box 100, Boyertown, Pa. 19512, with details in support of the warranty claim. Alleged defective part or parts must be returned through trade channels in accordance with the Boyertown Furnace Company's procedure currently in force for handling returned goods for the purpose of inspection to determine cause of failure. Boyertown Furnace will furnish the new parts to an authorized Boyertown Furnace distributor who in turn will furnish the parts to the heating contractor who installed the boiler. If you have any questions about the coverage of this warranty, contact Boyertown Furnace Company at the above address. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Installation and Service Check List

Boiler Model: _____ Serial No.: _____
 Installation Date: _____
 Installer Name: _____ Phone No.: _____

Boiler Installation

- Boiler level and in solid contact with floor?
- Boiler and burner wired per wiring diagram and National Electric Code? 120VAC wiring
Type _____ Size _____ AWG
- Burner sealed to boiler? Mounting nuts tight?
- Space is large enough to provide required clearances?
- Local, state and national codes, laws, regulations and ordinances followed?

Vent System

- Existing chimney and vent system inspected to NFPA Code and in good condition?
- New vent pipe installed and properly sealed?
- Vent size checked against furnace manual and codes?
- Gas boilers – Double Swing Damper installed along with spill switch.

Oil Burner Operation

- Burner Model: _____ Nozzle: _____ GPH _____ Deg. _____ Type _____
- Burner Pump Pressure: _____
- Fuel filter and fuel lines installed and inspected as per burner manual?
- Air bled from oil piping? Piping checked for leaks?
- Burner started, adjusted and tested per burner manual?

Gas Burner Operation

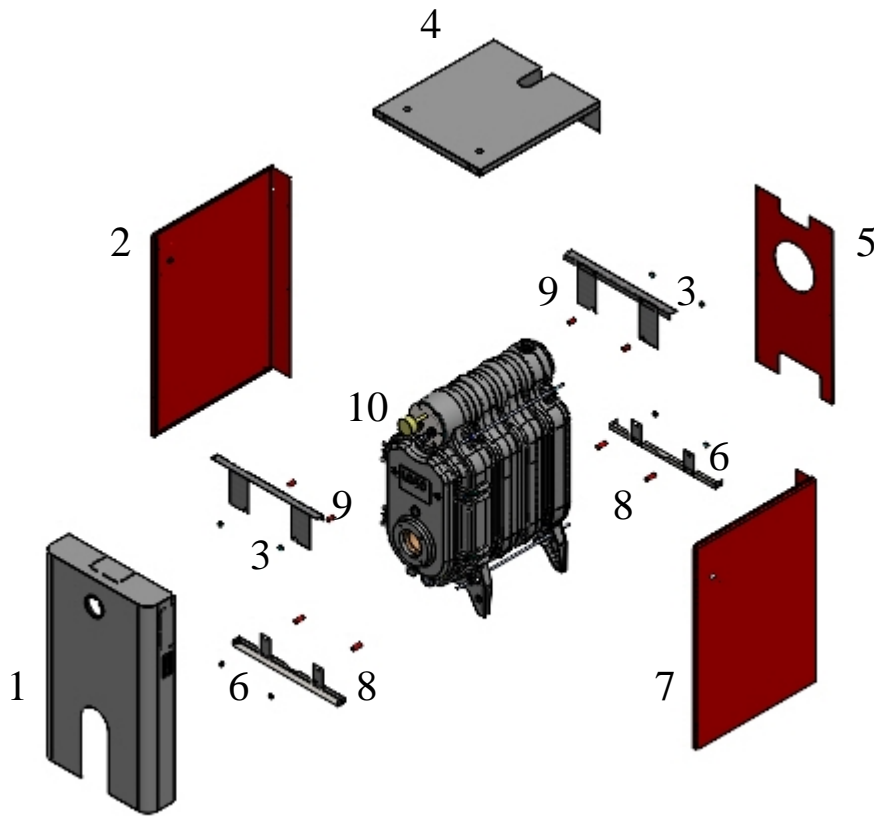
- Burner Model: _____ Orifice: _____ Manifold Pressure: _____
- Fuel lines installed and inspected as per the burner manual?
- Piping checked for leaks?
- Burner started, adjusted and tested as per the burner manual?

Boiler Operation

- Limit control tested for proper operation?
- Boiler observed going through several operational cycles for proper operation?

Post Installation

- Reviewed owners' information in this manual with owner or maintenance personnel and instructed to keep for future reference?
- Properly filled in and returned warranty registration card to Boyertown Furnace Co. Inserted burner manual instructions with furnace manual for future use?



Item	Qty.	Description	M3	M4	M5	M6
1	1	Jacket Front Panel	509000W	509000W	509000W	509000W
2	1	Left Side Jacket Panel	509030W	509060W	509090W	509120W
3	2	Jacket Upper Bracket	509170	509170	509170	509170
4	1	Jacket Top Panel	509020W	509050W	509080W	509110W
5	1	Jacket Rear Panel	509010W	509010W	509010W	509010W
6	2	Jacket Lower Bracket	509180	509180	509180	509180
7	1	Jacket Right Side Panel	509040W	509070W	509100W	509130W
8	4	Spacer 1-9/16" x 1/2"	594500	594500	594500	594500
9	4	Spacer 1" x 1/2"	594502	594502	594502	594502
10	1	Casting Assembly	705997C	705998C	705999C	706000C
	1	Hydrolevel 3250 TC	552116C	552116C	552116C	552116C
	1	Sensor Hydrolevel 48"	552123	552123	552123	552123
	1	Immersion Well Hydrolevel	552816	552816	552816	552816
	1	Temperature/Altitude Gauge	559561	559561	559561	559561
	1	Drain Valve 3/4" x 2-1/2"	327998	327998	327998	327998
	1	Relief Valve	570182	570182	570182	570182
	1	Coil Gasket	705047	705047	705047	705047
		Coil	705045	705046	705046	705046



-----Cut and Return This Form or register online at www.boyertownfurnace.com-----

Boyertown Furnace Co.
P.O. Box 100
Boyertown, PA 19512

Boiler Model: _____ Date Installed: _____ Serial Number: _____

Name of Purchaser: _____

Purchaser's Address: _____

Dealer's Name: _____

Dealer's Address: _____
