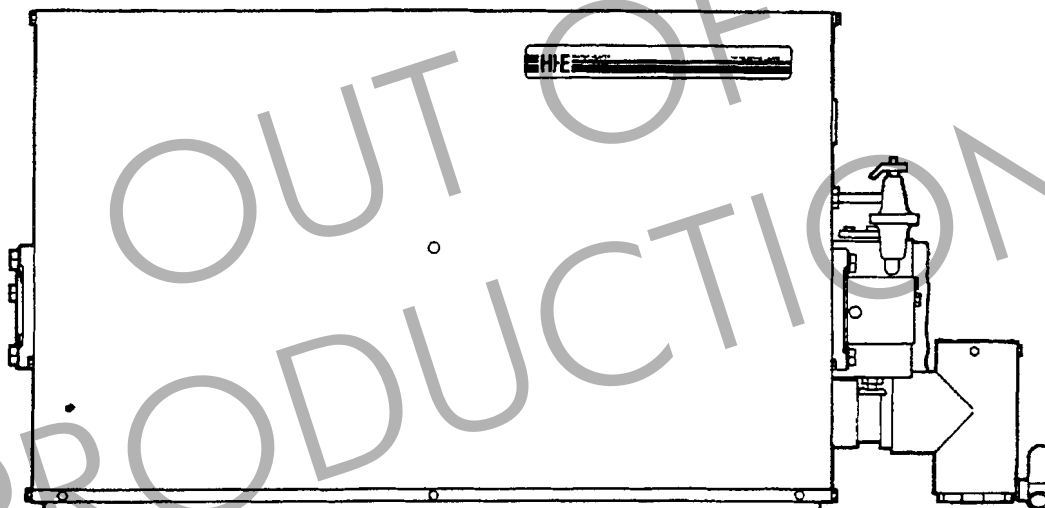


FOR YOUR SAFETY - This product must be installed and serviced by a professional service technician, qualified in hot water boiler installation. Improper installation and/or operation could create carbon monoxide gas which could cause serious injury, property damage, or death. Improper installation and/or operation will void the warranty

Hi-E Hydronic Boiler Model HHH



These instructions are to be stored next to the boiler for reference purposes

⚠ WARNING

Improper installation, adjustment, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency or the gas supplier.

FOR YOUR SAFETY

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

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions
- If you cannot reach your gas supplier, call the fire department.

Installation and service must be performed by authorized personnel.

H0210100-

Table of Contents

SECTION 1. GENERAL INFORMATION

1A. Introduction	1
1B. Description	1
1C. Warranty	1
1D. Flow Requirements	1
1E. Variable Water Flow Systems	1
1F. System Pressure Requirements	1
1G. Hot/Chilled Water Systems	1
1H. Technical Assistance	2

SECTION 2. INSTALLATION INSTRUCTIONS

2A. General	2
2B. Site Location	2
2B-1. Indoor Installation	2
2B-2. Removal of Existing Boiler	2
2B-3. Outdoor Installation	3
2B-4. Flooring - Typical Installation	3
2C. Vent Pipe Installation	3
2C-1. Outdoor Installation	3
2C-2. Indoor Installation - Combustion and Ventilation Air	4
2D. Condensate Disposal	4

2E. Water Flow System	5
2E-1. Introduction	5
2E-2. Piping of System to Boiler	5
2E-3. Filling Fully Connected System	5
2E-4. Water Chemistry	6

2F. Gas Supply Piping	6
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2G. Electric Wiring	7
---------------------------	---

2H. Installation Checkout and Adjustment	7
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SECTION 3. OPERATING INSTRUCTIONS

3A. Lighting and Shutdown	8
3B. Abnormal Operation	9
3C. Normal Operating Sequence	9
3D. High Limit Checkout	9
3E. Periodic Inspection	9

SECTION 4. TROUBLE-SHOOTING GUIDE

4A. General	9
4B. System Problems	9

SECTION 5. PARTS LIST

5. Parts List	10
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SECTION 1. General Information

1A. Introduction

This manual supplies installation and operation information for the Teledyne Laars Hi-E Model HHH 300 hot water boilers. It is important that the installer read Section 2 (Installation Instructions) and check local, State and Provincial codes before beginning installation of the boiler. Experience has shown that most operating problems are caused by improper installation.

1B. Description

The Hi-E hydronic boiler is a high efficiency boiler which incorporates state-of-the-art design in its combustion and heat transfer components and its electronic control system. It utilizes a downward-firing fiber matrix burner. Because of the high efficiency, the combustion products are exhausted at a very low temperature creating condensation.

The Hi-E hydronic boiler is design certified by the International Approved Service as complying with the latest edition of the standard for Gas-Fired Hot Water Boilers, ANSI Z21.13 and CAN-B 149. It is specifically designed as a general service boiler. Consult your dealer for appropriate Teledyne Laars products for other applications.

1C. Warranty

The Hi-E is sold with a limited factory warranty. Details are specified on the back cover of this manual, and a copy of the Warranty and Warranty Registration Card are included in the plastic bag shipped with the boiler. Fill out and return the Warranty Registration Card. The boiler serial number can be found on the rating plate, which is located on the inside of the top lid of the boiler. Damage caused by improper installation, assembly or operation is NOT covered by this Warranty.

1D. Flow Requirements

The Hi-E boiler must have continuous flow through the heat exchanger when firing for proper operation. The system pumps must be capable of developing sufficient pressure to overcome the resistance of the boiler plus the entire circulating system at the designated GPM (see Table 1). The temperature rise across the boiler should never exceed 30°F.

Flow Rate (GPM)	Heater Head Loss (Ft.)	Pipe Size (In.)	Temp. Rise Across Heater (°F)
28	1.0	2	20

Table 1. HHH 300 Ratings

1E. Variable Water Flow Systems

There can be reduced water flow through the boiler in heating systems using zone valves, zone pumps or 3-way valves. This can result in a high temperature rise across the boiler. Teledyne Laars strongly recommends primary-secondary pumping for all variable flow systems. The boiler pump in a primary-secondary system maintains the constant flow through the boiler even though the system flow is variable. In a primary-secondary system the pressure drop of the boiler is not added to the system (see Figure 1).

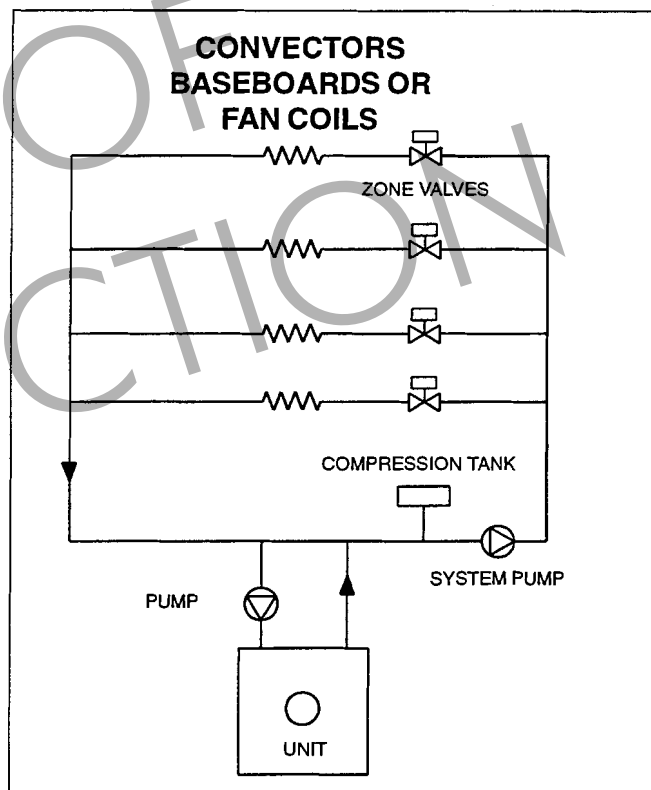


Figure 1. Primary-secondary plumbing.

1F. System Pressure Requirements

The Hi-E boiler is designed to operate on a closed, pressurized system. Maintain a minimum of 12 psi on the system where boiler supply water temperature is 200°F or less. If higher temperatures are required, the minimum system pressure should be at least 15 psi above the water vapor pressure corresponding to the elevated water temperature.

1G. Hot/Chilled Water Systems

When a boiler is connected to an air conditioning system where the same water is used for heating and cooling, you must prevent chilled water from entering the boiler. When changing such a system from cooling to heating, allow the chilled water to circulate through the building, after the chiller has been turned off, for a period long enough for the water

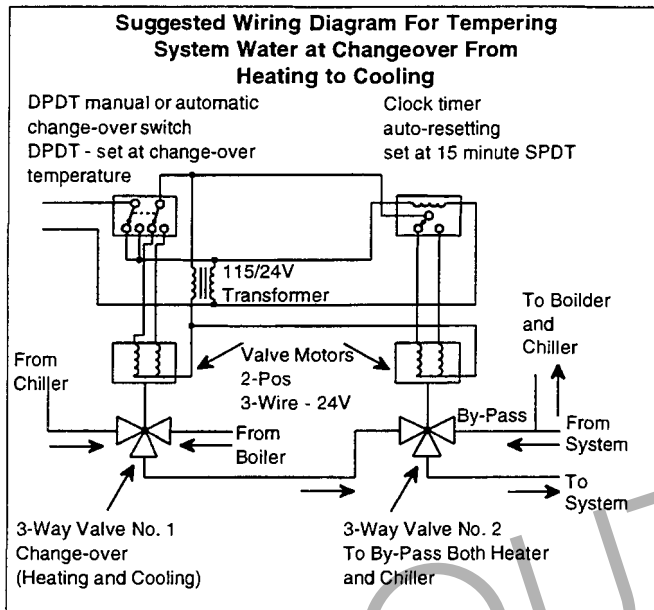


Figure 2. Boiler-Chiller installation.

to warm up before the water flows into the boiler. It is equally important to prevent hot water from entering the chiller. The system shown in Figure 2 is suggested to make sure the system water is neither too hot nor too cold when a changeover takes place. When a boiler is connected to heating coils located in air handling units (where they may be exposed to refrigerated air circulation), install a flow control valve or other automatic means to prevent gravity circulation of chilled water through the boiler.

1H. Technical Assistance

Consult Teledyne Laars or your local distributor with any questions or problems involving the specifications, installation, and operation of your Teledyne Laars equipment. An experienced technical support staff is ready to assist in assuring the proper performance and application of Teledyne Laars products.

SECTION 2. Installation Instructions

2A. General

Install the boiler in accordance with applicable local codes and ordinances. In the absence of such codes, installation must be per the latest edition of the National Fuel Gas Code, ANSI Z223.1 and the National Electrical Code, ANSI/NFPA 70. In Canada, the installation must be per CAN-B 149.

2B. Site Location

Both indoor and outdoor installations of the Hi-E boiler require adequate clearances on all sides for inspection and service (See Table 2).

CLEARANCES	INDOOR (Inches)	OUTDOOR (Inches)
Water Connection Side	12	12
Opposite Side	6	6
Rear	6	6
Top	24	Open
Front	18	18

Table 2 . Clearances

2B-1. Indoor Installation

Install the boiler on a waterproof floor with a floor drain and a 6 inch curb on all sides to protect the building when it is necessary to drain the boiler for repairs. Teledyne Laars will not be held responsible for water damage to the building associated with this boiler.

2B-2. Removal of Existing Boiler

At the time of removal of an existing boiler, the following steps shall be followed with each appliance remaining connected to the common venting system placed in operation, while the other appliances remaining connected to the common venting system are not in operation.

1. Seal any unused openings in the common venting system.
2. Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.
3. Insofar as is practical, close all building doors and windows, and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of the building. Turn on clothes dryers and any appliance not connected to the common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.
4. Place in operation the appliance being inspected. Follow the lighting instructions. Adjust thermostat so appliance will operate continuously.
5. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-burning appliances to their previous condition of use.
6. Any improper operation of the common venting system should be corrected so the installation conforms with the National Fuel Gas Code, ANSI Z223. 1. When resizing any

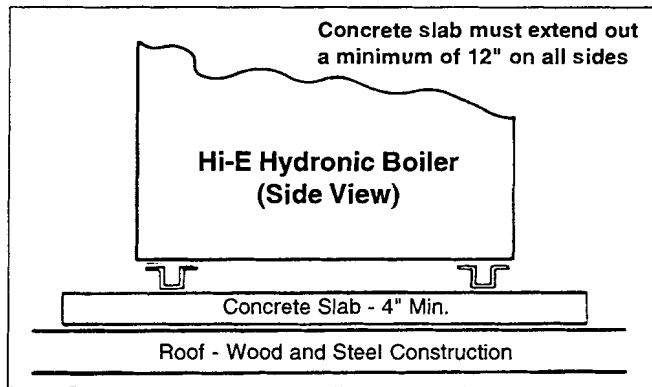


Figure 3. Typical roof installation.

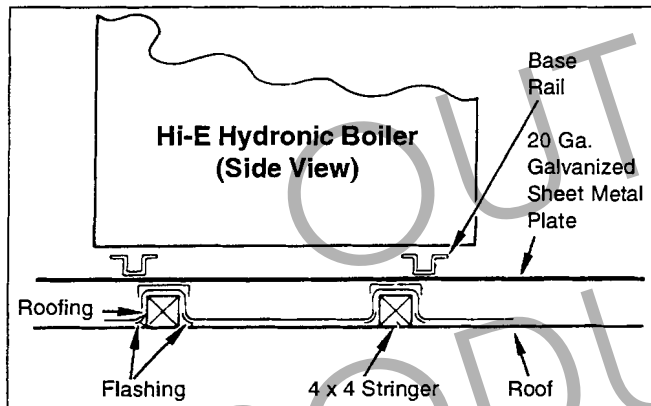


Figure 4. Typical roof installation.

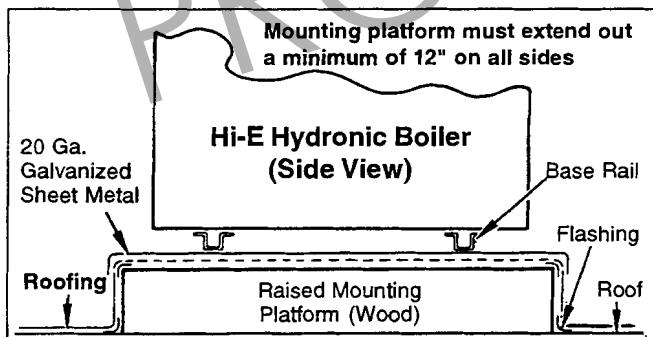


Figure 5. Typical roof installation.

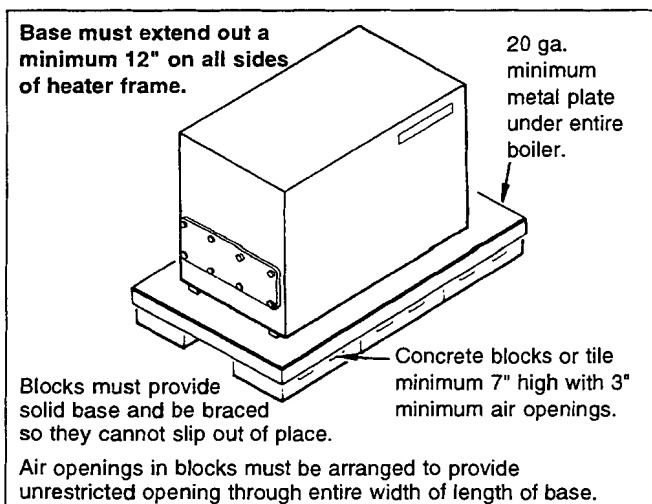


Figure 6. Installation on concrete blocks or tile.

portion of the common venting system, the common venting system should be resized to approach the minimum size as determined using the appropriate tables in Appendix G in the National Fuel Gas Code, ANSI Z223. 1.

In Canada, at the time the boiler is removed from common venting system, the common venting system should be resized so that the installation conforms to CAN/CGA B 149.1 or 2.

2B-3. Outdoor Installation

Never install the boiler under a roof overhang. Do not locate the boiler below or adjacent to any doors, windows, louvers or grates, etc. which communicate in any way with an inhabited area of a building, even though such communication might be through another building such as a garage or utility room.

2B-4. Flooring - Typical Installation

The boiler may be installed on a combustible floor, but do not install the boiler on carpeting. To facilitate condensate disposal, it may be advisable to elevate the boiler several inches off the floor (see Fig. 3 through Fig. 6).

2C. Vent Pipe Installation

The Hi-E boiler is shipped from the factory for outdoor installation. Order a vent termination kit (part number 10685700) separately for indoor installations.

2C-1. Outdoor Installation

The vent stack necessary for outdoor installation is shipped with the boiler. Figure 7 illustrates its installation. Insert the vent stack into the vent stack adapter with the screen up. Use the screws provided to secure the stack.

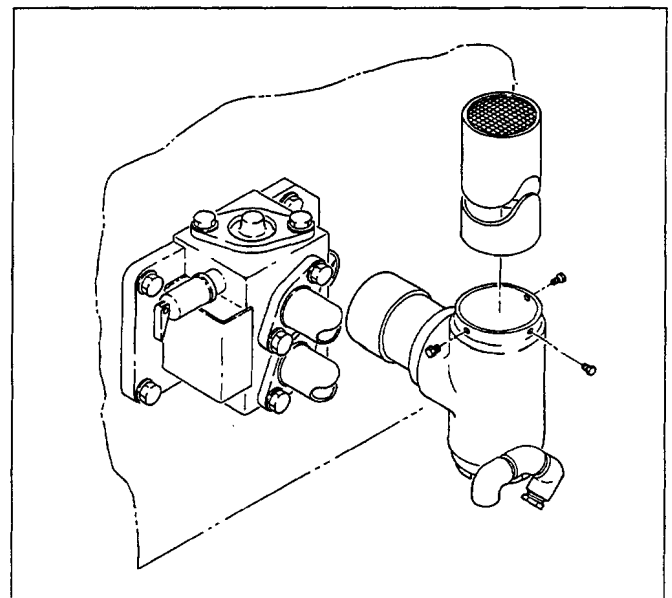


Figure 7. Vent pipe installation.

2C-2. Indoor Installation

Vent the Hi-E boiler to the outdoors using the indoor vent kit assembly. It must **not** be vented to a chimney or venting system serving any other gas appliance. Provide the boiler with uninterrupted openings to outside air for combustion and ventilation. The minimum net free air openings at floor and ceiling locations are 320 square inches each. The National Fuel Gas Code, ANSI Z223.1 in the USA and the CAN1-B149 in Canada provide information for combustion air inlet requirements.

⚠ WARNING:

Do not store any chemicals, cleaners, or any other corrosive material near combustion air openings or in the vicinity of combustion air openings. Failure to prevent corrosive material from entering combustion air could result in reduced boiler life and possible unsafe operation.

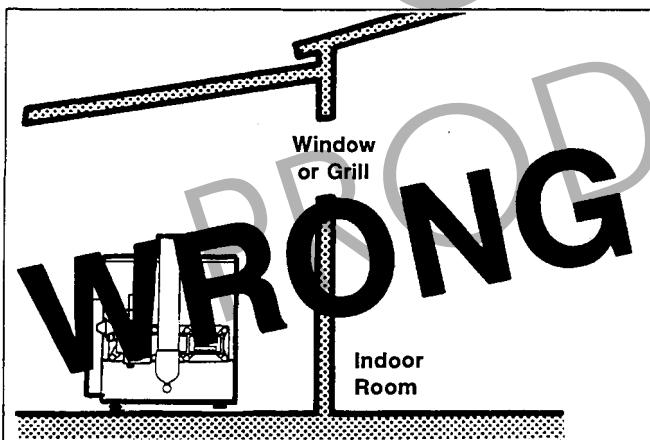


Figure 8. Incorrect outdoor installation.

Locate the vent terminal assembly properly per applicable codes and with consideration of the following:

1. Locate the vent terminal so that it is not subject to damage by pedestrians and other traffic, and such that the discharge is not objectionable. The National Fuel Gas Code requires a through-wall vent terminal to be at least 7 feet above grade if located at public walkway.
2. Locate the terminal so the vent exhaust does not impinge on building surfaces and other nearby objects. Vent products are very moist and may corrode such surfaces or objects.
3. Locate the terminal at least 4 feet horizontally from any gas or electric metering, regulating, or relief equipment.
4. Locate vent terminal at least 4 feet from any building opening. Take special care to assure that combustion products do not enter a

building through windows, doors, combustion air vents, or any other building.

5. Locate vent terminal so that the flue passage cannot be blocked by snow or ice.

Install the terminal on the building exterior by cutting a 4-1/2 inch diameter hole as shown in Figure 9. Attach the terminal plate by using the four screws provided. NOTE: Depending on wall construction, anchor attachment may be necessary. Install the vent terminal so it points downwards. Provide rainwater flashing and caulking as required.

Run piping between the Hi-E boiler and vent terminal. Vent piping must be 3 inch schedule 40 CPVC plastic. Route vent piping as directly as possible, with a minimum of turns and fittings. The maximum length is 40 feet with a maximum of four elbows.

Support vent piping with suitable hangers so its weight does not bear on the boiler or vent terminal and so the piping joints are not strained. Support horizontal runs with plumbers tape or pipe hangers at intervals not greater than six feet. Fasten piping securely to the boiler and vent terminal.

Slope vent piping not less than 1/4 inch per foot upward from the boiler so condensation will flow back to the boiler. Install it to prevent accumulation of condensate anywhere in the vent piping.

Seal vent piping at all joints including the vent adapter connection at the boiler and the vent termination through the proper use of CPVC solvent cement.

2D. Condensate Disposal

The high efficiency of the Model Hi-E boiler creates water condensation from the flue products, especially during the initial heat-up phase. This water is mildly acidic, having a pH of 3.5 to 6.0. By comparison, most drinking water has a pH of 5.0 to 8.0.

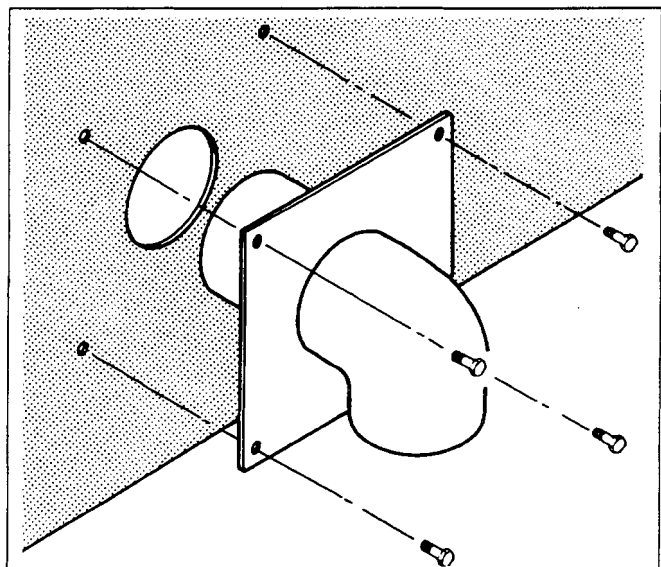


Figure 9. Vent termination installation.

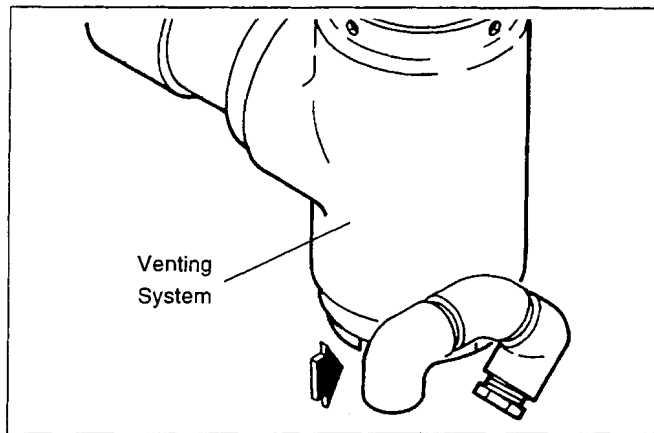


Figure 10. Condensate disposal.

Some rain water has a pH as low as 3.0, the same as vinegar.

Connect a 1/2" drain pipe between the "S" trap on the boiler vent terminal (see Figure 10) and the "P" trap on the sanitary drain to properly dispose of this condensate per local codes. The pipe must be PVC. Attach it to the boiler with solvent cement. Local codes may require neutralization of the condensate before final disposal. In such a case, contact Teledyne Laars for details.

2E. Water Flow System

2E-1. Introduction

It is important that the system be designed to ensure proper water flow through the boiler. Figure 11 is the recommended system piping configuration.

2E-2. Piping of System to Boiler

1. Be sure to provide service valves at the inlet and outlet to the boiler so it can be readily isolated for service.
2. The pressure relief valve installed in the tapped opening provided in the outlet header must be piped, *but not fastened*, to a drain or floor sink. The drain pipe must be the same size as the valve outlet and must pitch downward from the valve. If the PRV supplied with the boiler is not factory installed, install it in the outlet header consistent with the ANSI/ASME Boiler and Pressure Vessel Code, Section IV. Pay special attention to relief valve settings in installations where the boiler is located on the ground floor of a tall building, or where the operating temperature of the boiler is above 210°F. In both instances, the static pressure of the system is elevated and could cause the relief valve to leak and bring considerable raw water into the system. Where no special setting of the relief valve is ordered, the factory will furnish a 75 psi setting. Never reduce the relief valve opening. If necessary, install the relief valve in a Tee immediately past the boiler outlet.

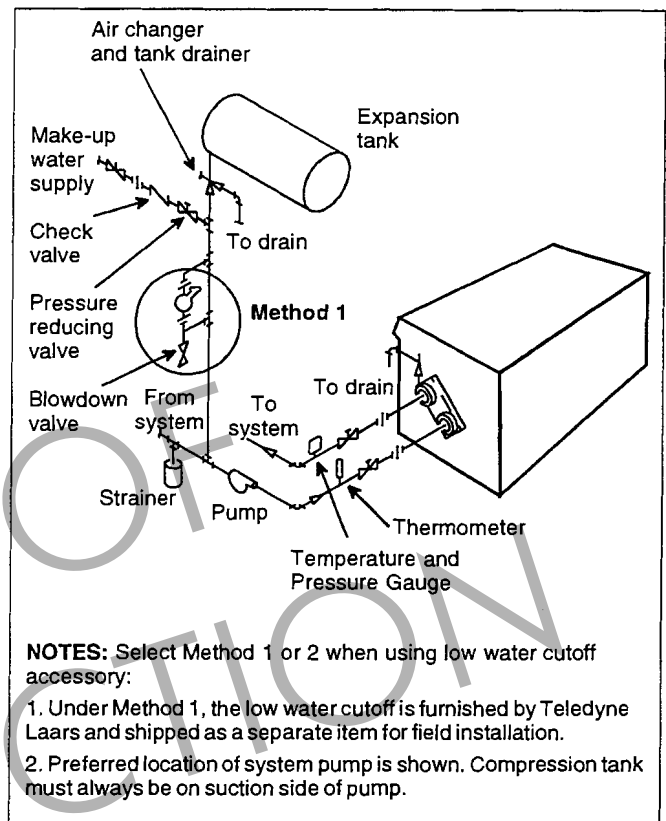


Figure 11. Boiler piping.

3. Provide the boiler installed above radiation level with a low water cut-off device either as part of the boiler or at the time of boiler installation (see Figure 11).
4. Install manual and/or automatic bleeding devices at high points in the system to eliminate air. Install a correctly sized expansion or compression tank with suitable air charger and tank drainer, as appropriate.
5. Support the weight of all water and gas piping with suitable hangers or floor stands.
6. Check piping diagrams with local applicable plumbing, heating and building safety codes.

2E-3. Filling Fully Connected System

1. Close all bleeding devices and open make-up water valve. Allow system to fill slowly.
2. If make-up water pump is employed, adjust pressure switch on pumping system to provide a minimum of 12 psi at the highest point in the heating loop.
3. If a water pressure regulator is provided on the make-up water line, adjust the pressure regulator to provide at least 12 psi at the highest point in the heating loop.
4. Open bleeding devices on all radiation units at the high points in the piping throughout the system, unless automatic air bleeders are provided at such points.

5. Run system circulating pump for a minimum of 30 minutes with the boiler shut off.
6. Open all strainers in the circulating system, check flow switch operation, and check for debris.
7. Recheck all air bleeders as described in Step 4 above.
8. Check water level in expansion tank. With the system full of water and under normal operating pressure, the level of water in the expansion tank should not exceed 1/4 of the total, with the balance filled with air.
9. Start up the boiler according to procedure described in Section 3. Operate the entire system, including the pump, boiler and radiation units for one (1) hour.
10. Recheck the water level in the expansion tank. If the water level exceeds 1/4 of the volume of the expansion tank, open the tank drainer and drain to that level.
11. Shut down the entire system and vent all radiation units and high points in the system piping as described in Step 4 above.
12. Close make-up water valve and check strainer in pressure reducing valve for sediment or debris from the make-up water line. Reopen make-up water valve.
13. Check gauge for correct water pressure and also check water level in the system. If the height indicated above the boiler insures that water is at the highest point in the circulating loop, then the system is ready for operation.
14. Within three (3) days of start-up, recheck all air bleeders and the expansion tank as described in Steps 4 and 8 above.

Important:

The installer is responsible for identifying to the owner/operator the location of all emergency shutoff devices.

If for any reason, the water is turned off temporarily, to service the equipment for example, there could be a problem when the boiler is tuned back on caused by airlock. To eliminate the airlock, open the pressure relief valve and allow the air to bleed out until water starts to flow. As soon as full circulation is restored, the trapped air can be transported to air vents installed in the system piping.

2E-4. Freeze Protection

Although the Hi-E boiler is design-certified by IAS for outdoor installations, such installations are not recommended in areas subject to freezing temperatures unless proper precautions are taken. Maintaining a mixture of 50% water and 50% properly inhibited HVAC glycol is the preferred method of freeze protection for hydronic systems. (Do not use

automotive anti-freeze.) This mixture will protect the boiler to temperatures of about -35°F (-37°C). To get the desired temperature rise across the boiler when this mixture is used, increase the gpm flow recommended for water by 15%. Increase the head loss requirement by 20%.

2F. Gas Supply Piping

Before installing gas piping, check the rating plate on the boiler to be sure that it is for use with the correct gas. Note also the supply pressure requirements in Table 3, and make sure that they are met:

	Gas	Natural	LP
Min. Supply Press. (in. W.C.)	5	11	11
Max Supply Press. (in. W.C.)	10	14	14

Table 3. Gas Supply Pressure Requirements

Table 4 shows recommended pipe sizing for natural gas per the National Fuel Gas code, ANSI Z223. 1. These figures are based on a supply line pressure drop of approximately 0.5" W.C. Consult local codes to be sure that their requirements are met.

	Distance from Meter, ft.		
	0-50	50-175	175-400
Pipe Size	1"	1- 1/4"	1- 1/2"
Note:	Use one size smaller pipe for LP gas.		

Table 4. Natural Gas Pipe Size Requirements

Open the top of the boiler by removing the screws on the left and right sides near the front.

Support piping so that its weight does not bear on the boiler. Provide a service union, a drip leg and a manual shutoff valve in the gas supply line outside of the boiler jacket. Do not use a restrictive gas cock.

After installing the boiler, test the complete gas supply system including all connections, for leaks using a soap solution or other medium acceptable under applicable codes. Do not use a flame or any ignition source for leak detection. Do not pressure test the gas piping with the boiler connected or serious damage to the gas controls will result.

Before placing the boiler in operation, check the gas connection and the internal gas-carrying parts for leakage. This includes all components from the gas connection point on through the gas valve, venturi and fan, including the burner housing. Do the leak testing with a soap solution.

⚠ Caution

Liquefied petroleum gas is heavier than air. Therefore, do not install boiler using LP gas in pits or other locations where gas might accumulate. Locate boilers a safe distance from LP gas storage and filling equipment. Consult local codes and fire protection authorities relative to specific installation restrictions.

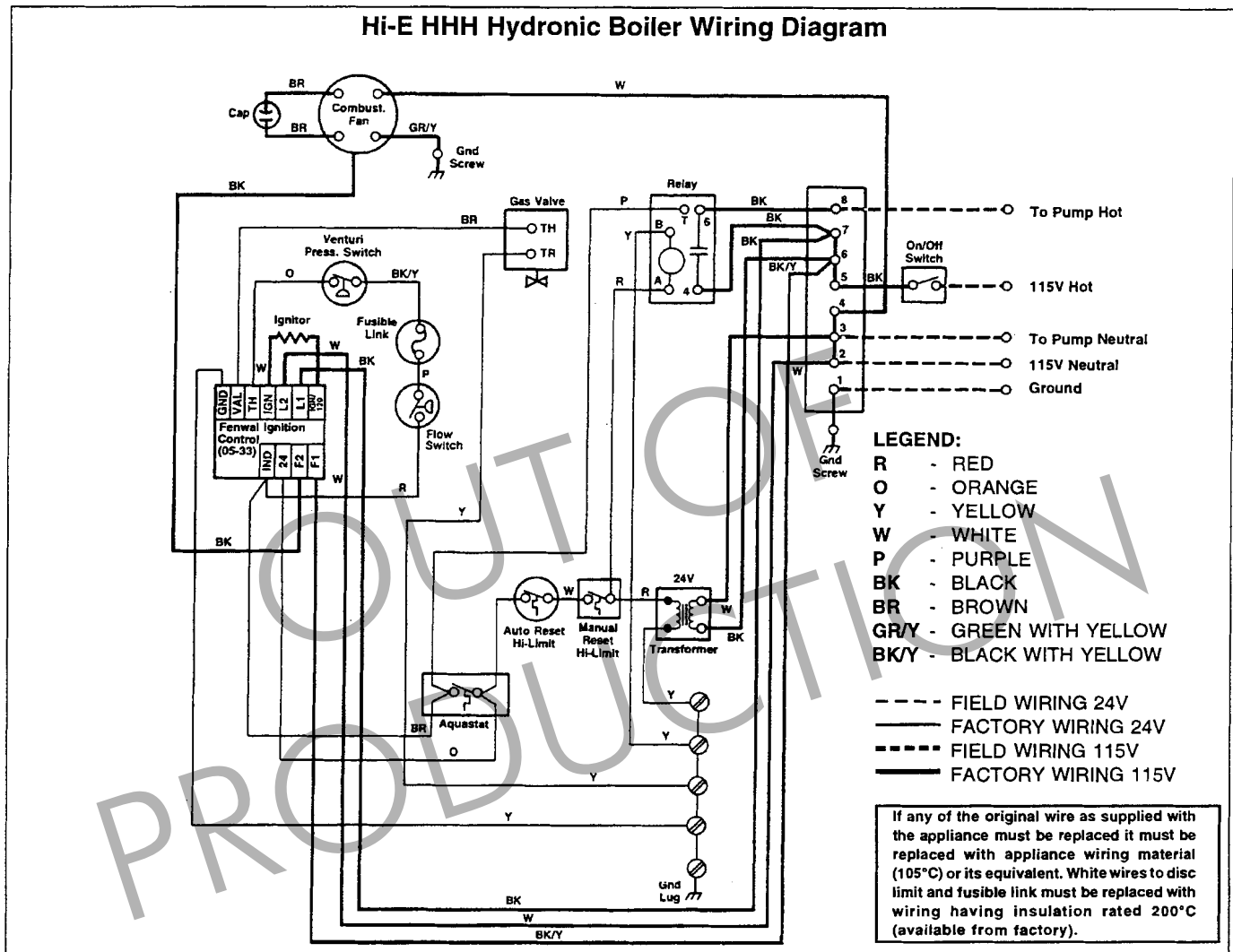


Figure 12. Hi-E boiler wiring diagram.

2G. Electric Wiring

Provide the Model Hi-E boiler with electrical power from a 115V/60Hz circuit, and a definite grounding means. The installation must be in accordance with the latest edition of the National Electrical Code, ANSI/NFPA 70, unless local code requirements dictate otherwise.

To make electrical supply connections, open the top of the boiler by removing the screws on the left and right sides near the front. Make connections to the pigtail leads in the junction box, which is under the aquastat. A green screw is provided in this box for the grounding connection.

Figure 12 is the wiring diagram for the Hi-E boiler. If the boiler is to be operated by an external controller, connect it at the wire nut which is provided in the 24V circuit.

2H. Installation Checkout and Adjustment

It is the installer's responsibility to check out and adjust the system so that the owner can operate it properly. The boiler must be started and its operation

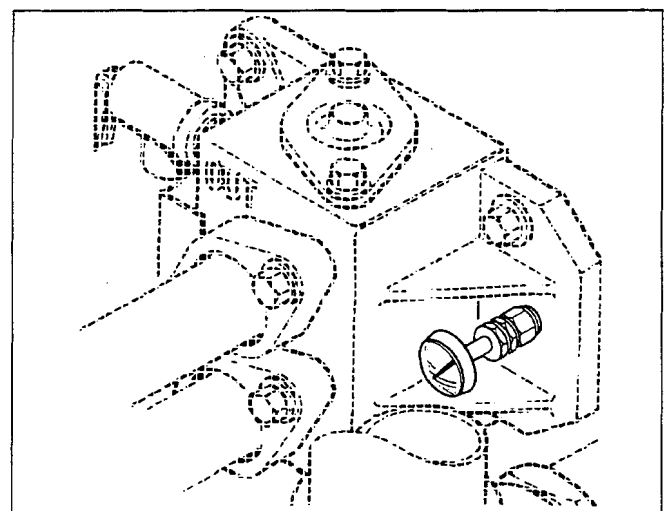


Figure 13. Thermometer installation.

observed and adjusted as necessary. Consult the "Operating Instructions" section of this manual.

Proper water flow is extremely important for efficient operation and long boiler life. To verify the water flow, follow this procedure:

1. Turn off the boiler.
2. Close the isolation valves.
3. After turning off the pump, remove the brass plug at the boiler outlet and install a Petes plug (see Figure 13).
4. Install a pocket thermometer in the Petes plug.
5. Open the isolation valves and start the pump.
6. Note the temperature.
7. Turn the boiler on.
8. Read the new temperature. The temperature difference should agree with Table 1 for the existing water conditions.
9. If a manual bypass or throttling valve is included in the system, it should be adjusted to achieve the proper temperature rise.

SECTION 3.

Operating Instructions

3A. Lighting and Shutdown

A lighting and shutdown instruction label is on the underside of the boiler top. To open the boiler, remove the screws on the left and right sides near the front. The front edge of the top panel can then be raised, the rear being retained on the hinge joint. When the boiler is open, the gas control is accessible. Lighting and shutdown instructions are as follows:

FOR YOUR SAFETY READ BEFORE OPERATING

⚠ WARNING:

If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

BEFORE OPERATING, smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.

If you cannot reach your gas supplier, call the fire department.

Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a quali-

fied service technician. Force or attempted repair may result in a fire or explosion.

Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace boiler which has been under water.

Operating Instructions

- a. STOP! Read the above safety information.
- b. Push the "OFF" button on the right side of the boiler.
- c. Turn off all electric power to the appliance.
- d. Remove the two (2) screws located on each side of the boiler top near the front.
- e. Lift the boiler top to gain access to the gas control.
- f. Set the thermostat to the lowest setting.
- g. Turn the gas control knob clockwise  until it stops, then push the control knob in slightly and turn clockwise  to "OFF".

NOTE: The knob cannot be turned to "OFF" unless it is pushed in slightly. Do not force it.

- h. Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow the safety information above. If you don't smell gas, go to the next step.
- i. Turn the gas control counterclockwise  until it stops, release the knob, then turn counterclockwise  to "ON" (see Fig. 14).
- j. Turn on all electric power to the appliance.
- k. Set the thermostat to the desired setting.
- l. Push the button on the side of the boiler.
- m. Close the boiler top and replace the screws.
- n. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Push the "OFF" button located on the right side of the boiler.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove the two (2) screws located on each side of the boiler top near the front of the boiler.

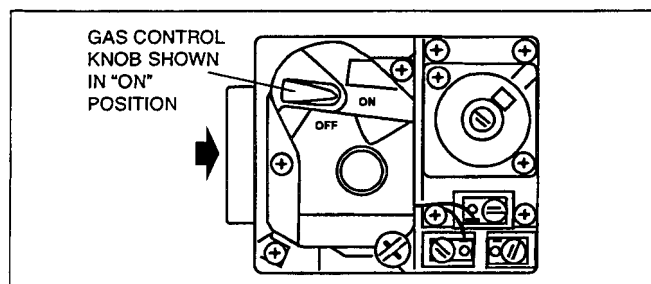


Figure 14. Example of gas control knob.

4. Set both thermostats to the lowest setting.
5. Lift the boiler top to gain access to the gas control.
6. Turn the gas control knob clockwise **C** until it stops, then push the control knob in slightly and turn clockwise **C** to "OFF". Do not force.

3B. Abnormal Operation

Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the appliance. If water leakage or any other form of abnormal operation is observed, shut off the gas at the manual gas valve, and the electricity to both the boiler and the circulation pump.

3C. Normal Operating Sequence

When the circulation pump is running, the boiler will automatically respond to changes in the water temperature. If the water cools below the temperature set on the aquastat, the following operating sequence begins:

1. The aquastat powers the ignition control.
2. The ignition control turns on the combustion fan. After an initial purge period of 35 seconds, the igniter is turned on. The igniter takes about 25 seconds to get hot; a glow can be seen through the view port on the front of the boiler.
3. When the igniter is hot enough, the ignition control powers the gas valve and the fiber matrix burner ignites. The burner flame can be seen as an orange glow through the view port.
4. The boiler will continue to operate until the aquastat senses that the water is up to the temperature, then shuts off power to the ignition control. The combustion fan continues to run for about 1 minute to blow all combustion products out of the boiler.

If the igniter fails to light the burner in Step 3 (for example, if there is air in the gas line), the ignition control shuts off the gas valve after a few seconds of operation. The purge and ignition sequence is automatically repeated. If there is no ignition after three tries, the ignition control "locks out" until the problem is corrected.

3D. High Limit Checkout

After running the boiler for a long enough period to bring the water temperature within the range of the high limit, slowly back off the high limit setting until the boiler shuts off. The main burners should re-ignite when the high limit is turned back up to its original setting and the high limit is reset.

3E. Periodic Inspection

Regular inspections by trained service personnel will keep the boiler operating efficiently throughout the year. The following guidelines are suggested for this inspection:

1. Make sure there is no accumulation of flammable materials, leaves, paper, etc. around or beneath the boiler.
2. Inspect the condensate disposal system to be sure that condensate flows freely.
3. Examine the burner/heat exchanger by opening the top of the boiler. Look for signs of overheating, corrosion, etc. Conduct a normal operating cycle and make sure all components operate properly.
4. Make a periodic visual check of the igniter and main burner by looking through the view port. See Section 3C.
5. Verify that the flow switch operates properly by shutting the circulating pump off and on a few times. The burner should go off shortly after the pump stops, and an ignition sequence should start shortly after it starts.
6. The combustion air filter should be regularly inspected and cleaned of accumulated dust, leaves, etc.
7. Inspect and clean the air openings on the rear panel and vent stack outlet regularly of any material such as leaves, etc. that would obstruct the flow of combustion air or flue gases.
8. Manually operate the pressure relief valve once a year.
9. Low water cut-offs should be inspected every six (6) months, including flushing of float types.

Keep this manual in a safe place for future reference by you and your qualified service technician when inspecting or servicing the boiler.

SECTION 4. Trouble-Shooting Guide

4A. General

A qualified service technician must service the Hi-E boiler. The following procedure identifies typical system problems.

4B. System Problems

Experience has shown that most complaints about boilers failing to turn on have nothing to do with the boiler directly. Usually, something has reduced water flow through the boiler, causing safety switches to shut

down the boiler. Any of the following problems could cause the boiler to fail to operate. Check these items first:

⚠ Caution:

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

Verify proper operation after servicing.

Be sure the boiler has been properly installed (see Section 2).

Make sure the pump is not airlocked, clogged or otherwise inoperative.

Make sure the gas valve is ON and there is gas pressure in the line.

Carefully inspect all electrical connections and wiring. Finding a loose connection or a charred wire can save a lot of time and money.

Verify that the electrical circuit serving the boiler is ON.

Make sure the switch on the side of the boiler is in the ON position.

Verify that the temperature controller is set high enough to call for heat.

If the pump is circulating water, and the rest of the items listed above check out, the problem could be in the boiler control system.

SECTION 5.

Parts List

To obtain or order parts for the Hi-E heater, check with your nearest Teledyne Laars dealer or distributor. They have many of the commonly needed parts in stock. If your dealer cannot supply you, contact Service Manager, Teledyne Laars, 6000 Condor Dr. Moorpark, California, 93021, telephone (805)529-2000.

Description	Part Number
GAS/AIR SYSTEM	
1. Gas Orifice, Natural	10646801
1A. Gas Orifice, LP	10646802
2. Gas Valve	V0072100
3. Burner Assembly	L0056800
4. Venturi	10583200
4A. O-ring, Venturi (not shown)	S0081200
5. Air Filter	A0078500
6. Combustion Blower, Amatek	A0079200
7. Gasket, Burner/Fan	S0080500
8. Wing Nut	F0045300
9. Igniter	W0038000
9A. Gasket, Igniter	W0038100
10. Filter Cap Retainer	10626300
11. Filter Cap Weldment	10623400
ELECTRICAL SYSTEM	
12. Venturi Pressure Switch	E0115200

Description	Part Number
13. High Limit Switch, set at 195°F	E0106500
14. Temperature Control	E0014400
15. Transformer, 115/24V	E0097400
16. Ignition Control	E0130700
17. Fusible Link Assembly	E0099303
18. High Limit, Manual Reset	E0015900

WATER SYSTEM

19. Pressure Relief Valve, 75 psi	A0063300
20. In/Out Header	10689900
21. Return Header	10578300
22. Gasket, In/Out Header	S0080100
23. Gasket, Return Header	S0080000
24. Gasket, Flange, 1-1/2" Pipe	S0078000
25. Sleeve for Flange	S0078200
26. Flange	10573500
27. Flange Bolts	F0031700
28. Drain Cock	P0058700
29. Drain Plug, 1/8" NPT	P0071300
30. Flow Control Ca	10694000
31. Flow Control Gasket	S0074100
32. Flow Control Cap Bolt	F0033900
33. Header Bolt	F0013300
34. Barrier, In/Out Header, Vertical	10599200
35. Barrier, In/Out Header, Horizontal	10599300
36. Barrier, Return Header	10599400
37. Heat Exchanger Tube Assembly	10619001
38. Flow Switch	E0013000
39. Well, Temperature Control	E0025900

Combustion Chamber/Flue Gas System

40. Burner Shroud	10620800
41. Insulation, Front	T0024500
41 A. Insulation, Rear	T0024700
41 B. Insulation, Sides	T0024600
42. Side Panel	10619600
43. Sight Glass	F0044800
44. Condensate Pan	10620200
45. Gasket, Combustion Chamber, Side	S0080300
45A. Gasket, Combustion Chamber, End	S0080400
46. Header Clamp Bar, Burner	10607300
47. Header Clamp Bar, Condensate Pan	10607400

48. Side Baffle Assembly	10619800
49. Gasket, Side Panel	S0080200
50. Gasket, Burner Stud	S0080600

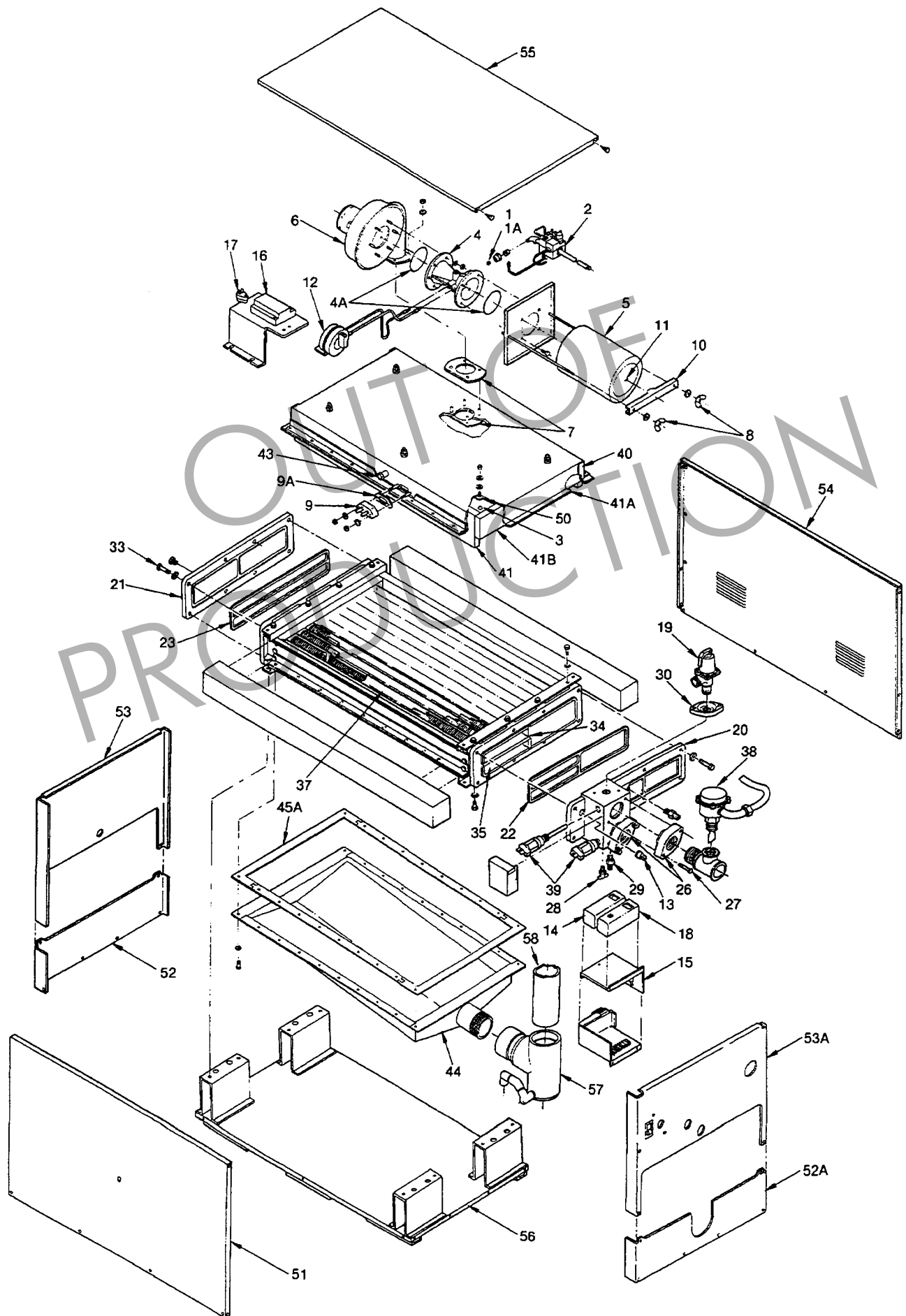
Jacket Components

51. Front Panel	10685400
52. Lower Side Panel, Left	10606300
52A. Lower Side Panel, Right	10616800
53. Upper Side Panel, Left	10603700
53A. Upper Side Panel, Right	10685900
54. Rear Panel	10617403
55. Top Cover	10684900
56. Base Assembly	10688900

Vent System

57. Vent Adapter Assembly	10686700
58. Vent Stack Assembly	10648800
59. Vent Termination Kit* (not shown)	10685700

* Indoor installations only



TELEDYNE LAARS HI-E HYDRONIC BOILER LIMITED WARRANTY

Your Teledyne Laars Hi-E Hydronic Boiler Model HHH is backed by this double warranty to assure your complete satisfaction.

1. CONTROLS, COPPER HEAT EXCHANGER TUBES, FAN MOTOR, BURNER AND FIREBOX PANELS ARE WARRANTED AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP FOR TWO (2) YEARS FROM DATE OF PURCHASE.
2. ALL OTHER PARTS ARE WARRANTED AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP FOR FIVE (5) YEARS FROM DATE OF PURCHASE.

The above warranty applies only if the installation and operating instructions applicable to the model purchased are expressly and completely followed. These instructions are furnished with the unit and are also available by writing to the Teledyne Laars factory. The liability of Teledyne Laars shall not exceed the repair or replacement of defective parts, and shall not include transportation to or from factory, field labor, and consequential or incidental damages. Ship in-operative parts or complete heater with Serial

number, Model number and purchase date, transportation prepaid, directly to address below, attention Customer Service.

This warranty gives you specific legal rights. You may also have other rights which vary from state to state, and by province. Some states and provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.



An Allegheny Teledyne Company

6000 Condor Dr., Moorpark, CA 93021* (805) 529-2000
20 Industrial Way, Rochester, N.H. 03867 (603) 335-6300
480 S. Service Road West, Oakville, Ontario, Canada L6K 2H4 (905) 844-8233



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