HAYWARD®

Installation, Operation & Service Procedures Pool and Spa/Hot Tub Heaters

Models H150, H200, H250, H300, H350 & H400

FOR YOUR SAFETY

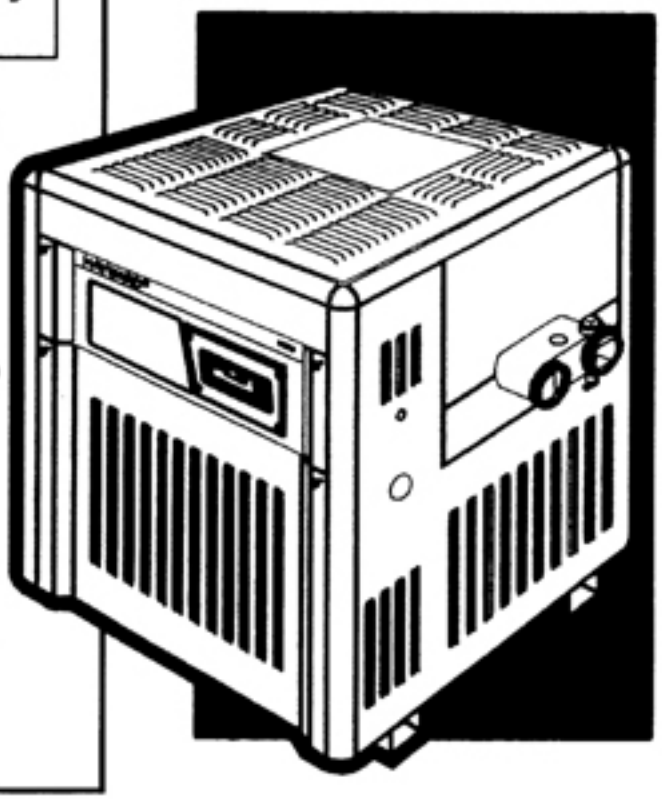
WARNING: If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury, or death.

— 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 a qualified installer, service agency or the gas supplier.



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Section I. General Information

Introduction:

This manual contains instructions for installation, operation, maintenance, troubleshooting and parts lists for the safe use of the Model H150, H200, H250, H300, H350 and H400 swimming pool/spa/hot tub heaters.

Hayward strongly recommends that the manual be read by the installer before installing the swimming pool/spa/hot tub heater. If after reviewing the manual, any questions still remain unanswered, contact the factory or local representative. Following heater installation, the installer should leave the manual with the consumer for future reference.

Hayward heaters:

The H-Series gas-fired pool/spa heater is the result of nearly 50 years in the engineering and production of the finest in water heating equipment. The direct fired finned-tube design of the pool/spa heater is the most advanced in the industry, offering highly efficient, economical pool/spa heating and scale free operation. No effort has been spared in making the pool/spa heater the most rugged, highly dependable, easy-to-maintain pool/spa heater available.

The H-Series heaters are suitable only for heating of swimming pools, spas or hot tubs. These heaters should not be used as space heating boilers, general purpose water heaters or for heating salt water pools and fish ponds. When installed and operated in accordance with the manual's instructions, the H-Series heater will provide many years of trouble-free service and increased pool/spa enjoyment.

The H-Series pool/spa heaters are so similar in design that many operating controls and other components are interchangeable. For this reason, the procedures in this manual pertain to all six models unless otherwise noted.

Limited warranty summary:

We warrant the H-Series pool/spa heater to be free from defects in materials and workmanship, and we will, within two years from date of installation for single family residential users and one year for all other users, for the original purchaser, repair or, at our option, replace without charge any defective part.

We further warrant that if the heat exchanger or exchanger headers (water-containing section) leak within two years from the date of such installation for single family residential users and one year for all other users, due to defects in materials and workmanship, we will provide a replacement part.

Under the terms of the special FireTile™ limited warranty, we will replace any FireTile™ components used in the combustion chamber of the pool/spa heater which fail from defects in workmanship and materials under normal use and service in a single family residential application for a period of five (5) years.

Cost of freight, installation, fuel, and service labor (after one year) is at user's expense. For full details of warranty agreement, see warranty certificate shipped with heater.

⚠CAUTION: If the pool/spa heater is damaged or destroyed by improper maintenance, excessive water hardness, incorrect water chemistry or freezing, it is not covered under the manufacturer's warranty.

Section II. Heater Sizing

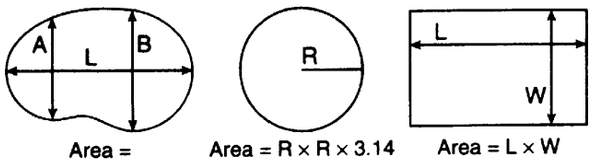
Selecting the correct size heater:

Factors influencing heater sizing include pool/spa size, average wind velocity, ambient temperature and desired increase in temperature over ambient. A pool/spa in a warm area with little or no wind will not require as large a heater as one in a cool, windy location. Detailed sizing information is provided below.

For a swimming pool:

1. Determine pool's surface area in square feet. For indoor pool installations divide the pool's surface area by 3.

Pool Surface Area
Figure 1



Area = (A+B) × L × .45

Area = R × R × 3.14

Area = L × W

2. Determine desired pool water temperature (usually 78 - 82°F).
3. Determine average air temperature of coldest month of use.
4. The temperature rise is the difference between 2 & 3.
5. Locate in Figure 2 the surface area equal to or just greater than the pool's surface area and the temperature degree rise and select the appropriate heater model.

Figure 2 is based on 3½ MPH wind velocity and elevation of up to 2,000 feet above sea level.

When not in use, keep pool covered to reduce heat loss, chemical usage and dirt load on the filtering system.

For a spa or hot tub:

Determine spa capacity in gallons (surface area × average depth × 7½).

The reference table lists the time required in minutes to raise the temperature of the spa/hot tub by 30°F. Locate in the table below the spa/hot tub size in gallons equal to or just greater than the spa/hot tub size in gallons. Select the desired time to raise the spa/hot tub temperature 30°F, read to the left and select the appropriate heater model.

This guide can be adjusted for other temperatures rises. For example, if a 15°F increase in temperature is desired, simply divide the time for 30°F rise by the ratio of 30/15 = 2.

⚠NOTE: Heat losses and/or heat absorbed by spa walls (such as concrete) or other objects will add to the heat-up time.

Spa sizing is based on an insulated and covered spa. Always cover spa or hot tub when not in use to minimize heat loss and evaporation.

Figure 2 - Recommended Heater Model

Temp. Rise °F	10°	15°	20°	25°	30°	35°
Model	Pool Surface Area In Square Feet					
H150	1385	924	693	554	462	396
H200	1848	1232	924	739	616	528
H250	2309	1540	1155	924	770	660
H300	2771	1848	1386	1109	924	792
H350	3233	2156	1617	1293	1078	924
H400	3695	2463	1848	1478	1232	1056

Figure 3 - Recommended Heater Model

Model	Spa/Hot Tub Size in Gallons								
	200	300	400	500	600	700	800	900	1,000
	Time in Minutes to Raise Spa/Tub Temperature 30°F								
H400	9	14	19	23	28	33	37	42	47
H350	11	16	21	27	32	37	43	48	54
H300	12	19	25	31	37	44	50	56	62
H250	15	22	30	37	45	52	60	67	75
H200	19	28	37	47	56	66	75	84	94
H150	25	37	50	62	75	87	100	112	125

Section III. Installation

Equipment inspection:

On receipt of the heater equipment, inspect the heater carton and optional DHI or HWS vent (if used) carton for damage. If any carton is damaged, note it when signing for it. Remove the equipment from the carton(s) and advise the carrier of any damages at once.

Important notice:

The instructions herein are intended for the use of a qualified technician, specifically trained and experienced in the installation of this type of heating equipment. Some states or provinces require that installation and service people performing the installation be licensed. If this is the case in the state or province where heater is located the contractor must be properly licensed.

⚠WARNING: Failure to comply with the appliance and vent package installation instructions and service instructions in this manual may result in equipment damage, fire, asphyxiation, or carbon monoxide poisoning. Exposure to products of incomplete combustion (carbon monoxide) can cause cancer and birth defects or other reproductive harm.

Conformance with codes:

The heater shall be installed in accordance with all local and state codes. The heater installation and vent sizing, installation and termination shall conform with the National Fuel Gas Code ANSI Z223.1 (latest edition) and with the requirements of the authority having jurisdiction. Design Certification in the United States is in compliance with American National Standard Z21-56 (latest edition).

For Canadian installations, the heater is to be installed in accordance with standards CAN/CGA - B149.1 and B149.2 - INSTALLATION CODES FOR GAS-BURNING APPLIANCES AND EQUIPMENT and/or Local Codes, and, if applicable, Standard CSA C22.1 – CANADIAN ELECTRICAL CODE, Part 1.

Sea level/high altitude installation:

The H-Series heaters may be installed up to 2000 feet of elevation above sea level. For elevations from 2000 to 4500 feet above sea level, heater shall be a high altitude model which has a suffix "H" in the heater model designation (Example: Model H400H1). For elevations above 4500 feet, consult customer service at Hayward.

Location of heater:

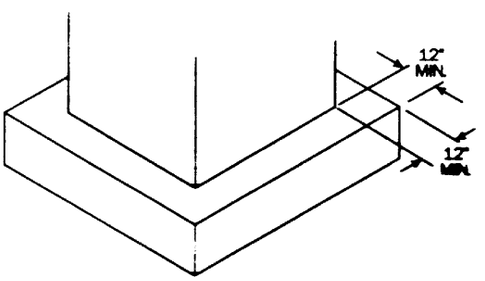
Locate the pool/spa heater in an area where leakage of heat exchanger or connections will not result in damage to the area adjacent to the heater or to the structure. When such locations cannot be avoided, it is recommended that a suitable drain pan, with drain outlet, be installed under the heater. The pan must not restrict air flow.

This heater must be installed at least five feet from the inside wall of a pool/spa unless separated from the pool/spa by a solid fence, wall or other permanent solid barrier. This heater must be installed also at least five feet from the wall of an above-ground pool.

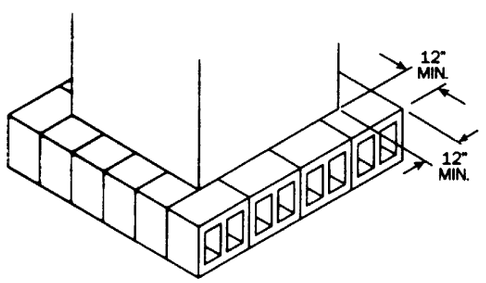
Flooring:

The H-Series pool/spa heaters must be installed on a non-combustible floor or slab. Installation on other floors may be accomplished provided the floor under the appliance is protected with hollow masonry not less than 4 inches thick covered with sheet metal of not less than 24 gauge. Such masonry must be laid with ends unsealed and joints matched in such a way as to provide a free circulation of air from side to side through masonry. The masonry must extend a minimum of 12 inches beyond the heater to all sides. See Figure 4. In all cases, floor protection is the responsibility of the installer and the installer must check to be certain that the floor is not exposed to excessive heat during extended periods of operation.

Figure 4



INSTALLATION ON CONCRETE SLAB



INSTALLATION ON BLOCKS

Outdoor/Indoor* vents:

The H-Series heaters may be installed outdoors when equipped with the integral vent (Figure 5) or the optional high wind HWS vent (Figure 6). For indoor installations, a DHI vent (Figure 7) must be used.

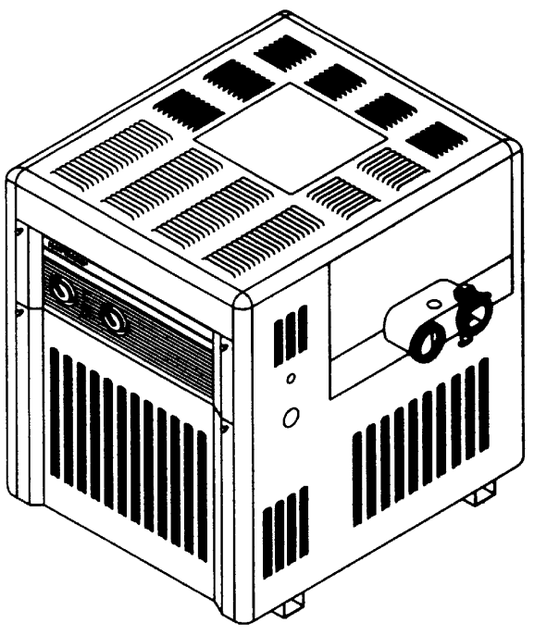
⚠ ***NOTE:** For Canadian indoor installations, these heaters can only be installed in an enclosure that is not normally occupied and does not directly communicate with occupied areas; i.e. outdoor shelter.

Check to be sure that the vent supplied with the heater is the correct one for the installation location.

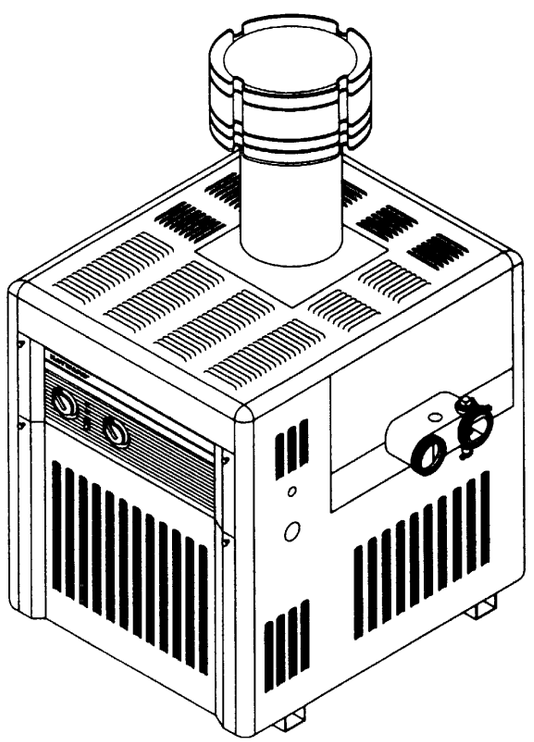
Outdoor heater-high wind conditions:

In areas where high winds are a daily occurrence, or where severe downdrafts are present due to surrounding structures, it may be necessary to install the HWS high wind vent (Figure 6). Installation instructions are provided in the carton with the HWS vent.

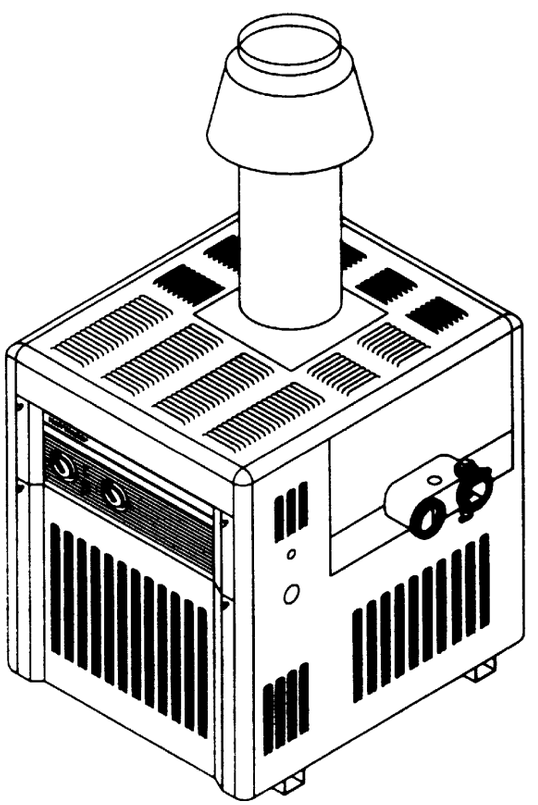
Integral Vent
Figure 5



High Wind Vent (HWS)
Figure 6



Indoor Drafthood (DHI)
Figure 7



Reversible water connections:

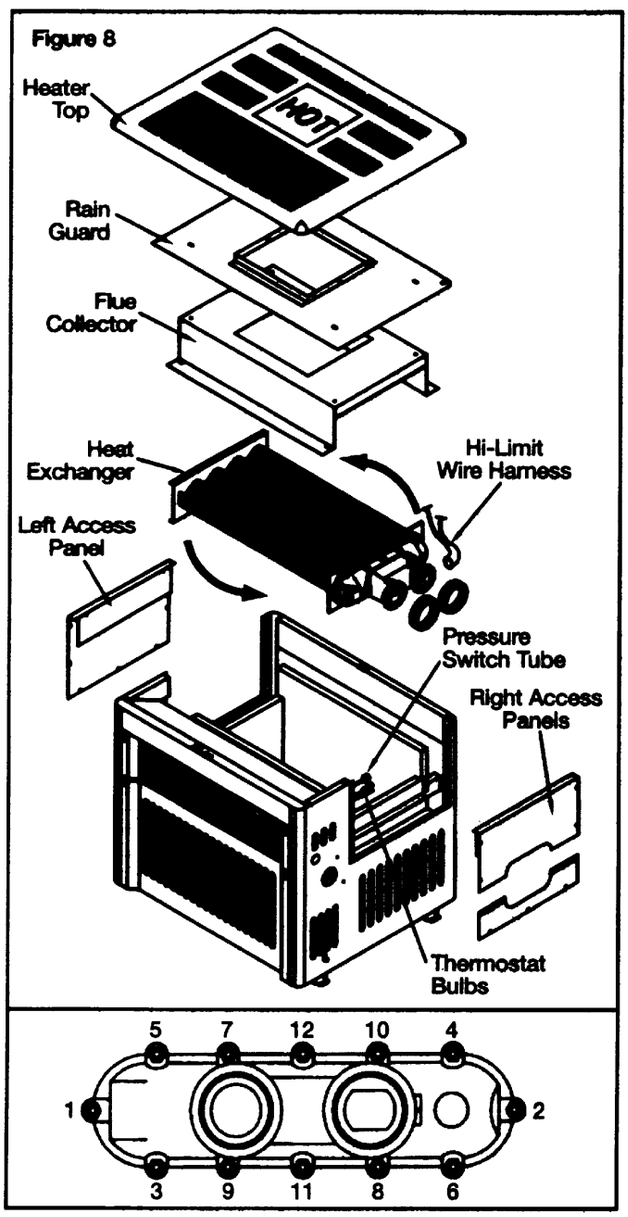
The H-Series heater is designed so that it can be installed with the water connections located on either the left or right side of the heater. Heaters are shipped from the factory with the water connections on the right side. To bring the water connections to the left side, follow the step-by-step instructions below and refer to the illustration in Figure 8. A trained service technician should perform these procedures before the heater is installed.

1. Lift up and remove heater integral vent.
2. Remove screws from left and right side access panels and remove the panels.
3. Remove screws from rear heat shield and remove heat shield.
4. Remove screws from top rain guard and remove rain guard.
5. Disconnect high limit wires from the main harness and/or terminal block. Pull the high limit wires through oval slot in the intermediate panel. Disconnect wires from the pressure switch. Reroute the disconnected main harness wires to opposite side of heater.
6. Remove the pressure switch tube and pull through oval slot in the intermediate panel.
7. **Millivolt Heaters Only** - Remove the thermostat bulb from the front header and reroute to opposite side of heater.

⚠ **NOTE:** Using needlenose pliers to pull out copper strip makes bulb removal easier. Pull thermostat capillary tube and bulb through oval slots in the intermediate panel.

⚠ **CAUTION:** Be careful not to crimp capillary tube as they could break from mishandling.

8. **Electronic Heaters Only** - Disconnect thermistor leads from control panel and pull trhough intermediate panel.
9. Remove the drain valve and brass plug from the front header and save for reinstallation.
10. Remove the four screws from the flue collector and remove flue collector from heater.
11. Remove 12 nuts retaining front header and carefully remove header. **CAUTION:** By-pass and thermal governor may become dislodged when removing front heater. They must be reinstalled properly prior to reinstallation of front header. **CAUTION:** Header O-rings may be reused if not permanently deformed. If installing new O-rings, Jack's 327 Lube may be liberally applied to O-rings to keep them in place during header installation.
12. Lift out heat exchanger and rotate it 180 degrees horizontally. **CAUTION: DO NOT FLIP IT OVER. THE HEAT EXCHANGER WILL BE DAMAGED IF INSTALLED INCORRECTLY. CAUTION:** Care must be taken not to damage top corners of combustion chamber panels.
13. Reinstall front header on heat exchanger ("TOP marking on header should now be on the bottom).
14. Torque nuts from 5 to 7 ft.-lbs. in the sequence shown in Figure 8. Install drain previously removed into the bottom header, and install brass plug into the top. Use new sealant on the threads of these parts before reinstalling. Do over tighten.
15. Move the pressure switch tube over to the left side of the heater and route through hole in the intermediate panel. Insert tube in fitting and tighten the ferrule down with the nut.
16. Replace the flue collector and secure with the four screws. Make sure insulation strips on flue collector remain in place.
17. **Millivolt Heaters Only** - Carefully route the thermostat capillary tube and bulb to the heater left side and route bulb through the oval slot in the intermediate panel. Place thermostat bulb back in the bulbwell using the copper strip to hold the bulbs all the way into the bulbwell.
18. **Electronic Heaters Only** - Route thermistor leads through intermediate panel and plug into control panel.
19. Pull high limit wires through oval slot in the intermediate panel. Reattach the main harness wires to the limit switches wires. Reattach wires to pressure switch.
20. Replace the heater front door.
21. Replace the top rain guard and secure with screws removed in step 4.
22. Replace the rear heat shield and secure with screws removed in step 3.
23. Place access covers on the opposite sides and secure with screws removed in step 2.
24. Replace heater top.
25. Check for any possible leaks after initial filtration system start-up.



Outdoor installation and venting:

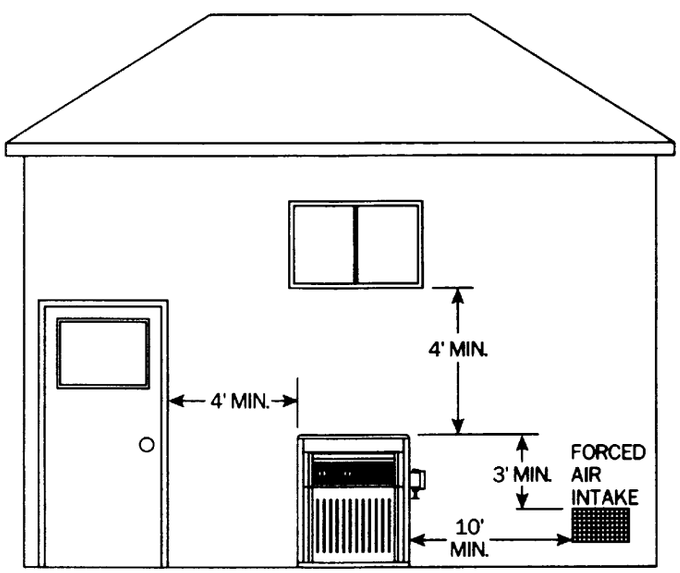
The following installation and service clearances must be maintained from surfaces to provide adequate air flow to the heater.

Outdoor Installations
Top - Open and unobstructed Front - Unobstructed Back - 6" Non-combustible floor Right side (Water side) - 12" Left side - 6"

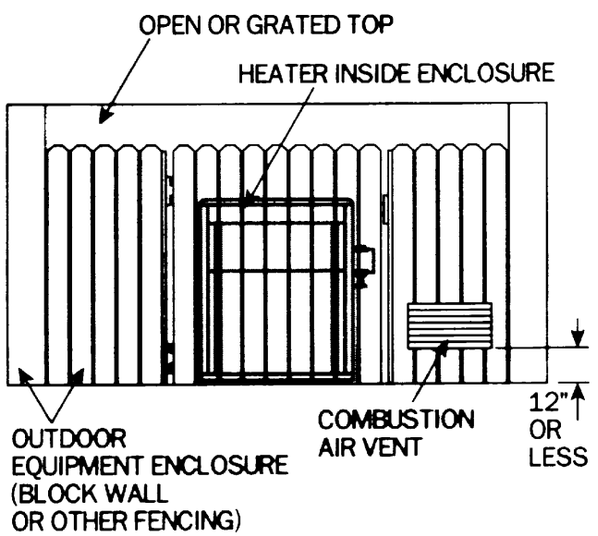
Figure 9

1. Outdoor models with integral vent or HWS vent are self-venting and do not require additional vent piping.
2. Do not install in a location where growing shrubs may in time obstruct a heater's combustion air and venting areas.
3. When locating an outdoor model consider that high winds can roll over or deflect off adjacent buildings, walls, and shrubbery to create a negative draft causing flame rollout and sooting, reducing combustion efficiency and damaging controls. Normally, placing the heater at least 2 feet from any wall will prevent this condition.
4. The venting system shall terminate at least 4 feet below, 4 feet horizontally from, or 1 foot above any door, window, or gravity air inlet into any building. The bottom of the vent terminal shall be located at least 12 inches above grade. A venting system shall terminate at least 3 feet above any forced air inlet located within 10 feet. See Figure 10.
   ⚠WARNING: (Canadian Installations Only) – The venting system shall not be installed with the top of the vent assembly within 10 feet below or to either side of any opening into the building.
5. Do not install this appliance under an overhang less than 3 feet from the top of the appliance. The area under the overhang must be open on three sides.
6. Do not install heater directly under a roof overhang edge that is not equipped with a rain gutter. Cascading rain water off the roof edge could otherwise cause pilot outage or other operating problems.
7. Do not install heater where water spray from ground sprinklers can contact heater. Sprinkler water could cause pilot outage or other operating problems.
8. Do not install within 3 feet of an air conditioning condensing unit. Blown air from a condensing unit adjacent to heater could cause pilot outage, poor combustion, or other operating problems.
9. Do not install under a deck.
10. Any enclosure around the heater must provide a combustion air vent commencing within 12 inches of the bottom of the enclosure. The vent opening shall have a minimum free area of 1 square inch per 4,000 BTU per hour of total input rating of all heaters in the enclosure. See Figure 11.

Outdoor Installation
Figure 10



Outdoor Enclosure
Figure 11



Indoor installation and venting:

The following installation and service clearances must be maintained from combustible materials.

Indoor Installations*
Top - 36"
Non-combustible floor
Front - Unobstructed
Vent - 6"
Alcove - 24"
Back - 6"
Right side (Water side) - 12"
Left side - 6"

*Canada outdoor shelters

Figure 12

Do not install in a closet!

For alcove installations, the drafthood (DHI) shall be installed so as to be in the same atmospheric pressure zone as the combustion air inlet to the pool heater.

Air supply:

Indoor installations and outdoor shelters must be provided with adequate combustion and ventilation air vents to assure proper heater operation. These vents must be sized according to the requirements stated in A. and B. below and must never be obstructed when heater is in operation.

When air blowers are used in spa/hot tub installations, caution must be observed to insure sufficient combustion air is available to the gas heater for proper combustion. A separate blower air duct is recommended.

Equipment located in confined spaces:

A. **All Air Supply From Inside The Building:** The confined space shall be provided with two permanent openings communicating directly with an additional room(s) of sufficient volume so that the combined volume of all spaces meets the criteria for an unconfined space (a space whose volume is not less than 50 cubic feet per 1000 BTUH). The total input of all gas utilization equipment installed in the combined space shall be considered in making this determination. Each opening shall have a minimum free area of 1 square inch per 1,000 BTU per hour of the total input rating of all gas utilization equipment in the confined space, but not less than 100 square inches. See Figure 13. One opening shall be within 12 inches of the top and one within 12 inches of the bottom of the enclosure.

B. **All Air Supply From Outdoors:** The confined space shall be provided with two permanent openings, one commencing within 12 inches of the top and one commencing within 12 inches of 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.

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. See Figure 14.
2. When communicating with the outdoors through vertical ducts, 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. See Figure 14.
3. When communicating with the outdoors through horizontal ducts, each opening shall have a minimum free area of 1 square inch per 2,000 BTU per hour of total input rating of all equipment in the enclosure. See Figure 15.
4. When ducts are used, they shall be of the same cross-sectional area as the free area of the openings to which they connect. The minimum dimension of rectangular air ducts shall be not less than 3 inches.

⚠**NOTE:** For more detailed methods of providing air for combustion and ventilation, refer to latest edition of the National Fuel Gas Code, ANSI Z223.1.

1 Square Inch Per 1000 BTU Per Hour		
Input	Combustion Air	Ventilation Air
150,000	150 square in.	150 square in.
200,000	200 square in.	200 square in.
250,000	250 square in.	250 square in.
300,000	300 square in.	300 square in.
350,000	350 square in.	350 square in.
400,000	400 square in.	400 square in.

Figure 13

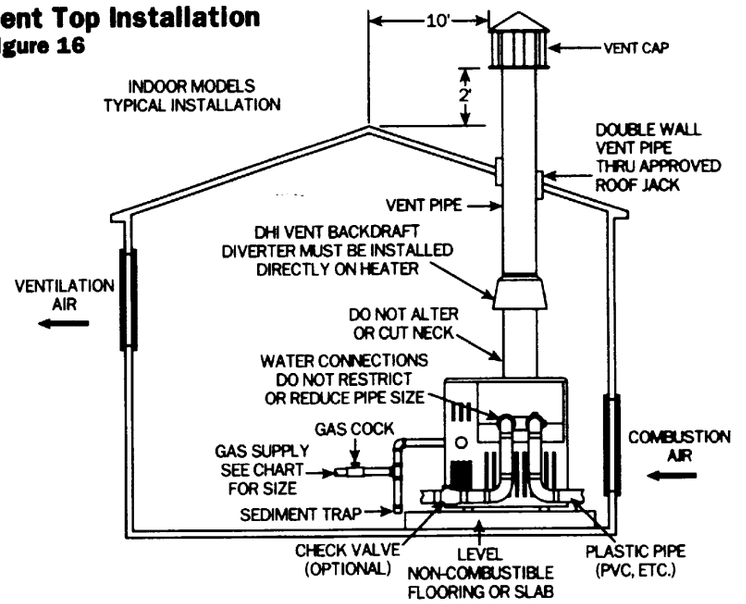
1 Square Inch Per 4000 BTU Per Hour		
Input	Combustion Air	Ventilation Air
150,000	37.5 square in.	37.5 square in.
200,000	50 square in.	50 square in.
250,000	62.5 square in.	62.5 square in.
300,000	75 square in.	75 square in.
350,000	87.5 square in.	87.5 square in.
400,000	100 square in.	100 square in.

Figure 14

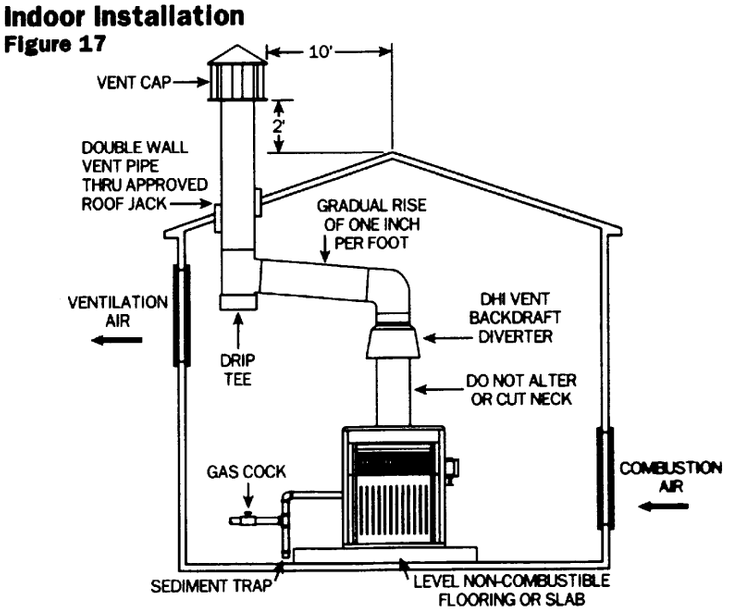
1 Square Inch Per 2000 BTU Per Hour		
Input	Combustion Air	Ventilation Air
150,000	75 square in.	75 square in.
200,000	100 square in.	100 square in.
250,000	125 square in.	125 square in.
300,000	150 square in.	150 square in.
350,000	175 square in.	175 square in.
400,000	200 square in.	200 square in.

Figure 15

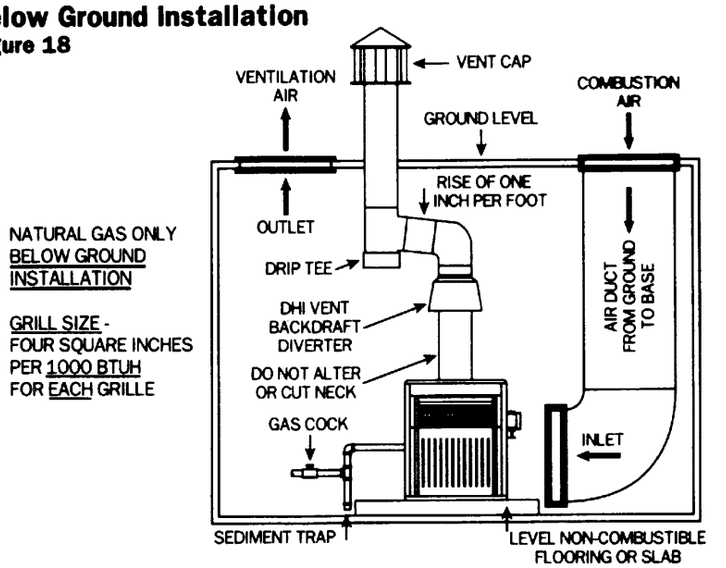
Vent Top Installation
Figure 16



Indoor Installation
Figure 17



Below Ground Installation
Figure 18



Venting:

Locate the pool/spa heater as close as practical to a chimney or gas vent. See Figures 16, 17 and 18. Do not alter back draft diverter (DHI) in any way. Install draft diverter (DHI) on top of heater.

Vent material should be of blued steel or galvanized steel with double wall construction when passing through walls or a ceiling. Vent size diameters for the H-Series heaters are as per Figure 19.

Vent Size Diameters	
Model	Vent Diameter
H150	6"
H200	7"
H250	7"
H300	8"
H350	9"
H400	9"

Figure 19

The discharge opening of the vent must be at least three feet above the roof surface and at least two feet higher than any portion of a building within ten feet horizontally. The vent stack shall be at least five feet in height above the drafthood outlet. The vent cap location shall have a minimum clearance of 4 feet horizontally from electric meters, gas meters, regulators and relief openings.

The weight of the vent or chimney must not rest on the heater drafthood. Support must be provided in accordance with the applicable codes. The DHI drafthood must be easily removable for maintenance and inspection. The vent pipe must be supported to maintain proper clearances from combustibles.

Venting extending above the roof by more than five feet should be guyed or braced above or below the roof to protect the vent from wind and/or snow damage.

Gas supply and piping:

Refer to the charts on Figure 20 for gas pipe sizing for low pressure natural gas, low pressure single stage propane gas and high pressure two stage propane gas systems.

Gas pipe size:

Follow local gas codes for proper gas line material selection (copper, iron or plastic pipe etc.)

LOW PRESSURE NATURAL GAS PIPE SIZING: (Based upon gas pressure of 0.5 psig or less and a pressure drop of 0.5 inch W.C.)

DISTANCE FROM METER TO INLET OF GAS VALVE	MODEL	H150	H200	H250	H300	H350	H400
	BTU	150,000	200,000	250,000	300,000	350,000	400,000
	LINE MATERIAL	IRON OR PLASTIC PIPE	IRON OR PLASTIC PIPE	IRON OR PLASTIC PIPE	IRON OR PLASTIC PIPE	IRON OR PLASTIC PIPE	IRON OR PLASTIC PIPE
0 to 50 feet		3/4"	1"	1"	1 1/4"	1 1/4"	1 1/4"
50 to 100 feet		1"	1"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
100 to 200 feet		1 1/4"	1 1/4"	1 1/4"	1 1/2"	1 1/2"	1 1/2"
200 to 300 feet		1 1/4"	1 1/4"	1 1/2"	2"	2"	2"

LOW PRESSURE PROPANE GAS PIPE SIZING "SINGLE STAGE": (Based upon gas pressure of 11 inches W.C. inlet pressure at a pressure drop of 0.5 inch W.C.)

DISTANCE FROM OUTLET OF TANK REGULATOR TO INLET OF GAS VALVE	MODEL	H150		H200		H250		H300		H350		H400	
	BTU	150,000		200,000		250,000		300,000		350,000		400,000	
	LINE MATERIAL	IRON PIPE	TUB-ING	IRON PIPE	TUB-ING	IRON PIPE	TUB-ING	IRON PIPE	TUB-ING	IRON PIPE	TUB-ING	IRON PIPE	TUB-ING
0 to 50 feet		3/4"	7/8"	3/4"	7/8"	1"	1 1/8"	1"	1 1/8"	1"	1 1/8"	1"	–
50 to 100 feet		3/4"	1 1/8"	1"	1 1/8"	1"	1 1/8"	1"	–	1 1/4"	–	1 1/4"	–
100 to 200 feet		1"	1 1/8"	1"	–	1 1/4"	–	1 1/4"	–	1 1/4"	–	1 1/4"	–
200 to 300 feet		1"	–	1 1/4"	–	1 1/4"	–	1 1/4"	–	1 1/4"	–	1 1/2"	–

It is ***VERY IMPORTANT,*** when installing a propane heater on a two (2) stage regulation system, to follow the gas line sizing chart below—without exception.

HIGH PRESSURE "TWO STAGE" SYSTEMS:

HIGH PRESSURE PROPANE GAS PIPE SIZING "FIRST STAGE": (Based upon gas pressure of 10 psig inlet pressure at a pressure drop of 1 psi.)

DISTANCE FROM OUTLET OF 1st STAGE REGULATOR TO INLET OF 2nd STAGE REGULATOR	MODEL	H150		H200		H250		H300		H350		H400	
	BTU	150,000		200,000		250,000		300,000		350,000		400,000	
	LINE MATERIAL	IRON PIPE	TUB-ING	IRON PIPE	TUB-ING	IRON PIPE	TUB-ING	IRON PIPE	TUB-ING	IRON PIPE	TUB-ING	IRON PIPE	TUB-ING
0 to 50 feet		1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
50 to 100 feet		1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	5/8"	1/2"	5/8"
100 to 150 feet		1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	5/8"	1/2"	5/8"	1/2"	5/8"

LOW PRESSURE PROPANE GAS PIPE SIZING "SECOND STAGE": (Based upon gas pressure of 11 inches W.C. inlet pressure at a pressure drop of 0.5 inch W.C.)

DISTANCE FROM OUTLET OF 2nd STAGE REGULATOR TO INLET OF GAS VALVE	MODEL	H150		H200		H250		H300		H350		H400	
	BTU	150,000		200,000		250,000		300,000		350,000		400,000	
	LINE MATERIAL	IRON PIPE	TUB-ING	IRON PIPE	TUB-ING	IRON PIPE	TUB-ING	IRON PIPE	TUB-ING	IRON PIPE	TUB-ING	IRON PIPE	TUB-ING
0 to 10 feet		1/2"	5/8"	1/2"	5/8"	1/2"	3/4"	3/4"	3/4"	3/4"	7/8"	3/4"	7/8"

Figure 20

All gas installations:

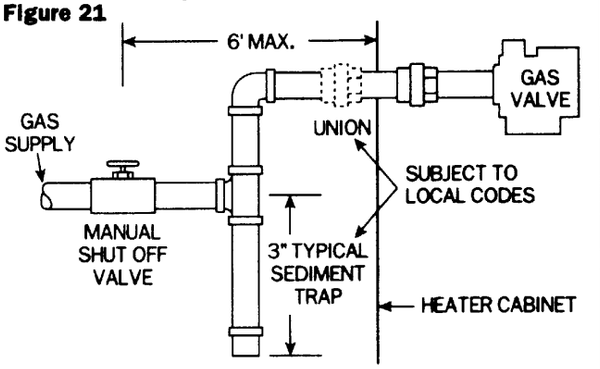
The H-Series heater is to be installed with a gas connection located on the left side (or right side, if necessary). Insert the pipe to the gas valve through the star-slit black plastic cap in the cabinet side. It is recommended that a ground-joint union be installed inside (or outside if space does not allow) the heater cabinet to facilitate servicing the burner assembly tray. See Figure 21.

An A.G.A. Certified main gas valve shutoff must be installed outside of cabinet and within 6 feet of the heater. Gas shutoff valve must have an I.D. large enough to supply the proper amount of gas volume to the heater.

⚠NOTE: Apply joint compounds (pipe dope) sparingly and only to the male threads of pipe joints. Do not apply joint compound to the first two threads. Use joint compounds resistant to the action of liquefied petroleum gas. Do not over tighten the gas inlet pipe or damage may result. See Figure 21.

To prevent dirt and moisture from entering gas valve, a sediment trap should be installed in the gas line close to the valve. See Figure 21.

Sediment Trap
Figure 21



Do not use flexible appliance connectors on any gas connections unless the connector is A.G.A. approved for outdoor installation, is marked with the BTUH capacity (which must be equal to or greater than the heater rated input), and the type of gas (Natural or LP) to be used.

Reduction of the gas supply pipe or tubing to the inlet of the heater gas valve must be made at the valve only and must match the valve inlet size (3/4").

If more than one appliance is installed on the gas line, consult the local gas company for the proper gas line size.

Any questions concerning the installation of the proper gas line size can be directed to Hayward Technical Service. Telephone numbers can be found in Troubleshooting Guide Section.

NATURAL GAS

The gas meter must have the capacity to supply enough gas to the pool heater and any other gas appliances if they are on the same pipeline (Example: 225 meter = 225,000 BTUH). If doubt exists as to the meter size, consult local gas utility for assistance. Hayward **will not** be responsible for heaters that soot up due to improper meter and gas line sizing resulting in improper gas volume.

PROPANE GAS

All propane gas tanks must be located outdoors and away from pool/spa structure and in accordance with the standard for storage and handling of propane gas, ANSI/NFPA 58 (latest edition) and applicable local codes. If propane gas tank is installed underground, the discharge of the regulator vent must be above the highest probable water level.

Propane tanks must be sufficient capacity to provide adequate vaporization for the full capacity of the equipment at the lowest expected temperatures. Consult a propane company expert for correct sizing.

⚠NOTE: Whenever a high pressure double regulation system is utilized for propane gas, consult a propane professional for accurate pipe and pressure sizing. Make sure that 1st and 2nd stage regulators are large enough to handle the BTUH input listed for the heater(s) being used.

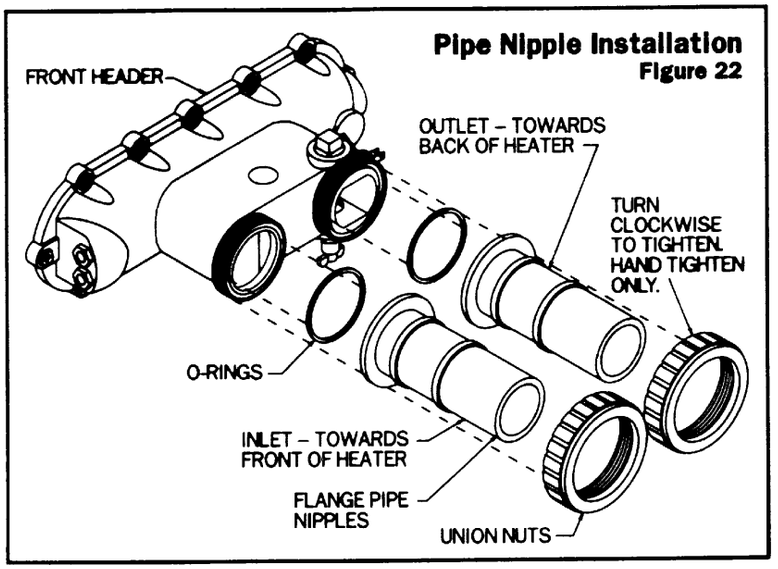
Hayward **will not** be responsible for heaters that soot up due to improper gas line or Propane tank sizing resulting in improper gas volume.

Water piping:

The H-Series heater is designed for use with pool and spa/hot tub water only, as furnished by municipal water distribution systems. The warranty does not cover heater use with mineral water, sea, salt or other non-potable waters.

Do not install any restriction in the water pipe between heater outlet and pool/spa with the exception of a three-way switching valve and an in-line chlorinator and associated check valve. Blockage of water flow from heater return to pool may result in

Pipe Nipple Installation
Figure 22



fire or explosion causing property damage, personal injury or loss of life.

PLUMBING CONNECTIONS

1. The H-Series heater is equipped with CPVC SCH-80 flanged pipe nipples, union nuts, neoprene O-rings for use with 2" pipe connections. Figure 22 shows the method for installing these parts on the front header.

NOTE: Assemble these parts to heater prior to plumbing. Tighten union nuts securely before gluing fittings to ends of pipe nipples.

2. The CPVC SCH-80 flanged pipe nipples must be installed on the heater inlet and outlet without modification. CPVC SCH-80 plastic has an ASTM rating of F441 and is NSF approved. The opposite ends of the pipe nipples should be attached to the filtration system as particular installation dictates.
3. Pipe, fittings, valves and any other element of the filter system may be made of plastic materials, if acceptable by the authority having jurisdiction. 1½" plastic pipe if used, will slide directly into the flanged pipe ends.
4. Heat sinks (heat traps), fireman switches and check valves are not necessary on the H-Series heaters. However, if there is any chance of "back-siphoning" of hot water when the pump stops running, it is suggested that a check valve be used on the heater inlet pipe.
5. The vari-flo by-pass that is built into the front header will maintain proper flow through the heat exchanger if the flow rate is within the range for the heater. See Figure 23.

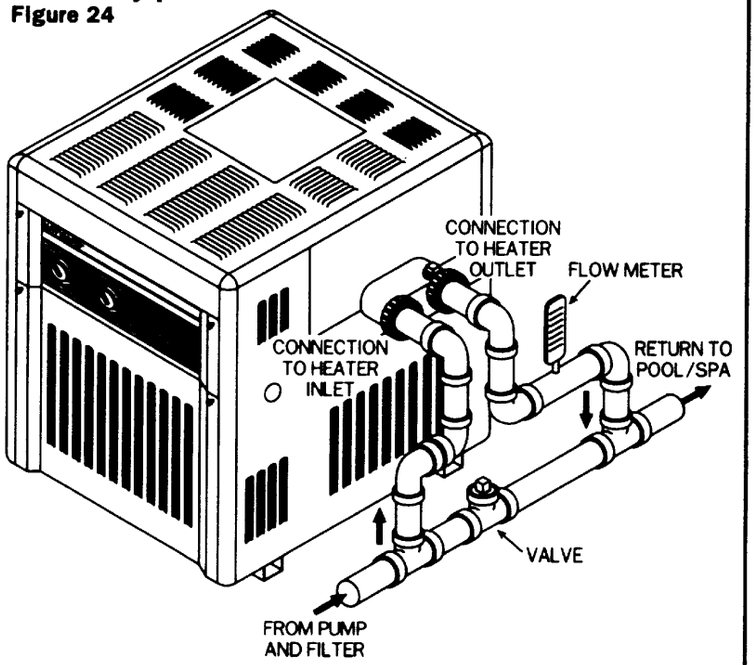
RECOMMENDED FLOW RATE IN GPM

Model	Minimum	Maximum
H150 - H400	25	125

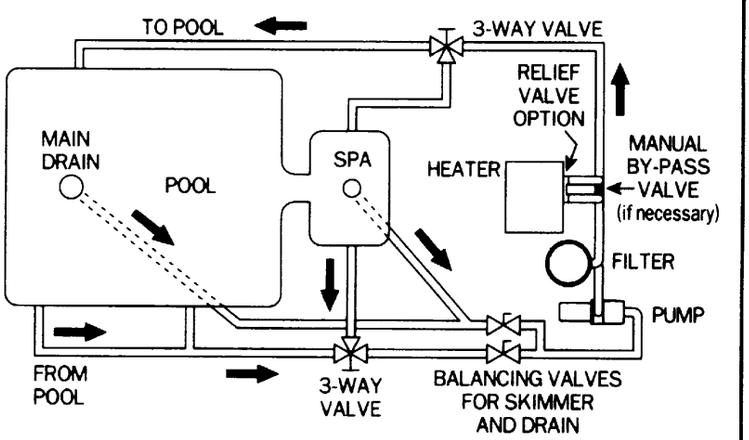
Figure 23

6. If the normal pump and filter system flow rate exceeds 125 gpm then a manual by-pass valve, as shown in Figure 24, must be installed as follows: Install a flow meter on the outlet line of the heater. Adjust the manual by-pass valve until the flow rate is within the rates required for the heater. Once the valve is set, the position should be noted and the valve handle removed to avoid further adjustment.
7. Figure 25 shows a typical pool piping diagram and layout for pool equipment. Figure 26 shows multiple heater usage for very large pools with and without an external by-pass (balancing) valve.

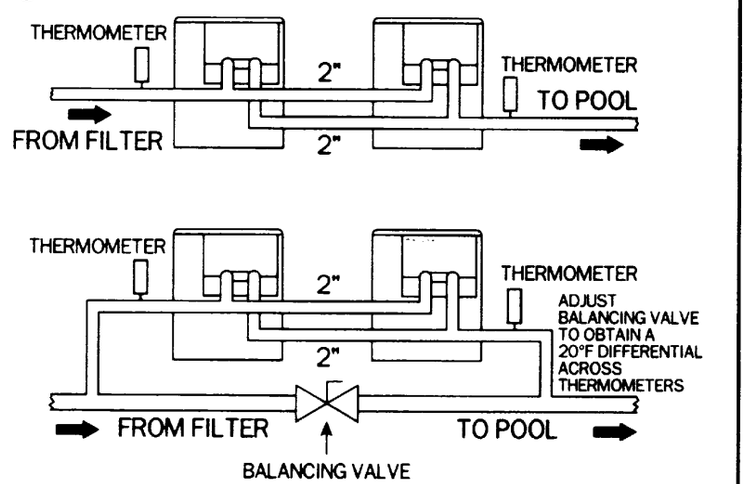
Manual By-pass Valve
Figure 24



Typical Plumbing To Pool
Figure 25



Multiple Heater Hookups
Figure 26



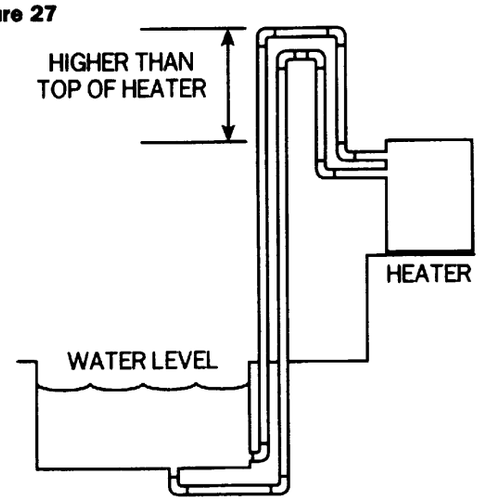
Installation above pool/spa surface:

If heater is installed less than three (3) feet above the surface of the pool/spa water, install eyeball fittings or directional flow fittings on the end of the return water line to the pool/spa to create adequate back pressure at the heater to operate the pressure safety switch when filter pump is running.

If heater is installed more than three (3) feet above surface of pool/spa water, install a loop as shown on Figure 27 to prevent drainage of water in heater during filter change.

For installation below pool/spa surface, refer to Section IV.

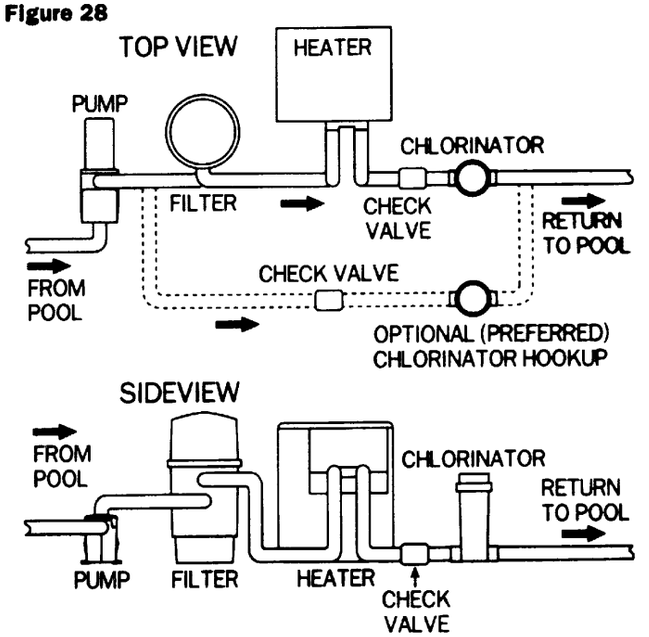
Heater Installation Above Pool
Figure 27



Automatic chlorinators and chemical feeders:

If used, a chlorinator must be installed downstream from the heater in the pool return line and at a lower elevation than the heater outlet connection. See Figure 28. Install a separate positive seal, corrosion resistant check valve (EXAMPLE: Rainbow Plastics #17288 or #172323) between the heater outlet and chlorinator to prevent highly concentrated sanitizers from back-siphoning into the heater. Back-siphoning usually occurs when the pump is shut off and a pressure-suction differential is created.

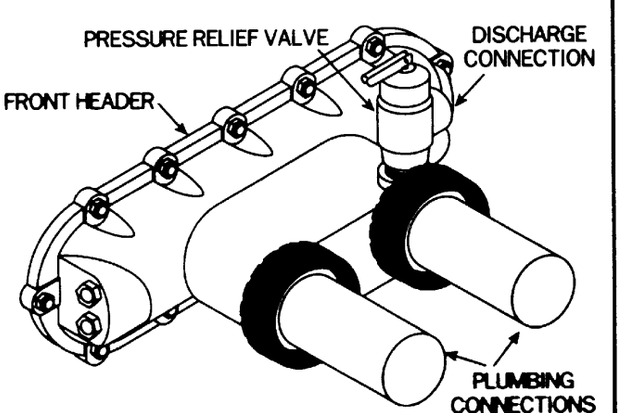
Automatic Chlorinator
Figure 28



Pressure relief valve:

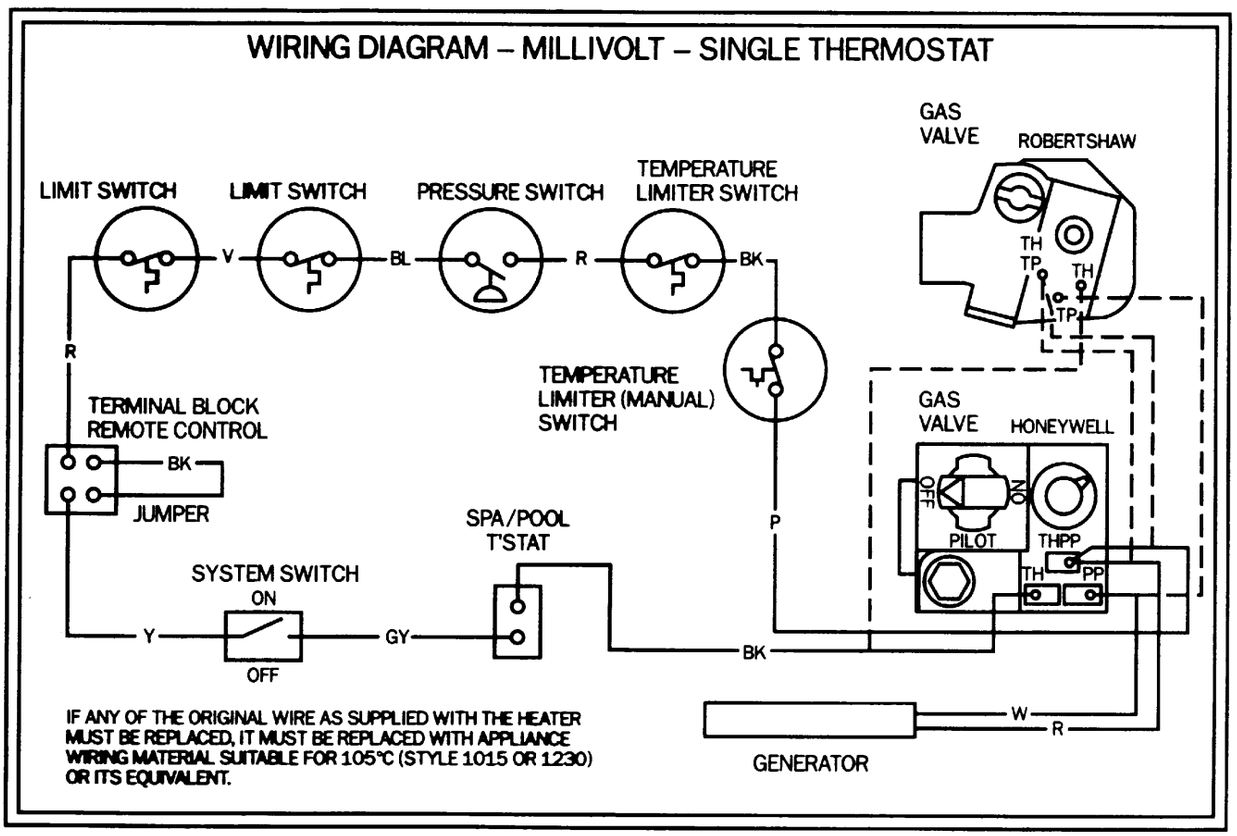
It may be necessary to install a pressure relief valve to conform with local building codes. A 3/4" pressure relief valve with a discharge capacity greater than or equal to the BTUH input of the heater and a pressure relief rating less than the heater working pressure is recommended (see rating plate.

Pressure Relief Valve
Figure 29



A 3/4" NPT connection is provided in the front header for installation of a pressure relief valve. See Figure 29. The valve shall be installed directly to the header in a vertical position. To avoid scalding or water damage due to relief valve operation, connect a drain pipe to the valve outlet and run the line to a safe place of discharge. The drain pipe must be at least the same size as the valve discharge connection throughout its entire length and must pitch downward from the valve. No shutoff valve or restriction shall be installed between the relief valve and the discharge of the drainline. The valve lever should be lifted at least once a year to ensure that the waterway is clear.

Wiring Diagram - Millivolt
Figure 30



Millivolt system:

The millivolt operated heater is equipped with a standing pilot and a thermopile (pilot generator). All of the electric current required to operate the controls within the heater is provided by the pilot generator. No external wiring or electrical connections are required. The system consists of seven separate controls wired in series with the gas valve. All switches in these controls must be "closed" for the main gas valve to open and allow the heater to operate. The individual controls are described in the Maintenance/Servicing section of this manual. Figure 30 shows the heater wiring for millivolt operated systems.

Electronic ignition system:

The electronic ignition system is equipped with the same basic controls as the millivolt operated heater but a direct spark ignition device (DS) is used to automatically light the main burners on each call for heat. With the DS module these controls operate on 24 volts so an external power source is required.

All wiring connections to the heater must be made in accordance with the latest edition of the National Electrical Code ANSI/NFPA 70, unless local code requirements specify otherwise. In Canada, follow CSA C22.1 – CANADIAN ELECTRICAL CODE, Part 1.

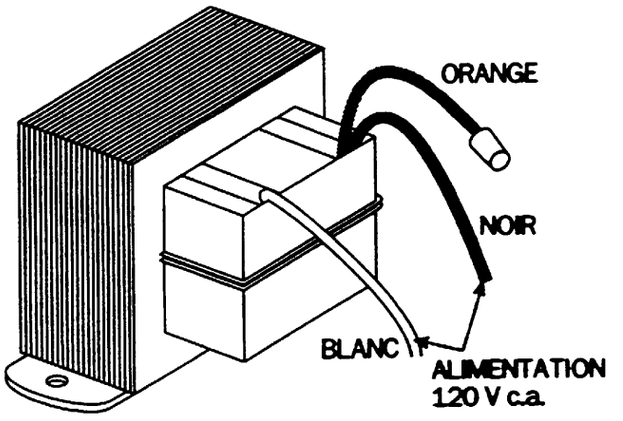
Since an external electrical source is utilized, the heater, when installed, must be electrically grounded and bonded in accordance with local codes, or in the absence of local codes, with the National Electrical Code, ANSI/NFPA 70.

The H-Series heater can be installed with the electrical connections, service entry/remote control, located on either the left or right side of the heater. Punch out the knockout slug adjacent to the controls compartment on either or both sides as necessary.

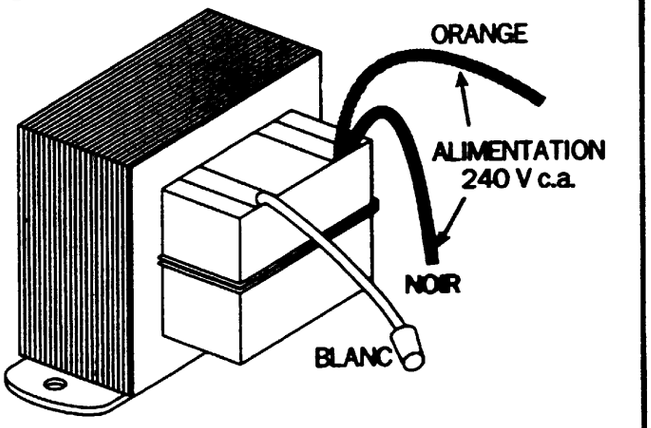
The heater is supplied with a dual voltage transformer for either 120 volt or 240 volt power supply. If the heater is to be wired in series with the pump, the electrical circuit draws only 0.3 amps. Use a 15 amp circuit breaker if heater is wired to a separate circuit.

Field wiring connections are to be made inside the junction box located behind the control access door. For a heater powered by a 120V source, refer to the wiring diagram and connect the power supply to the black (common) lead and the white (120V) lead. See Figure 31. For a pool heater powered by a 240V source, refer to the wiring diagram and con-

Connexion 120 V c.a.
Figure 31

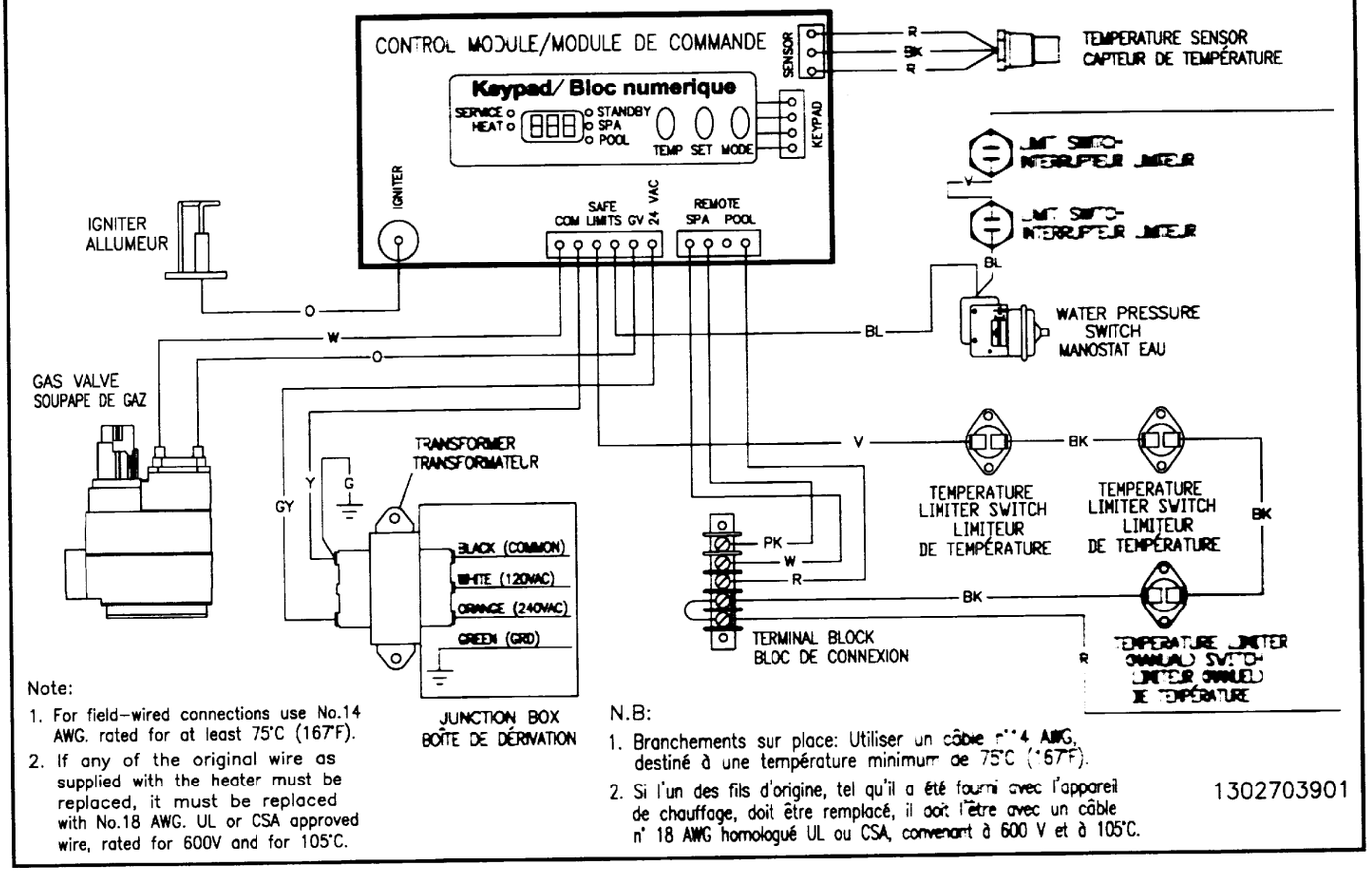


Connexion 240 V c.a.
Figure 32



Wiring Connection Diagram / Schéma de connexions

Figure 33



Note:
1. For field-wired connections use No.14 AWG. rated for at least 75°C (167°F).
2. If any of the original wire as supplied with the heater must be replaced, it must be replaced with No.18 AWG. UL or CSA approved wire, rated for 600V and for 105°C.

N.B:
1. Branchements sur place: Utiliser un câble n° 14 AWG, destiné à une température minimum de 75°C (167°F).
2. Si l'un des fils d'origine, tel qu'il a été fourni avec l'appareil de chauffage, doit être remplacé, il doit l'être avec un câble n° 18 AWG homologué UL ou CSA, convenant à 600 V et à 105°C.

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Les connexions de câblage à l'installation doivent être effectuées à l'intérieur de la boîte de dérivation située derrière la porte d'accès des commandes. Pour un appareil de chauffage alimenté par une source de 120 V, se reporter au schéma de câblage et raccorder l'alimentation au conducteur noir (commun) en au conducteur blanc (120 V). Pour un appareil de chauffage de piscine alimenté par une source de 240 V, se reporter au schéma de câblage et raccorder l'alimentation au conducteur noir (commun) et au conducteur orange (240 V). Voir Figure 32. Une patte de mise à terre à l'intérieur de la boîte de dérivation est prévue pour raccordement du fil de terre isolé vert. Remettre le couvercle de la boîte de dérivation en place et fermer le panneau d'accès au terme du câblage sur place.

La Figure 33 montre le câblage de l'appareil de chauffage pour les systèmes à allumage électronique.

Remote control connections:

A terminal block is provided in the H-Series heater control compartment for connection of a remote control system. Remote wiring should be run in a separate conduit. Do not run remote wiring parallel to high voltage wires.

Electronic Heaters

Use 22 AWG wire for runs less than 30 feet. For run over 30 feet, use 20 AWG wire. Runs should not exceed 200 feet.

The terminal block for connecting remote switches is located to the right of the electrical junction box. The dipswitch for disabling the heater's temperature thermostat is located on the circuit board. The setting of this dipswitch may need to be changed depending on the type of remote that is connected to the heater.

2-Wire Remote Thermostat:

This type of remote has its own temperature sensor for regulating the water temperature. To disable the heater's thermostat, set the bypass dipswitch to the "on" position. Wire the remote to terminals 1 & 2 of the terminal block. Do not remove the jumper clip on terminals 4 & 5.

To operate the heater by remote thermostat, the heater's control must be in either the "Pool" or "Spa" mode. The heater's display will show "bO". The "Pool" or "Spa" LED will be illuminated. The heater will fire when instructed by the remote thermostat. The heater's thermostat will function to limit the water temperature to a maximum of 104° F.

2-Wire Remote Switch:

This type of remote allows for the heater to be remotely turned off or on. The heater uses its internal thermostat to regulate the water temperature.

Connect this type of remote to terminals 4 & 5. Remove the jumper clip from 4 & 5. The bypass dipswitch should be kept in the off position.

The heater's internal thermostat will regulate the water temperature. Whenever the remote switch is off, heater will be disabled and the display will show "LO".

3-Wire Remote Switch:

A 3-wire remote allows for the "Pool" or "Spa" modes of the heater to be remotely selected. The heater uses its internal thermostat to regulate the water temperature.

Connect Pool/Low of the remote to terminal 1, Common to terminal 2, and Spa/High to terminal 3. Do not remove the jumper clip on terminals 4 & 5. The bypass dipswitch should be kept in the off position.

To operate the heater with a remote 3-wire switch, the heater's control must be in the "Standby" mode. The Standby LED will be illuminated. When the remote switch is set to "Pool/Low", the Pool LED will be energized and the display will show the Pool water temperature. When the remote switch is set to "Spa/High", the Spa LED will be energized and the display will show the Spa water temperature. The heater will use its internal thermostat to regulate the water temperature to the set point of the mode selected.

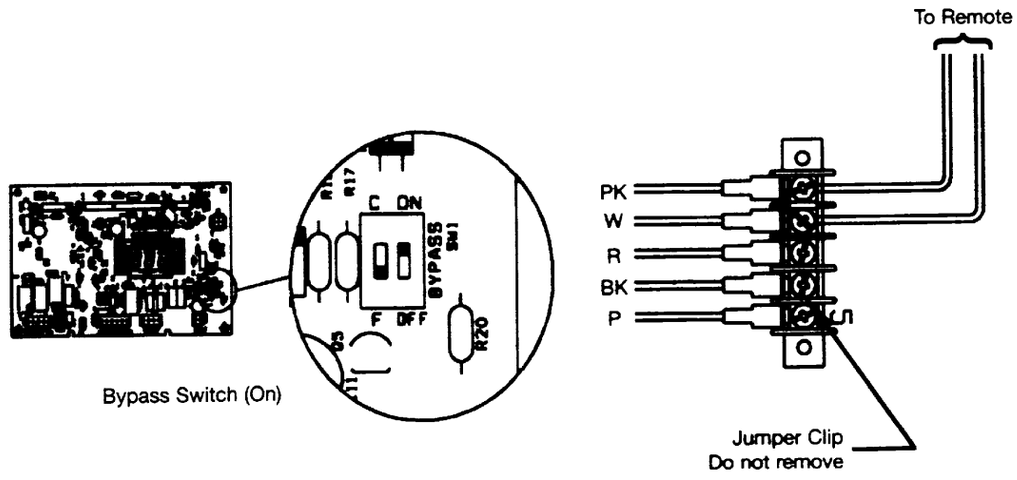
Millivolt Heaters

A terminal block for connecting 2-wire remote thermostats or switches is located on the Intermediate Panel.

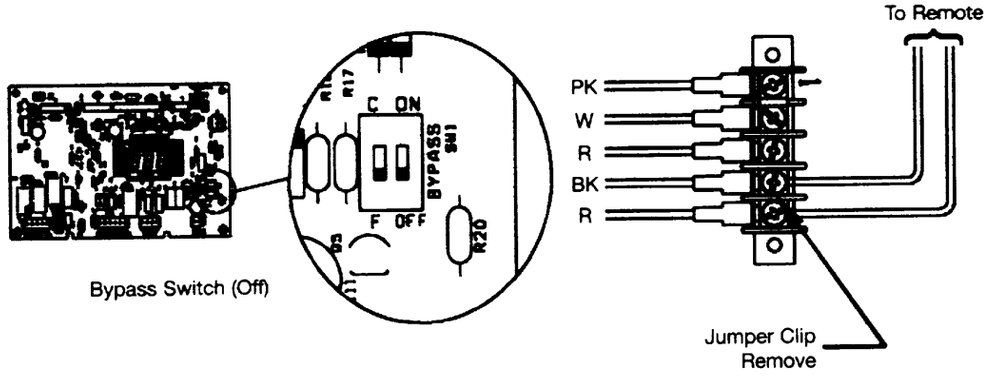
Use a high quality 22 AWG wire with corrosion resistant connections. Runs should not exceed 25 feet.

After hook-up is complete, turn thermostat to its maximum setting and move the system switch to on.

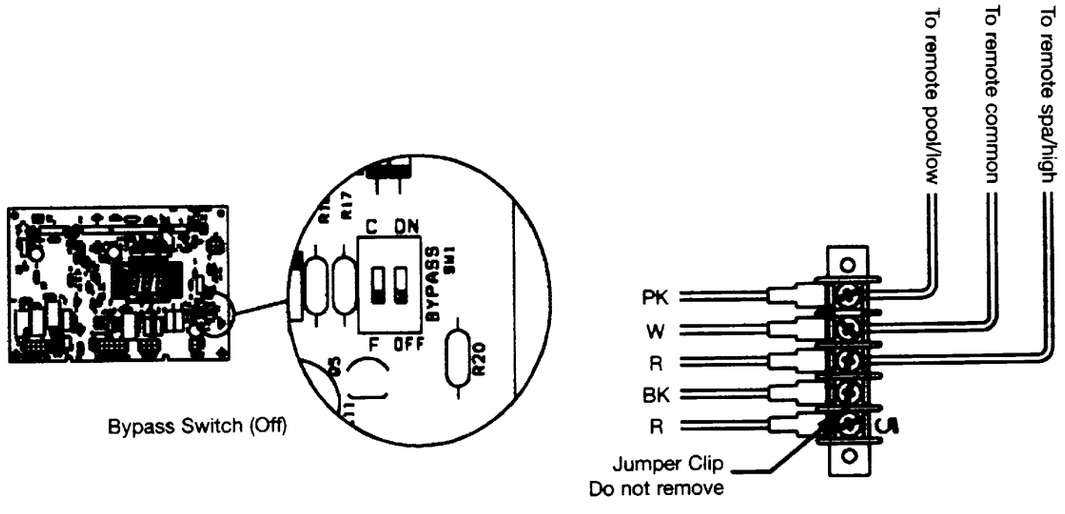
Connection to 2-wire Remote Thermostat



Connection to 2-wire Remote On/Off Switch



Connection to 3-wire Remote



Section IV. Installer Check-out And Start-up

General:

Some of the following procedures will require the heater to be operating. Full lighting and shutdown instructions are included on the lighting instructions label secured inside the cabinet. The instruction labels are shown in Figures 39 and 40. The millivolt heater must be lit manually. The electronic ignition models are lit automatically on each call for heat.

Water must be flowing through the heater during operation. Check that the pump is operating and the system is filled with water and purged of all air, prior to starting heater.

Gas line testing:

The appliance and its gas connection shall be leak tested before placing the appliance in operation. The heater and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psig (3.45 kPa). The heater must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psig (3.45 kPa).

Gas supply line must be capped when not connected. After pressure testing, reconnect the gas piping to the gas valve. Turn gas supply on and test all pipe and pilot tubing joints for leaks. Use a soap and water solution. Bubbles forming indicate a leak. ***Never use an open flame (match, lighter, torch, etc.) as a leak could cause an explosion or injury.*** Shut off gas and fix even the smallest leak right away. Be sure to leak test main burner and pilot tube fittings using above procedure once heater is in operation.

Gas pressure test procedure:

The following gas pressure requirements are important to the proper operation of the burners and pilots in gas heaters. Improper gas pressure or gas volume will create the following conditions:

1. Flame burns totally yellow.
2. Flame lifts off burner.
3. Heat exchanger soots up.
4. Pilot outage on millivolt heaters.

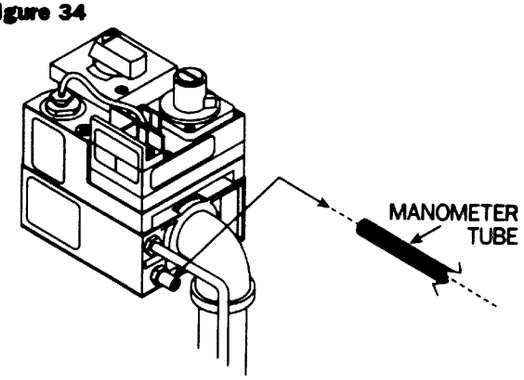
The pressure regulator on all H-Series heaters is preset at the factory and normally needs no adjustment. If gas pressure is inadequate, check for undersized piping between meter and heater or for low capacity gas meter.

A. Gas pressure test procedure:
   1. Obtain necessary equipment:
      a. Manometer to read pressure in inches of water column.
      b. 1/8" nipple (1/8" pipe thread x 1" long).
      c. 5/16" open end wrench.
      d. Screwdriver.

⚠SAFETY WARNING: Do not remove the 1/8" plug with the gas valve in the "ON" position. The gas valve must be in the "PILOT" or "OFF" position when the plug is removed.

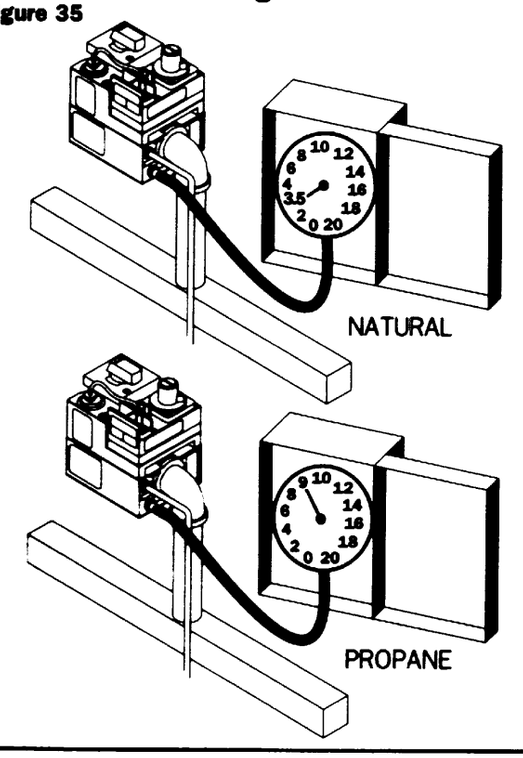
   2. Remove 1/8" plug from gas valve.
   3. Install 1/8" pipe nipple into gas valve.
   4. Attach manometer to the 1/8" pipe nipple. See Figure 34.

Gas Pressure
Figure 34

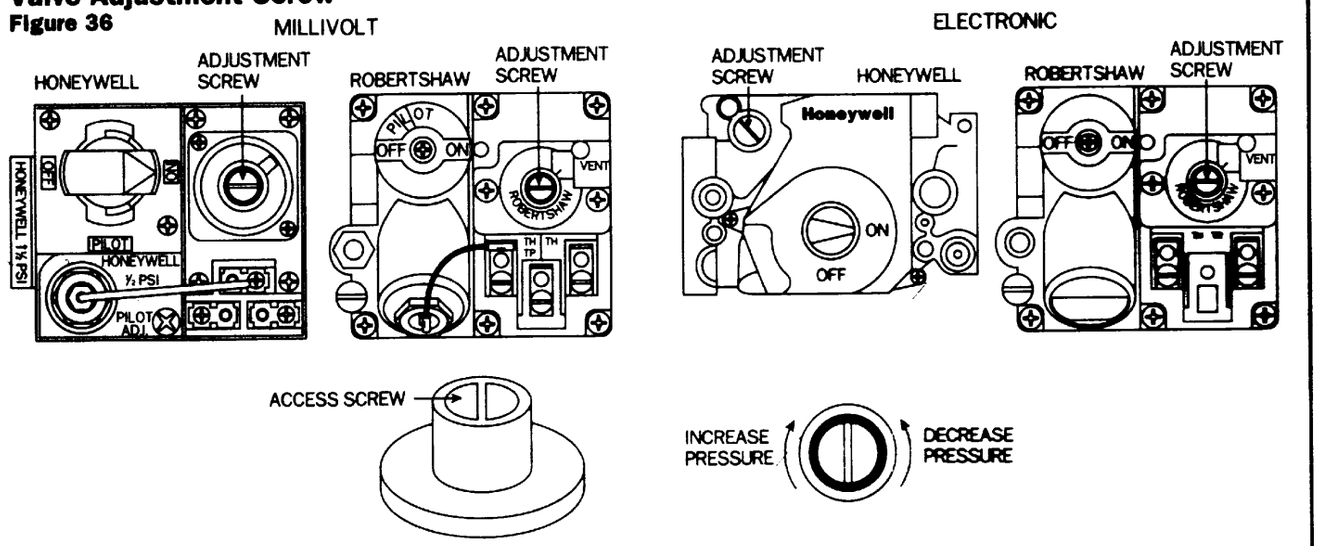


   5. Turn on water system and start heater following the lighting instructions on the label inside the cabinet. If there is more than just the pool/spa heater connected to the gas supply line, turn each of those appliances on while testing the heater.
   6. Take pressure reading with the heater running. Propane gas must have 9" W.C. (water column pressure). Natural gas must have 3.5" W.C. See Figure 35.

Gas Pressure Reading
Figure 35



Valve Adjustment Screw
Figure 36



7. If the gas pressure does not meet the above requirements the regulator must be adjusted.

B. Gas pressure regulator adjustment procedure:
   1. Remove access screw from the pressure regulator.
   2. Turn regulator adjustment screw clockwise to increase pressure and counterclockwise to decrease pressure. Replace access screw. See Figure 36.

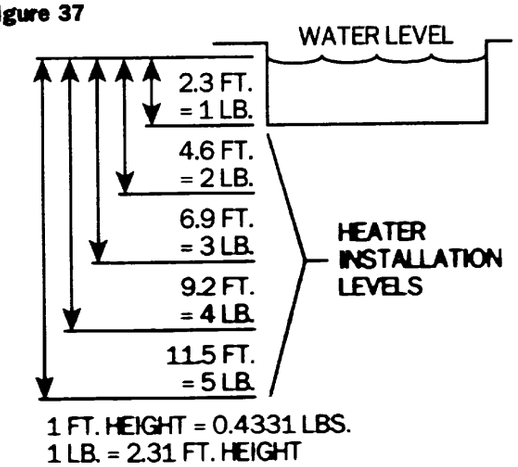
⚠SAFETY WARNING: Do not remove the 1/8" pipe nipple with the valve in the "ON" position. The valve must be in the "PILOT" or "OFF" position when the plug is removed.

   3. Remove 1/8" pipe nipple and replace 1/8" plug. If proper pressure cannot be achieved by adjusting the regulator, the installer must contact the gas supplier and request that the inlet pressure to the heater be set as follows: Natural gas - 7" W.C., Propane gas - 11" W.C. The inlet gas pressure must not exceed 10.5" W.C. (water column pressure) for Natural gas or 13" W.C. for Propane gas. Exposure to higher pressures can damage the gas control valve, causing leaks or diaphragm rupture. This damage could result in fire, explosion or burner overfiring leading to carbon monoxide poisoning. Minimum inlet gas pressure is 5.0" W.C. for Natural and 10" W.C. for Propane for the purpose of input adjustment.

Installation below pool/spa surface:

1. Clean filter thoroughly.
2. Set heater thermostat to highest setting.
3. Start filter pump. Make sure all air is out of water lines and complete system is full of water.
4. Turn filter pump off, adjust pressure switch control. (See "Pressure Switch" on Page 32.)
5. Check pressure switch function by turning filter pump on and off causing heater to respond on or off. If heater is installed beyond pressure limits, a flow switch must be installed in water line to heater.

Heater Installation Below Pool
Figure 37



Two speed pump:

In a few cases, the pressure from a two speed pump is below the one pound minimum required to operate the heater. This is apparent when the pressure switch cannot be further adjusted. In these cases the pump must be run at high speed to operate heater. If the pump and piping arrangements are such that the required one pound minimum pressure cannot be obtained, do not attempt to operate the heater. Correct the installation.

Heater installation, check-out and start-up should now be completed. BE SURE to leave Installation, Operation & Service Procedures Manual with consumer.

Section V. Consumer Operation & Maintenance Procedures

FOR YOUR SAFETY – READ BEFORE OPERATING

General:

Water must be flowing through heater during operation. Check that the pump is operating and the system is filled with water and purged of all air prior, to starting heater. In a new pool it is recommended that the filter be operated long enough to completely clean and clear the pool water and filter system.

Balance the pool/spa water chemistry and clean the filter. Then follow the instructions below.

Pool/Spa water chemistry:

See also Figure 38. The mineral content of swimming pool water increases daily due to addition of pool sanitizing chemicals and natural evaporation. Excess minerals will deposit on pool walls, in the filtration system, and in the heat exchanger tubes if the mineral content is too high.

Changing spa water regularly and maintaining correct chemical balance in pool/spa will keep the pool/spa safe and sanitary, and will protect heater and its warranty coverage. Purchase a good "DPD" water test kit and check the following chemical levels frequently:

CHLORINE OR BROMINE – Recommended level 1 to 4 ppm. Test before use.

pH – Recommended ideal level 7.4 to 7.6. **HIGH** readings reduce sanitizer efficiency. **LOW** readings are corrosive.

TOTAL ALKALINITY – 80 to 120 ppm. Test weekly during regular use. **LOW** readings are corrosive and cause rapid pH changes when chemicals are added.

CALCIUM HARDNESS – 200 to 400 ppm. Test whenever pool/spa is filled. **LOW** levels of hardness can be very corrosive.

Remember, addition of any chemicals can change levels of chlorine, pH, and total alkalinity.

It is recommended that residential spa water be changed every 2 to 3 months to prevent water problems Public spas may need to have the water changed every week, or even daily, depending on bather load.

Using chlorinators and chemical feeders:

Follow the instructions provided with any automatic or manual chlorinator and chemical feeder. All chemicals must be introduced and diluted into the pool or spa water before being circulated through the heater. **Do not place chlorine tablets or bromine sticks directly into the skimmer.** High chemical concentrations may result when the pump is not running. High chemical concentrations will cause very rapid corrosion of the heat exchanger. Such damage is not covered under warranty.

Heater operation:

Full lighting and shutdown instructions are included on the lighting instructions label secured inside the cabinet. The instruction labels are shown in Figures 39 and 40. The millivolt heater must be lit manually. The electronic ignition models are lit automatically on each call for heat.

⚠**WARNING:** If you smell gas in the appliance area or near the floor **(PROPANE IS HEAVIER THAN AIR AND HENCE SETTLES ON THE FLOOR)**, stop and follow instructions on front cover. Since propane can accumulate in confined areas, extra care should be taken when lighting propane heaters. It is always a safe practice to keep your head well away from the lower firebox opening when lighting the heater.

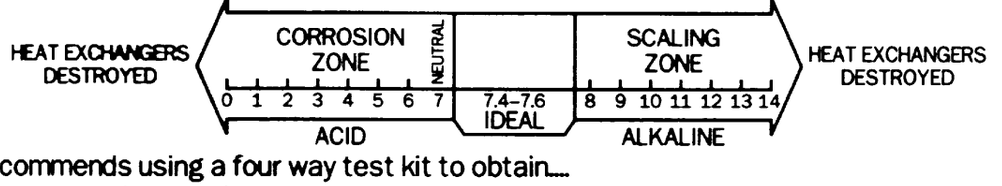
⚠**NOTE:** Do not use the unit below 40°F temperature with out adequate temperature protection. Do not operate heater while an automatic pool cleaner is in use unless the flow rate has been checked as correct under operation with the pool cleaner and a dirty filter.

Facts about water chemistry:

FACTORS which affect pool/spa water and, more importantly, the efficiency and operation of the pool/spa heater.

1. PROPER FILTRATION
2. PROPER CIRCULATION
3. DISINFECTION AND OXIDATION
4. pH CONTROL AND TOTAL ALKALINITY
5. ALGAE CONTROL

What is pH? It is the measure of the acidity or alkalinity of water. As shown on this chart, it is a critical measurement.



Hayward recommends using a four way test kit to obtain....

1. MIN./MAX. pH (7.2 - 7.8)
2. CHLORINE RESIDUAL (1.0 - 3.0 PPM), BROMINE (2.0 - 4.0 PPM)
3. TOTAL ALKALINITY (80 - 100 PPM) for calcium, lithium and sodium hypochlorite, or (100 - 120 PPM) for sodium dichlor, trichlor, and bromine.
4. CALCIUM HARDNESS (200 - 400 PPM)

Figure 38

Lighting instructions - Millivolt

Figure 39

FOR YOUR SAFETY READ BEFORE LIGHTING

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

A. This appliance has a pilot which must be lighted by hand. When lighting the pilot, follow these instructions exactly.

B. BEFORE LIGHTING, 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 appliances.
- 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.

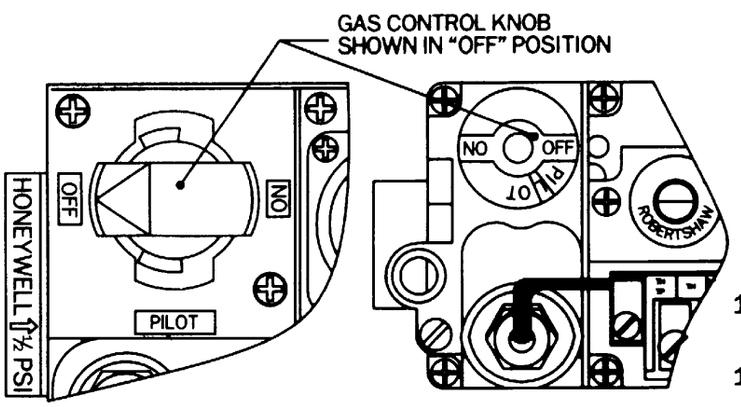
C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, do not try to repair it. Call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this heater if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

E. Should over-heating occur, or gas supply fail to shut off, turn off manual gas valve to the appliance.

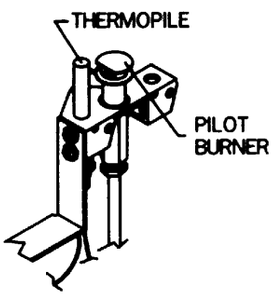
LIGHTING INSTRUCTIONS

1. Stop! Read the safety information above on this label.
2. Turn the thermostat on the control to the lowest setting.
3. Set the system switch on the control panel to the "OFF" position.
4. Remove heater front door.
5. Push in gas control knob slightly and turn clockwise to "OFF".



HONEYWELL ROBERTSHAW

6. Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go the next step.



7. Find pilot - follow metal tube from gas control. The pilot is beside the burner tube to the extreme left.
8. Turn knob on gas control counterclockwise to "PILOT."
9. Push in control knob all the way and hold in. Push the spark ignitor button several times to light pilot. Continue to hold the control knob in for about one (1) minute after the pilot is lit. Release knob and it will pop back up. Pilot should remain lit. If it goes out, repeat steps 5 through 9.
   - If knob does not pop up when released, stop and immediately call your service technician or gas supplier.
   - If the pilot will not stay lit after several tries, turn the gas control knob to "OFF" and call your service technician or gas supplier.
10. Turn gas control knob counterclockwise to "ON."
11. Replace the heater front door.
12. Set the system switch on the control panel to the "ON" position.
13. Turn the thermostat(s) on the control panel to desired setting.

TO TURN OFF GAS TO APPLIANCE

1. Turn the thermostat on the control panel to lowest setting.
2. Set system switch on the control panel to the "OFF" position.
3. Remove the heater front door.
4. Push in gas control knob slightly and turn clockwise to "OFF". Do not force.
5. Replace the heater front door.

Operating Instructions - Electronic Ignition

FOR YOUR SAFETY READ BEFORE LIGHTING

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

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

B. BEFORE LIGHTING 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 appliances.
- 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.

C. Use only your hand to turn the gas control knob. Never use tools. If the knob will not turn by hand, don't try to repair it; call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. 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 any part of the control system and any gas control which has been under water.

E. Should over-heating occur, or the gas supply fails to shut off, turn off manual gas valve to the appliance.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information on this label.
2. Change the "MODE" on the control panel to "STANDBY."
3. Remove the heater's front access panel.
4. This appliance is equipped with an ignition device which automatically lights the burners. Do not try to light the burners by hand.
5. Turn gas control knob clockwise ↷ to "OFF."

GAS CONTROL KNOB SHOWN IN "OFF" POSITION

6. Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information on this label. If you don't smell gas, go to the next step.
7. Turn gas control knob counterclockwise ↶ to "ON."
8. Replace the heater's front access panel.
9. Set the "MODE" on the control panel to "SPA" or "POOL."
10. Set the set point temperature on the control panel to the desired setting.
11. If the appliance does not operate, repeat steps 2 through 10. If the appliance still does not operate, follow instructions "TO TURN OFF GAS TO APPLIANCE" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Change the "MODE" on the control panel to "STANDBY."
2. Remove the heater's front access panel.
3. Turn gas control knob clockwise ↷ to "OFF."
4. Replace the heater's front access panel.

POUR VOTRE SÉCURITÉ LIRE AVANT L'ALLUMAGE

MISE EN GARDE: Si vous ne suivez pas exactement ces instructions, un incendie ou une explosion pourrait survenir et causer des dommages à la propriété, des blessures corporelles ou la perte de la vie.

A. Cet appareil n'a pas de pilote. Un mécanisme d'allumage automatique pour les brûleurs. N'essayer pas d'allumer les brûleurs à la main.

B. AVANT L'ALLUMAGE, sentir tour autour de l'appareil pour déceler d'éventuelles odeurs de gaz. S'assurer de sentir près du plancher parce que les gaz plus lourdes que l'air se concentrent au niveau du plancher.

QUE FAIRE EN PRÉSENCE D'ODEURS DE GAZ

- Ne pas essayer d'allumer l'appareil.
- Ne pas toucher à un commutateur électrique; Ne pas utiliser le téléphone dans la maison.
- Appeler immédiatement fournisseur de gaz chez un voisin. Suivre les instructions du fournisseur de gaz.
- Si le fournisseur ne peut pas être atteint, appeler le service des incendies.

C. Utiliser uniquement les mains pour actionner les boutons de commande du gaz. Ne jamais utiliser d'outils. Si le bouton ne s'enfonce pas ou ne se tourne pas à la main, ne pas essayer de le réparer. Appeler un technicien qualifié. L'utilisation de la force ou une tentative de réparation pourrait causer un incendie ou une explosion.

D. Ne pas utiliser cet appareil si une des composantes a été immergée dans l'eau. Appeler immédiatement un technicien qualifié pour vérifier l'appareil et remplacer toute composante du système de commande ou de gaz qui aurait été immergée dans l'eau.

E. Si le système surchauffait ou si le gaz refusait de se fermer, placer le robinet d'arrêt manuel de gaz de l'appareil en position ferme.

INSTRUCTIONS D'ALLUMAGE

1. STOP! Lire les consignes de sécurité sur cette étiquette.
2. Changer le MODE du tableau de commande à STANDBY.
3. Retirer le panneau d'accès avant de l'appareil de chauffage.
4. Cet appareil est pourvu d'un dispositif d'allumage qui allume automatiquement les brûleurs. Ne pas tenter d'allumer manuellement les brûleurs.
5. Tourner le bouton de commande du gaz en sens ↷ horaire à OFF (fermé).

BOUTON DE COMMANDE DE GAZ MONTRÉ EN POSITION "FERMÉ" (OFF)

6. Attendre cinq (5) minutes que tout gaz se dissipe. Arrêter si l'on sent alors une odeur de gaz. Suivre B dans les consignes de sécurité de cette étiquette. Passer à l'étape suivante en l'absence d'odeur de gaz.
7. Tourner le bouton de commande du gaz en sens anti-horaire ↶ à ON (ouvert).
8. Replacer le panneau d'accès avant de l'appareil de chauffage.
9. Régler le MODE du tableau de commande à SPA ou à POOL.
10. Établir la valeur de réglage sur le tableau de commande à la température désirée.
11. Si l'appareil ne fonctionne pas, répéter les étapes 2 à 10. Si l'appareil refuse toujours de fonctionner, suivre les instructions *Pour tourner le gaz à l'appareil* et appeler son technicien de service ou son fournisseur de gaz.

POUR FERMER LE GAZ SUR L'APPAREIL

1. Changer le MODE du tableau de commande à STANDBY.
2. Retirer le panneau d'accès avant de l'appareil de chauffage.
3. Tourner le bouton de commande du gaz en sens horaire ↷ à OFF (fermé).
4. Replacer le panneau d'accès avant de l'appareil de chauffage.

⚠Warning:

Do not ingest alcohol or drugs during use or prior to using pool, spa or hot tub. Ingestion of such intoxicants can cause drowsiness which can lead to unconsciousness, and subsequently result in drowning.

Do not heat pool, spa or hot tub water in excess of 102°F . A temperature of 100°F is considered safe for a healthy adult. Hotter water increases the risk of hyperthermia. Special caution is suggested for younger children.

Pregnant women beware! Soaking in water above 102°F (39°C) can cause fetal damage during first three months of pregnancy (resulting in the birth of a brain-damaged or deformed child). Pregnant women should adhere to the 100°F (38°C) maximum rule.

Before entering the spa or hot tub, users should check the water temperature with an accurate thermometer; spa or hot tub thermostats may err in regulating water temperatures by as much as four degrees Fahrenheit (2.2°C).

Persons with medical history of heart disease, circulatory problems, diabetes or blood pressure problems should obtain their physician's advice before using spas or hot tubs.

Persons taking medications which induce drowsiness, such as tranquilizers, antihistamines or anticoagulants, should not use spas or hot tubs.

If the pool/spa is used for therapy, it should be done with the advice of a physician. Always stir pool/spa water before entering the pool/spa to mix in any hot surface layer of water that might exceed healthful temperature limits and cause injury.

Do not tamper with controls, because scalding can result if safety controls are not in proper order.

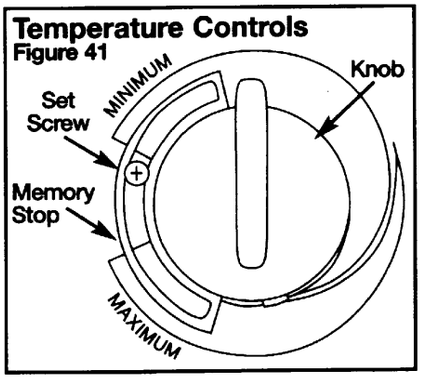
Temperature Controls:

Millivolt Heaters

Millivolt heaters are provided with a mechanical thermostat. The thermostat and system switch are mounted on the control panel. The thermostat controls the pool or spa temperature. The system switch allows one to turn the heater on or off. See Figure 41.

The memory stop provides a manual means of locking the desired maximum temperature setting of the pool or spa. Once the desired temperature setting of the knob has been determined, the memory stop is adjusted by loosening a set screw, rotating the memory stop to the knob setting, and retightening the set screw. The water temperature should be set and checked with an accurate thermometer immersed in the pool or spa.

Temperature Controls
Figure 41



Electronic Heaters

Electronic heaters are provided with a digital temperature control that can be set to heat either the pool or spa. The digital temperature control is located on the control panel. The digital thermostat contains a mode key, up and down temperature adjustment keys, a LED display, and five status LED's.

To turn the heater on, toggle the "MODE" key to "POOL" or "SPA". The water temperature will be displayed. To display the "POOL" or "SPA" set point, press the UP or DOWN key. The set point will flash while being displayed. To adjust the set point, press the UP or DOWN key until the desired set point is displayed. The display will revert back to showing the water temperature after about 15 seconds. The temperature can be displayed in either Fahrenheit or Celsius. To change to Celsius, move the position of the #1 "Dip Switch" (located on the back of the circuit board) to "C".

In the POOL or SPA modes, the actual water temperature is shown on the display. The Heating LED illuminates whenever the heater fires. If an abnormal condition is detected, the Service LED illuminates and a diagnostic code is displayed. Lists of the indicator LED's and diagnostic codes are shown below:

Status LED	
LED	**Explanation**
STANDBY	Illuminates when the heater is "off".
SPA	Illuminates when the heater is in the SPA mode.
POOL	Illuminates when the heater is in the POOL mode.
SERVICE	Illuminates when an abnormal condition has been detected. A diagnostic code will be shown on the display.
HEATING	Illuminates when heating is in progress.

Diagnostic Codes	
Code	**Explanation**
SF	Thermistore failure.
HS	Maximum water temperature exceeded.
LO	Limit string open.
IF	Ignition Failure
HF	Flame sense failure

Periodic inspection:

The H-Series heater is designed and built for long performance life when installed and operated according to the manufacturer's directions. Regular inspection by qualified service personnel is recommended to keep the heater operating properly. The following inspection points are suggested to help maximize heater life:

1. Periodically check the venting system on outdoor heaters. The heater's venting areas must never be obstructed in any way and minimum clearances must be observed to prevent restriction of combustion and ventilation air. Remember shrubs grow and in time may obstruct a heater's venting areas.
2. Check the venting on indoor heaters for looseness and possible leaks. Keep all openings for combustion and ventilation air clear and unobstructed.
3. Keep the entire pool heater area clean and free of all debris, combustible materials, gasoline and other flammable vapors and liquids. Remove any leaves or paper from around the heater.
4. Do not store chlorine, other pool chemicals, or other corrosives in the vicinity of the heater.
5. If heater is operating on Propane gas, Propane tank must not fall below 30% full or damage to the heater may occur. Hayward **will not** be responsible for heaters that soot up due to improper gas level in tank resulting in inadequate gas volume.
6. If another appliance is added to the gas line at a later date, consult local gas company to be sure the gas line will have the capacity to supply both units at full capacity at the same time.
7. Do not use the heater if any part has been under water. Contact a qualified service technician to inspect the entire heater and replace any part of the control system or gas valve that was under water. If heater has been totally submerged in water, replace the entire heater.
8. An inspection program is a good preventative maintenance measure. Keep this manual in a safe place for future reference and also for a service technician when inspecting or servicing heater. Additional inspection procedures to be performed by a qualified service technician are covered in Section VI. of this manual.

Winterization:

In moderate climate, the heater can continue to operate during short term cold spells. Do not use the heater to maintain the water temperature just above freezing or for freeze protection. Care must be taken to avoid freeze-ups in the heater. When it is used during freezing weather, the pump **must** run continuously. The heater is not warranted against freeze-ups.

In regions where freezing temperatures are encountered, all water **must** be drained from the heater when out of service, to prevent damage to the heater and piping. Draining heat exchanger is recommended as part of the season's shut-down procedures.

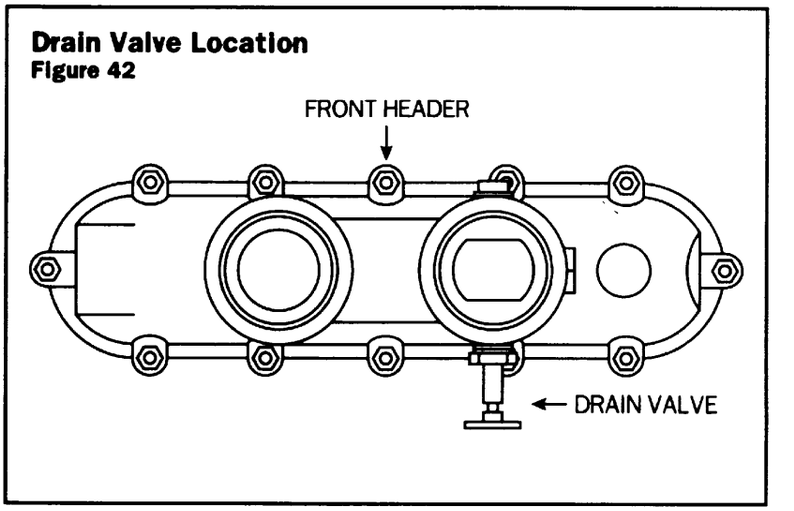
A HEATER DAMAGED BY FREEZING IS NOT COVERED UNDER THE MANUFACTURER'S WARRANTY.

Opening drain valve: (See Figure 42.)

(Above Pool Installations Only)

1. Turn heater thermostat(s) down to minimum setting. Set system switch to "OFF" position. Turn electricity off if heater has electronic ignition.
2. Turn heater gas valve to "OFF" position.
3. Turn manual gas valve outside of heater to off position.
4. Be sure circulating pump is off.
5. Open drain valve on front header and allow all water to drain from heater.
6. Leave drain valve open until spring startup.

Drain Valve Location
Figure 42



Spring start-up:

1. Inspect and clean heater, being sure heater is free of leaves and debris prior to startup.
2. Be sure inlet and outlet piping are properly attached to the unit and the drain valve is closed.
3. Turn filtration system pump on and allow system to run long enough to purge all air from the lines.
4. Turn manual gas valve outside of heater to on position.
5. MILLIVOLT HEATERS: Follow heater lighting instructions for lighting pilot and turn heater gas valve to "ON" position.
   ELECTRONIC IGNITION HEATERS: Turn electricity on, follow heater operating instructions and turn gas valve to the "ON" position.
6. Set system switch to "ON" for single thermostat heaters or to "POOL" or "SPA" position for dual thermostat heaters and turn thermostat(s) to desired temperature setting. Keep water at a safe temperature.
7. If operating difficulties are encountered, contact a qualified service company for assistance.

Section VI. Qualified Technician - Maintenance/Servicing

General:

⚠IMPORTANT: Only qualified service technicians, having appropriate test equipment, should be allowed to service the heater. Bear in mind that all of the components that comprise the system have an effect on the heater operation. Before proceeding with heater related troubleshooting tips covered in Section VII, be certain that the pump is operating correctly, the filters and strainers are not blocked, the valves in the piping are properly positioned and the time clocks are properly set.

⚠WARNING: Do not attempt to repair any components of heater. Do not modify heater in any manner. To do so may result in a malfunction which could result in death, personal injury, or property damage. Check with consumer to see if any part of heater has been under water. Replace any part of the control system and any gas control which has been under water. Never use or attempt to use parts that have previously been used.

Maintenance:

The following inspection procedures are recommended to be performed as part of annual heater maintenance and to assure safe operation.

1. External heat exchanger.
2. Internal heat exchanger.
3. Main burner and pilot (millivolt heater only) flame patterns.
4. Main burner orifices and pilot orifice (millivolt heater only).
5. Operating controls.

Inspection procedures are covered below. Some of the procedures will require disconnecting and removing wires in the control compartment. See Control Access below.

Control Access:

Access to some of the operating controls is gained by removing the control panel on the front of the heater. See Figure 43.

1. Turn the two screws counterclockwise which secure the control panel door.
2. Open the control panel to access the operating controls.
3. **⚠CAUTION:** Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.
4. Verify proper operation after servicing.
5. After servicing is complete close control panel door and secure by turning screws clockwise.

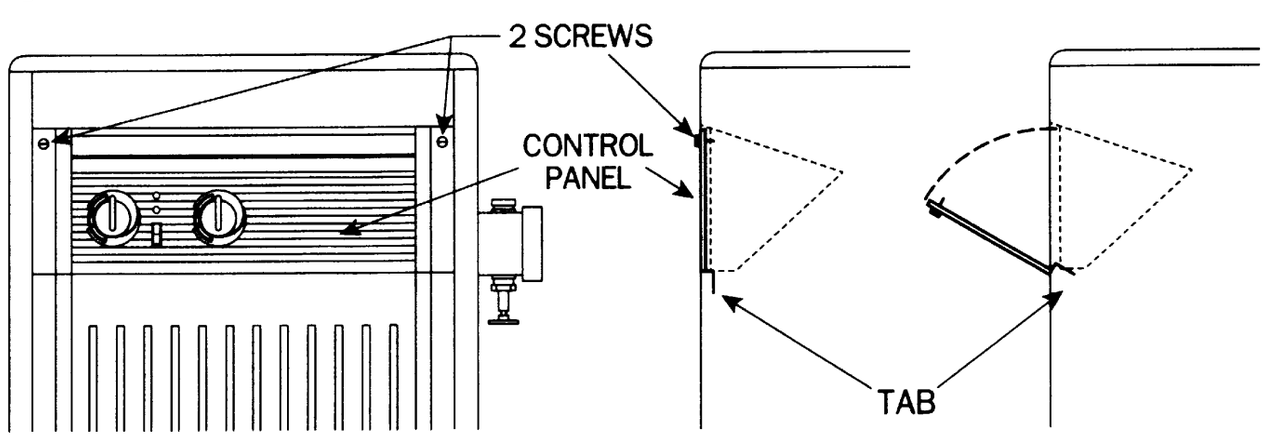
External heat exchanger inspection and cleaning:

Inspect the external surfaces of the heat exchanger for soot accumulation. If soot has accumulated on the tubes it must be removed and its cause must be corrected.

Soot on a heat exchanger may be ignited by a random spark or open flame. To prevent this from occurring, dampen any soot deposits with a wet brush or water spray before servicing or cleaning the heat exchanger. The soot can be removed with a wire brush or a high velocity water spray after the heat exchanger has been removed. (See removal procedure below.) Although the heat exchanger should be cleaned of soot and reinstalled in the heater, the fact that sooting occurred should be investigated as it may be indicative of some other problems, such as:

- Insufficient air supply.
- Inadequate venting.
- High or low gas pressure.
- Blockage of secondary air openings.
- Improper location of heater.
- Incorrect gas supply pipe size.
- Excessive water flow through heat exchanger.
- Low LP tank (below 30% full).

Control Access
Figure 43



Heat exchanger removal:

1. Shut off water, gas and electricity to the heater. See figure 8. Drain heat exchanger.
2. Lift up and remove heater integral vent.
3. Remove screws from left and right side access panels and remove the panels.
4. Remove screws from rear heat shield and remove heat shield.
5. Remove screws from top rain guard and remove rain guard.
6. Disconnect wires from limit switches on front header.
7. Remove the pressure switch tube and pull through oval slot in the intermediate panel.
8. **Millivolt Heaters Only** - Remove the thermostat bulb from the front header and reroute to opposite side of heater.

▲ **NOTE:** Using needle nose pliers to pull out copper strip makes bulb removal easier.

9. **Electronic Heaters Only** - Remove thermistor from front header.
10. Remove the four screws from the flue collector and remove flue collector from heater.
11. Loosen union nuts and detach pool plumbing from front header.
12. Lift heat exchanger off heater and desoot or replace as necessary.
13. Reverse the above procedure for reassembly.

Combustion chamber:

▲ **IMPORTANT:** Inspect the FireTile™ refractory for damage with the heat exchanger removed. Replace refractory as needed. Pull out the refractory boards individually, front and back first, then sides. Reverse procedure for reassembly.

Internal heat exchanger inspection and cleaning:

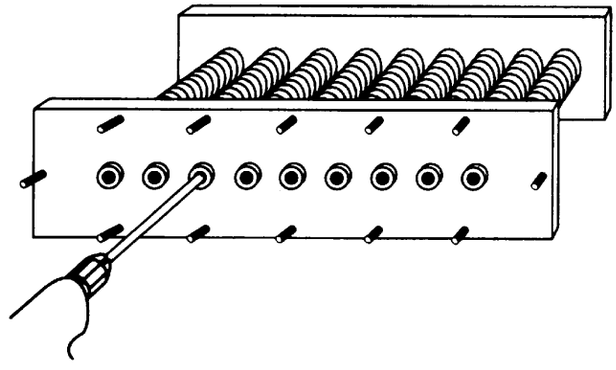
The heat exchanger should be inspected periodically for the accumulation of lime scale on the interior surfaces of the tubes.

Header Removal

1. Turn pump, main gas valve and heater power off.
2. Drain heat exchanger through drain valve on header.
3. Remove screws from left and right access panels and remove panels.
4. Remove wires from limit switches on header.
5. Remove thermistor from header.
6. Remove pressure switch tube from header.
7. Loosen union nuts and detach pool plumbing from header.
8. Remove the 12 washer-face nuts from header and remove header and O-ring. Inspect all 9 tubes of heat exchanger for any buildup of lime scale. If the heat exchanger needs to be cleaned, use the reaming or acid cleaning methods described below.

A. Reaming:
This procedure does not require removal of the entire heat exchanger from the heater. The tubes may be reamed using a carbide-tipped reamer and a 1" wire brush. For easy reaming, dry the heat exchanger first and frequently retract the reamer to remove lime powder and prevent binding. See Figure 44.

Heat Exchanger Tube Reaming
Figure 44



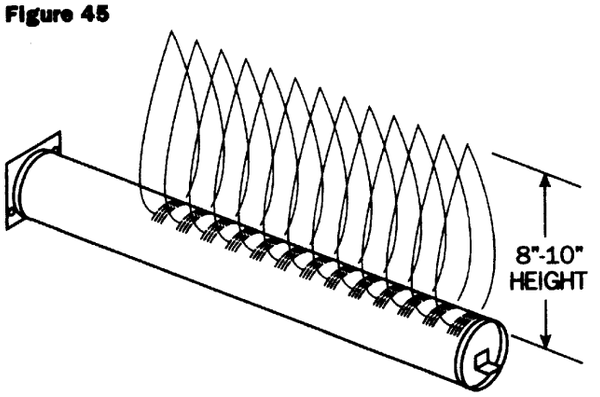
B. Acid Cleaning:
This procedure does require removal of the remaining heat exchanger from the heater. Follow steps 2, 4, 8 and 10 under Heat Exchanger Removal. The exchanger can be immersed in a muriatic acid solution (3 parts water to 1 part acid). The muriatic acid solution will remove some copper at a slow rate so care should be taken not to allow the exchanger to stay in the solution too long. When the tubes are clean, flush the assembly thoroughly with a soda-ash solution to neutralize any acid residue.
If the tubes are pitted or worn thin investigate and correct any hydraulic problems. Hydraulic problems may result from incorrect water chemistry, slow or excessive water flow, metals in the water, etc.

Reverse above procedures for reassembly. Use of a non flammable lubricant on the mounting studs is recommended before reinstalling the washer-face nuts. Tighten washer-face nuts in a random pattern and torque each nut 65 to 75 in-lbs (5.50 to 6.25 ft-lbs). The amount of scaling depends upon the local water conditions and the severity of use. The tubes should be inspected after 60 days of operation and again after 120 days of operation. A routine inspection schedule can be developed based on the amount of scale deposits found in the tubes.

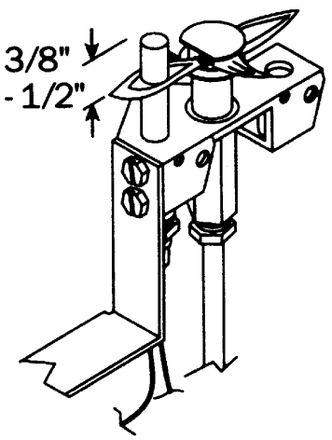
Burner inspection and cleaning:

With the heater on, remove the front door and make a visual inspection of the pilot and main burners. A mirror, placed on the heater bottom below the burners, may be necessary to view the main burner flames. The main burner flames should be about 8-10 inches in height and should not "lift" off the ports of the burners. See Figure 45. The flames should have well-defined mantles with the bottom 2-3 inches blue changing over to yellow upwards. A totally yellow or "lazy" flame may be an indication of a fuel-rich mixture due to restricted air openings, including spider nests in the burners and/or orifices.

Main Burner Flame Characteristics
Figure 45



Pilot Flame Characteristics
Figure 46



All burners should be brushed with a wire brush and be free of lint, dust and spider webs before each season of use. Burners with damaged ports must be replaced. See Figure 46 for pilot flame characteristics (millivolt heater only).

Burner assembly removal: (See Figure 47.)

1. Shut off water, gas and electricity to the pool heater.
2. Turn gas valve knob to "OFF" and set system switch to "OFF".
3. Remove wires and gas line from the heater gas valve. Remove the electrode/sensor wire (electronic ignition only) from the ignition module.
4. Remove the three bolts securing the burner mounting bracket to the intermediate panel.
5. Lift burner assembly up and out of the three retaining hooks on the intermediate panel and pull assembly out of heater.

Burner assembly installation: (See Figure 47.)

1. Guide burner assembly through intermediate panel. Lift up, and place burner mounting bracket on the three retaining hooks on the intermediate panel.
2. Secure the burner mounting bracket to the intermediate panel with three bolts.
3. Reconnect wires to the gas valve and ignition module (electronic ignition only) according to the wiring diagram.
4. Reconnect gas line to gas valve. Turn on gas and check for gas leaks. Use a soapy water solution. Bubbles forming indicate a leak. Never use an open flame (match, lighter, torch, etc.) as a leak could cause explosion or injury.
5. To start heater, follow the lighting instructions on the label inside the cabinet.

Gas valve replacement: (See Figure 47.)

⚠WARNING: Do not attempt to repair gas valve. If found to be defective replace entire valve. Attempts to repair it will void the warranty.

1 Follow "Burner Assembly Removal" procedure.
2. Disconnect wires to gas valve including pilot generator wires (millivolt only).
3. Disconnect pilot tubing from gas valve (millivolt only).
4. Unscrew gas valve from manifold pipe.
5. Replace gas valve. Only use liquid pipe dope on the male threads of the manifold. Do not place pipe dope on the first two threads of the pipe.
6. Reconnect wires to gas valve, including pilot generator wires and pilot tubing (millivolt only).
7. Follow "Burner Assembly Installation Procedure".

Pilot assembly removal: (See Figure 48.)

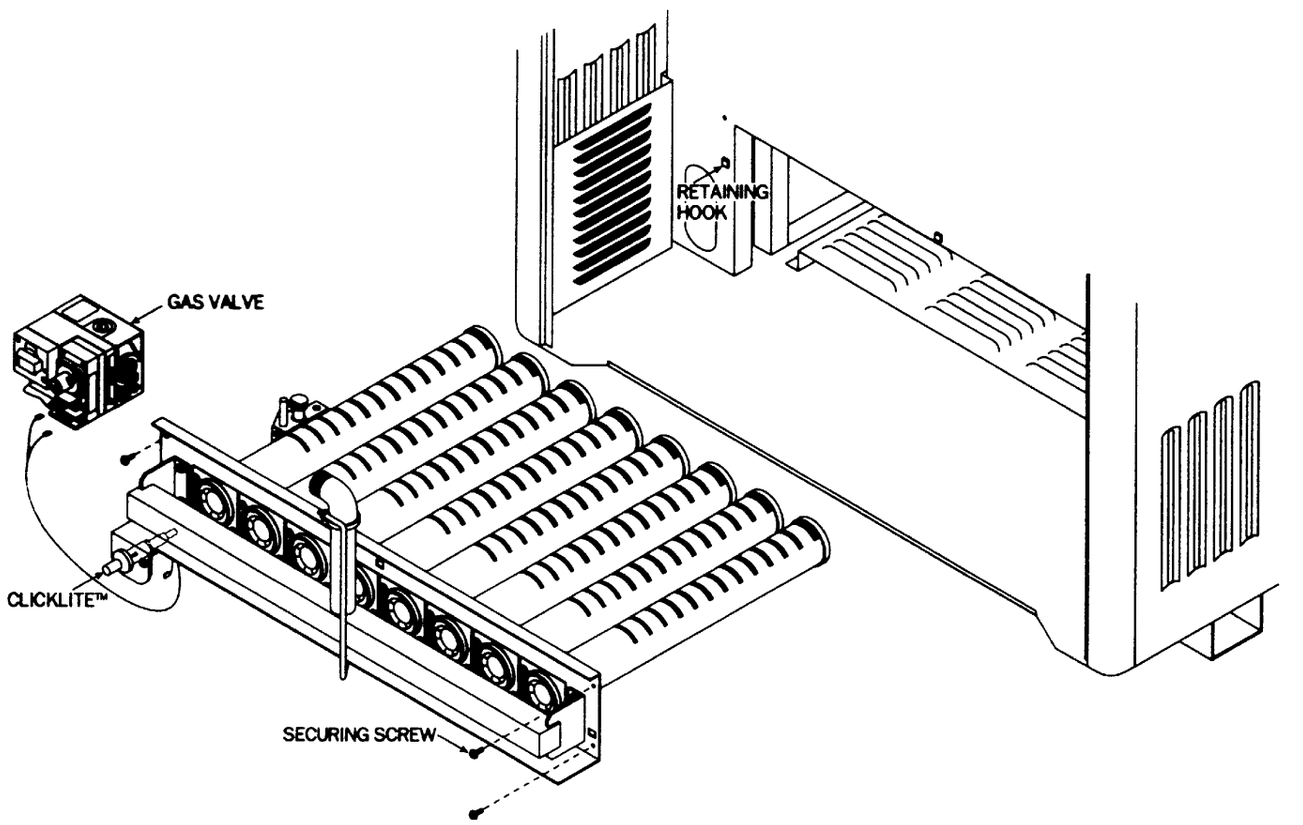
(Millivolt Heater Only)

1. Disconnect pilot generator wires and pilot tubing from gas heater gas valve.
2. Disconnect electrode ignitor wire from Clicklite™.
3. Remove screw securing pilot bracket to burner mounting bracket. Lower pilot bracket to clear locating stud and remove assembly from heater.
4. To service or replace pilot remove two screws securing pilot to pilot bracket and disconnect pilot tubing from pilot.

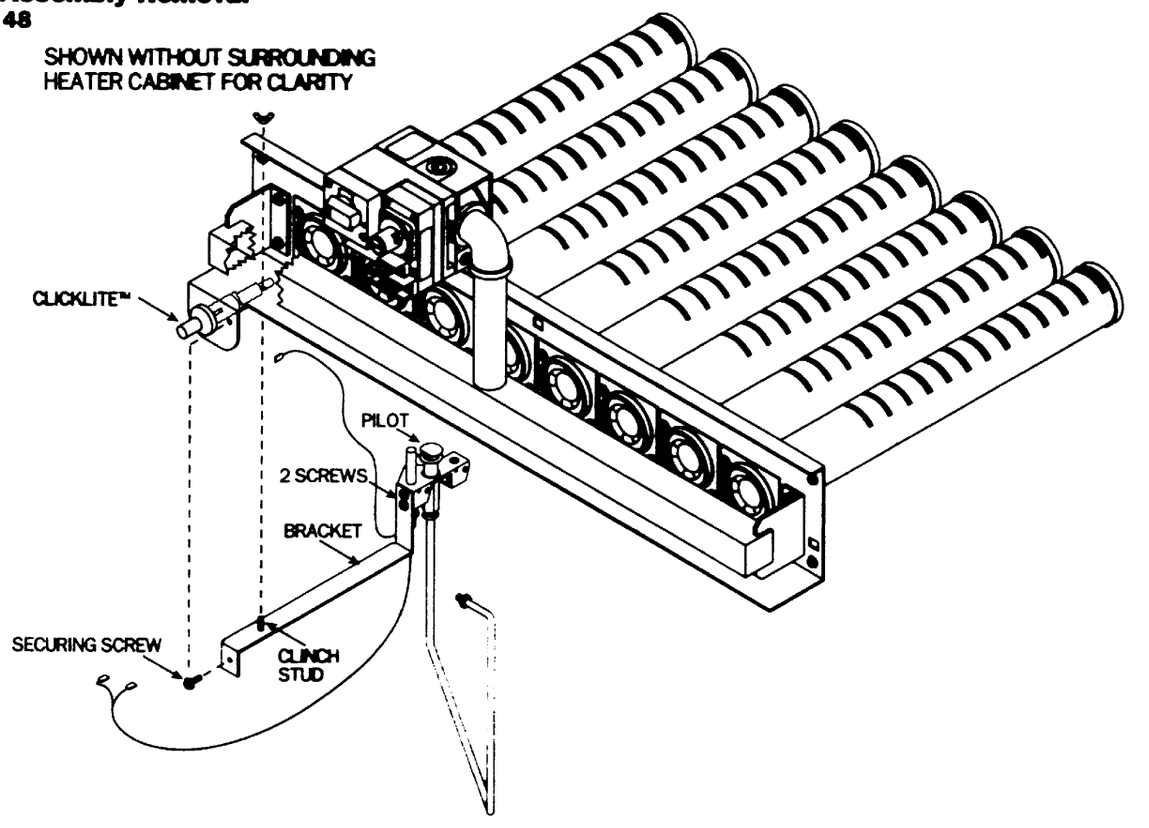
⚠CAUTION: Never enlarge the opening in the pilot orifice.

5. Reverse the above procedures for installation. Be sure there are no gas leaks at pilot tubing connections.

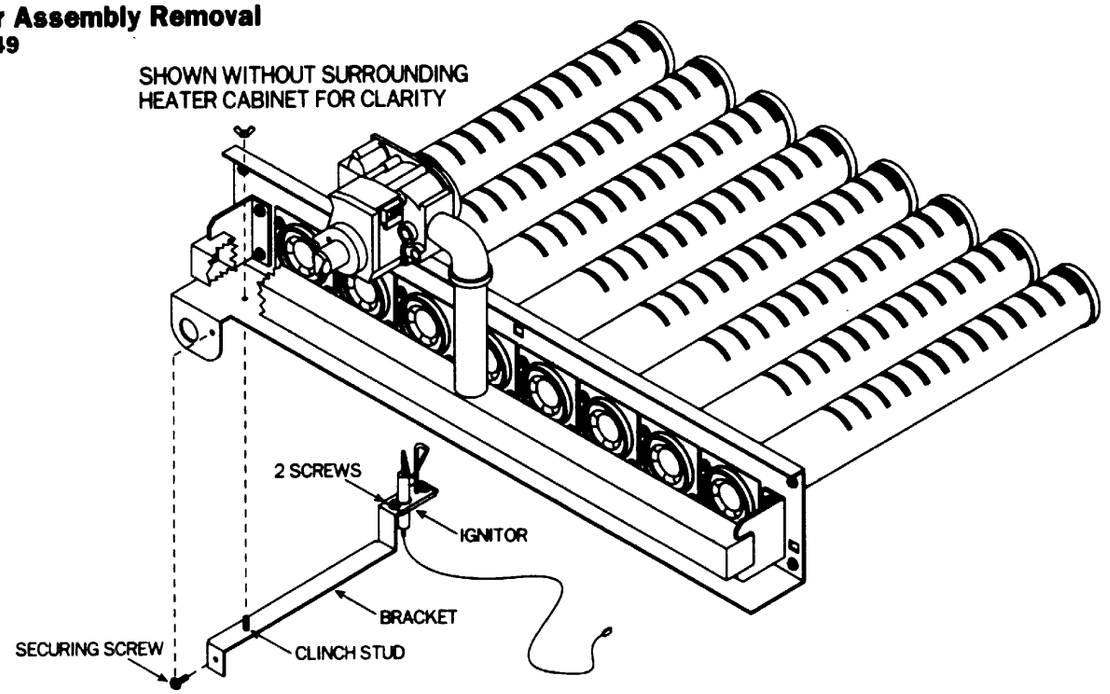
Burner Removal
Figure 47



Pilot Assembly Removal
Figure 48



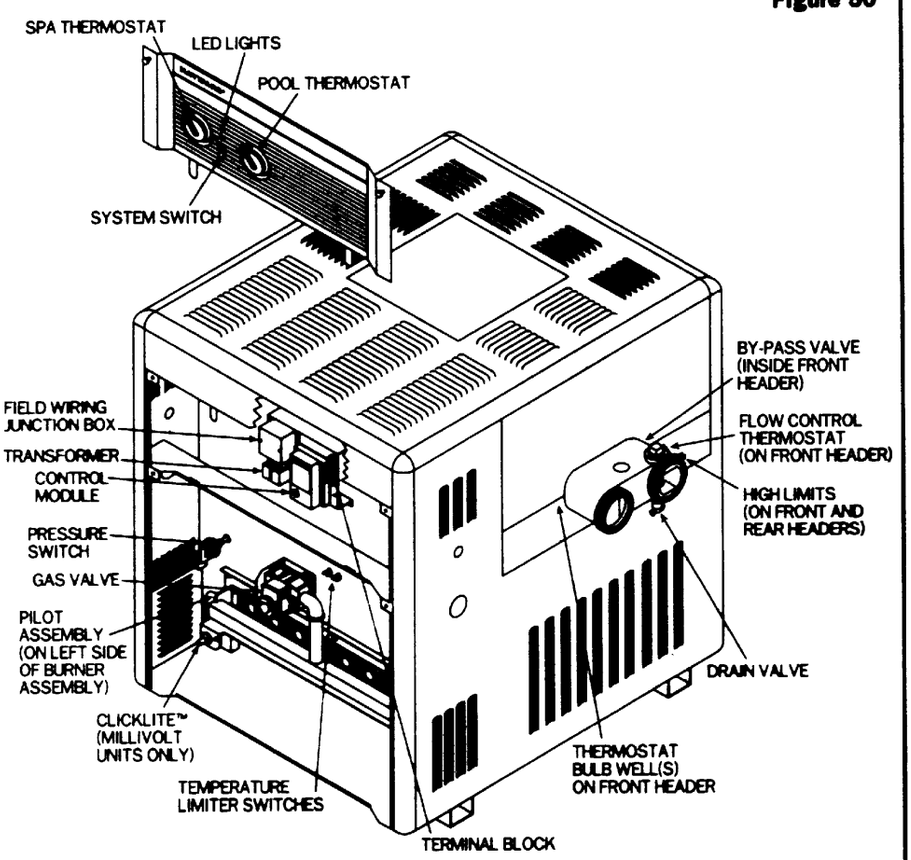
Ignitor Assembly Removal
Figure 49



Ignitor assembly removal: (Electronic Ignition Heater Only) (See Figure 49.)

1. Disconnect the electrode/sensor wire from the ignition module.
2. Remove screw securing ignitor bracket to clear locating stud and remove assembly from heater.
3. To service or replace ignitor remove two screws securing ignitor to ignitor bracket and disconnect electrode ignitor wire.
4. Recheck spark gap (9/64").
5. Reverse the above procedures for installation.

Control Locations
Figure 50



Main burner orifices:

The main burner orifices can be removed from the manifold with a 7/16" wrench without having to remove the burner assembly from the heater. After cleaning or replacing orifices re-install in manifold being careful not to overtighten as a leak may result.

⚠CAUTION: Do not enlarge orifice holes.

Gas conversion:

The factory installed gas train, where appropriate, may be changed from natural gas to propane or

from propane to natural gas, using the appropriate conversion kit, available from the factory. Gas conversions are to be performed only by a qualified agency. Detailed instructions are included with each kit.

▲NOTE: Conversion kits are not available in Canada. Conversions must be done by the conversion station at Hayward Pool Products Canada, Inc.

Control Locations:

The following sections give a brief overview of the various heater controls and service/replacement procedures. The text describes the intended purpose of the controls. See Figure 50 for general location of the controls.

Electrical wiring:

▲NOTE: If it is necessary to replace any of the original wiring, it must be replaced with wiring suitable for 105°C (Style 1015 or 1230) or its equivalent.

System Switch:

A two-way "ON/OFF" rocker switch is provided for single thermostat heaters and a three-way "POOL/OFF/SPA" rocker switch is provided on dual thermostat heaters.

To replace system switch:

1. Turn pump and main gas valve off. Turn thermostat to lowest setting.
2. Turn electricity off on electronic ignition heaters.
3. Open control panel and remove wires from system switch.
4. Press the ends of system switch in and remove from panel.
5. Replace system switch and reverse above procedure.

Temperature controls:

Millivolt Heaters

Millivolt heaters are manufactured with a mechanical thermostat models.

To replace thermostat:

1. Turn pump, main gas valve and system switch off.
2. Remove thermostat knob, open control panel and remove right side access panels.
3. Remove the thermostat bulb from the front header.

▲ NOTE: Using needle nose pliers to pull out copper strip makes bulb removal easier. Pull thermostat capillary tube and bulb through the oval slot in the intermediate panel.

▲ CAUTION: Be careful not to crimp capillary tube as it could break from mishandling.

4. Remove wires from thermostat.
5. Remove screws that secure thermostat mounting bracket to control panel.
6. Replace thermostat and reverse above procedures.

Electronic Heaters

Electronic heaters are manufactured with an integrated thermostat and ignition control that operates the heater. The replacement part is available as an assembly only.

To replace control panel assembly:

1. Turn pump, main gas valve and electricity off.
2. Unplug wires from rear circuit board.
3. Remove four screws retaining the plastic bezel to the sheet metal.
4. Pull entire assembly through the front panel.
5. Replace control panel assembly and reverse above procedures.

High limits:

The high limit is an automatically resetting safety device wired in series with the thermostat, pressure switch, temperature limiter switches and main gas valve. See Figure 51. The pool heater is equipped with two automatic high limits. The limits are located on the front and rear headers

▲CAUTION: The two limit switches have different temperature settings (check Parts List).

If the water temperature at the location of the limit should exceed the limit set point, the main gas valve will shut off gas supply to the burners.

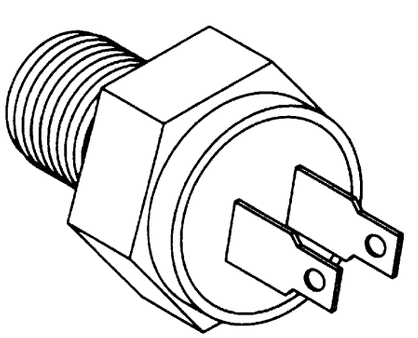
An erratic high limit is often an indication of a problem with water flow. Reduced flow may be caused by:

1. Clogged filter or strainer.
2. Excessive flow through the external bypass valve if one is used.
3. Lime scale accumulation in the heat exchanger.

To replace high limits:

1. Turn pump, main gas valve and system switch off.
2. Turn electricity off on electronic ignition heater.
3. Drain heat exchanger of all water.
4. Remove side access panels.
5. Remove wires from high limits.
6. Unscrew the defective high limit.
7. Replace the high limit and reverse above procedures.

High Limit
Figure 51



Temperature limiter switches:

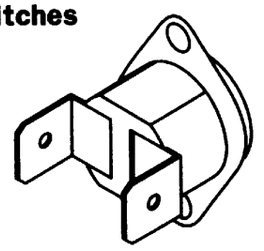
These controls will shut the heater off in the event that temperatures outside the combustion chamber and inside the heater cabinet become to hot. Possible causes for switch function include downdraft wind conditions or a blocked vent or drafthood. Technician should evaluate unit to determine cause.

The left switch is an automatic reset type while right backup switch is manual reset. See Figure 52. The manual reset switch is resettable by removing the heater front door and then pressing the center button on the switch which will reactivate it. Replace the front door and restart heater.

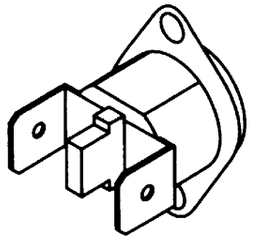
To replace switch(s):

1. Turn pump, main gas valve and system switch off.
2. Turn electricity off on electronic ignition heater.
3. Remove heater front door.
4. Remove the two wires and screws securing the switch(s).
5. Replace with new switch(s) and reverse the above procedures.

Limiter Switches
Figure 52



AUTOMATIC
RESET SWITCH



MANUAL
RESET SWITCH

Pressure switch:

The pressure switch (Figure 53) is preset at the factory for deck level installations. When the heater is located below the level of the spa or pool, the pressure switch may require an adjustment to compensate for the no-flow static head. The following procedure is recommended when the switch needs adjustment and/or is replaced:

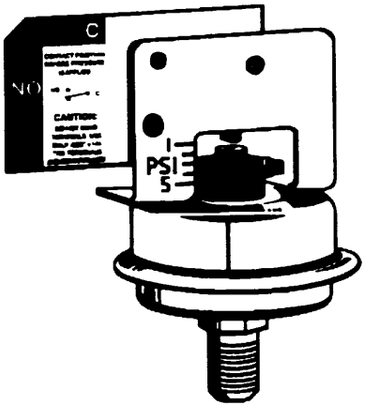
1. Be sure the filter is clean before making the adjustment.
2. With the pump and heater system switch on, turn the adjustment dial on the pressure switch clockwise, until a click is heard from the gas valve.
3. Turn the adjustment dial counterclockwise 1/4 turn.
4. Turn the pump off and on several times. The heater should shut off immediately when pump is shut off. If the heater fails to shut down with pump, repeat the steps above until the switch is adjusted properly.

⚠CAUTION: Do not operate the pool heater without the function of a properly adjusted pressure switch or flow switch.

To replace pressure switch:

1. Turn pump, main gas valve and system switch off.
2. Turn electricity off on electronic ignition heater.
3. Open front header drain and drain heat exchanger of all water.
4. Remove heater front door.
5. Remove wires from pressure switch.
6. Using two 1/2" open end wrenches disconnect the pressure switch from pressure switch tube.
7. Replace pressure switch and reverse above procedures. Use new sealant on pressure switch threads before reinstalling.
8. Check for any possible leaks after start-up of unit.

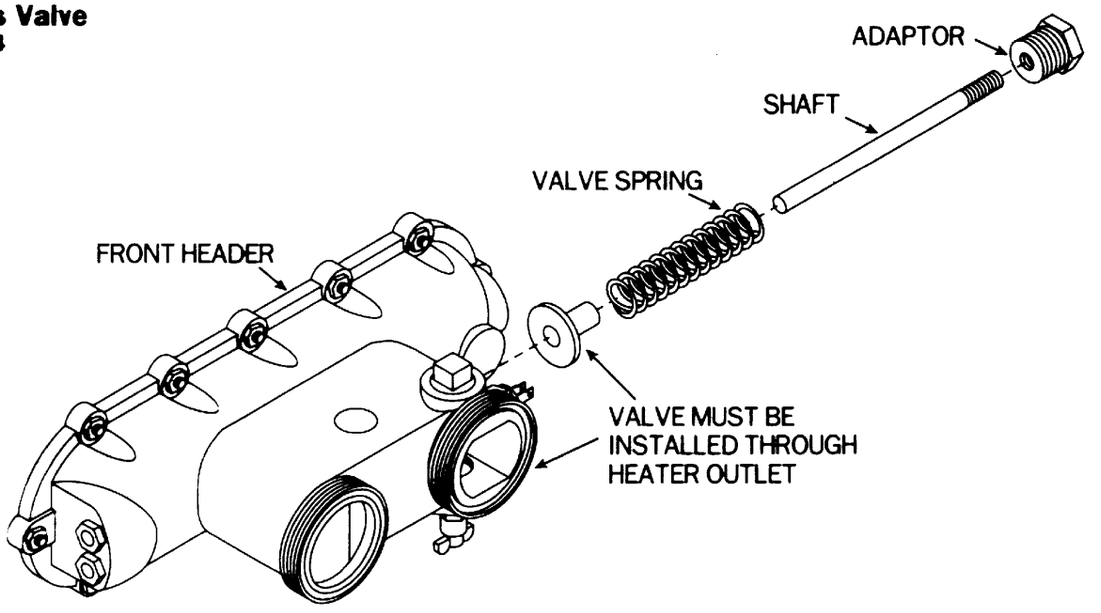
Pressure Switch
Figure 53



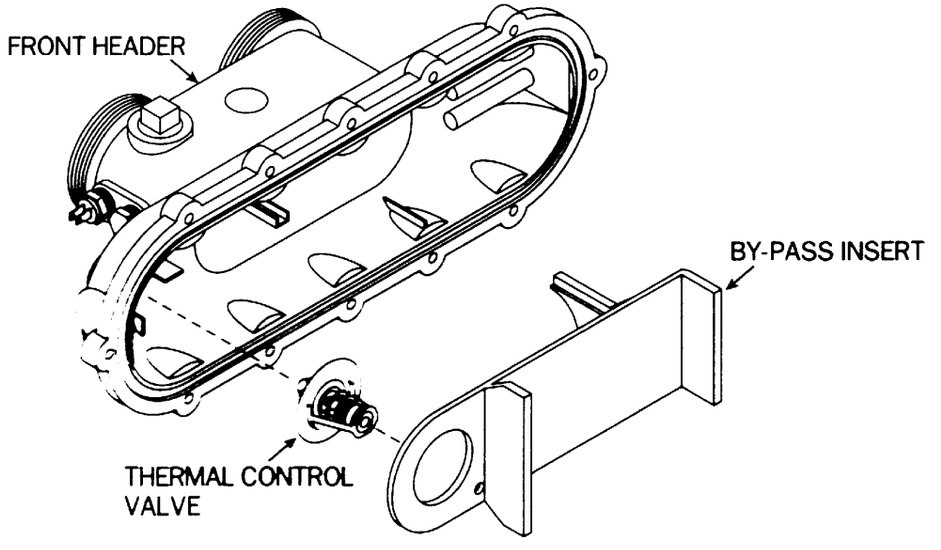
By-pass valve:

The front header houses an automatic by-pass valve. The valve provides proper water flow through the heat exchanger as the filter system water pressure varies. The valve assembly consists of a plunger, a spring and a shaft. The plunger glides along the shaft as system water pressure compresses the spring. Very high acid or chlorine concentrations may damage the valve parts or very hard water may leave deposits on the shaft causing the valve to stick. If the valve sticks open, very little water will pass through the heat exchanger causing overheating and possibly opening the high limit

By-pass Valve
Figure 54



Thermal Control Valve
Figure 55



contacts. If the valve sticks closed, too much water will flow throughout the heat exchanger causing condensation to occur. Either situation may result in insufficient heating of the pool or spa.

To replace valve parts:

Drain heat exchanger of all water. The valve may be removed as shown in Figure 54. The plug on the right side of the front header is unscrewed and the shaft and spring are pulled out. The plunger can be removed through the outlet port of the header after the pool plumbing is disconnected from the heater. Re-install by reversing above procedure.

Thermal control valve:

The front header also houses a thermal control valve. This valve helps to control condensation off the heat exchanger by not allowing water to flow through the heat exchanger until the water reaches a temperature of 105°F. Very hard water may leave deposits on the valve plunger causing the valve to stick. If the valve sticks open, cold water can flow through the heat exchanger causing condensation to occur. If the valve sticks closed, very little water will flow through the by-pass hole which will open the high limit contacts on the rear header.

To replace thermal control valve:

1. Follow the instructions on page 25 for front header removal only.
2. Remove the plastic by-pass insert from front header.
3. Remove the thermal control valve from front header.
4. Test the thermal control valve by placing it into a hot water bath (above 108°F) and watching

for movement that compresses the spring and opens the annular area in the center of the valve. If this action does not take place, replace the valve with a new one that has been tested as above. See Figure 55.

5. Reverse the procedures for reassembly.

Transformer: (Electronic ignition only)

The transformer reduces the main power supply of 120V or 240V down to 20 - 26 volts. This is the voltage range in which the heater operates.

To replace the transformer:

1. Turn pump, main gas valve, system switch and main power off.
2. Remove two screws and open front control panel.
3. Disconnect two slip-on terminal wires from the transformer.
4. Detach main power wires from transformer.
5. Remove the screws securing transformer to the mounting bracket and remove transformer.
6. Replace the transformer and reverse the above procedures.
   Rewire according to the wiring diagram on the heater.

Thermistor:

The thermistor monitors the return water temperature.

To replace pressure thermistor:

1. Turn pump, main gas valve and heater power off.
2. Turn electricity off.
3. Drain heat exchanger of all water.
4. Remove side access panels.
5. Disconnect thermistor leads from circuit board.
6. Unscrew the thermistor.
7. Replace the thermistor and reverse above procedures.

Section VII. Troubleshooting

General:

⚠NOTE: These instructions are intended for the use of qualified personnel trained and experienced in the installation and servicing of this type of heating equipment and its related system components. Some states may require installation and service personnel to be licensed. Persons not qualified should not attempt to repair this equipment according to these instructions.

⚠WARNING: Never leave a jumper wire connected to keep a heater running. A jumper wire should be used as a test device only, as it is not a cure for a defective control.

⚠CAUTION: Never allow the main burner to operate more than five seconds with the filter system shut off. Serious damage to the heater will result. Anytime the heater bangs or knocks, it indicates a water void or lack of water flow. Shut off heater immediately if this occurs.

⚠Wiring:

As a preliminary check, make sure that all wire connections are clean and tight and that all wiring conforms to the wiring diagrams. See Figures 30 and 33.

Troubleshooting Chart

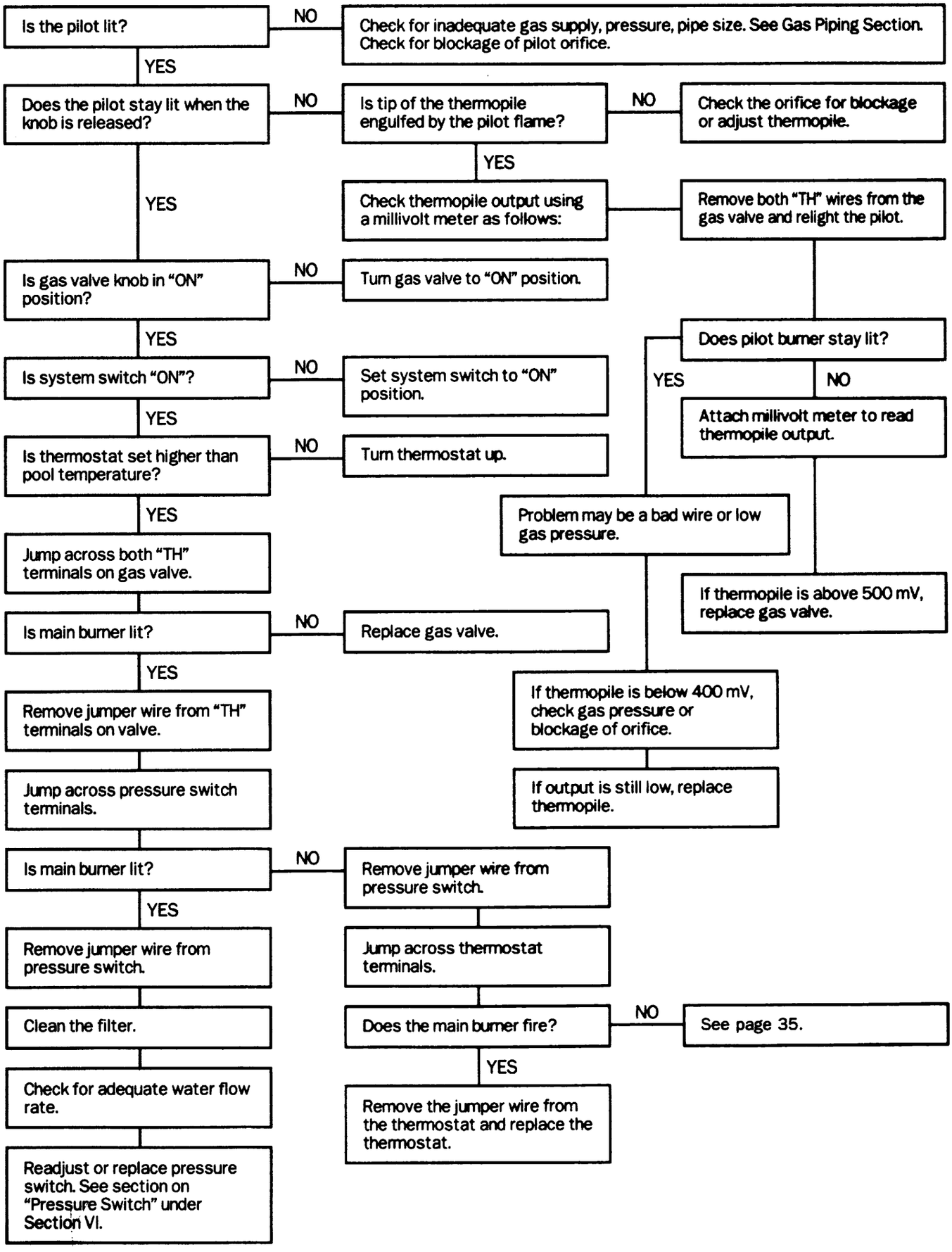
This chart may be used as a quick reference guide for maintenance and service problems. FOR QUALIFIED SERVICE PERSONNEL ONLY.

PROBLEM	POSSIBLE CAUSES	REMEDY
HEATER WILL NOT FIRE UP.		See Troubleshooting Procedure That Pertains To Your Heater, (Millivolt or Electronic Ignition).
HEATER CYCLING ON AND OFF CONTINUOUSLY.	Time Clock Set Wrong.	Reset Clock.
	Filter Is Dirty.	Clean Filter.
	External By-Pass Out Of Adjustment, (Where Used).	Adjust By-Pass.
	Pressure Switch Out Of Adjustment.	Adjust Pressure Switch.
SOOTING OF THE HEAT EXCHANGER.	High Water Flow Rates (Above 125 GPM).	Reduce Flow Rate By Adding A Manual By-Pass Valve.
	Internal By-Pass Stuck Open.	Check For Excessive Hardness Or Acidity That May Have Damaged Valve. Repair Or Replace.
	Lack Of Air For Combustion.	Provide Adequate Air. See Venting Installation.
	Low Fuel Volume.	Correct With Proper Gas Line Sizing.
	Improper Venting.	Provide By Proper Venting. See Section II.
	Burner Inlet Throat Blocked. High Pressure/Low Pressure.	Clean Burners Adjust Gas Pressure.
	Collapsed Combustion Chamber.	Replace Combustion Chamber.
PILOT OUTAGE (MILLIVOLT ONLY).	Low Gas Pressure.	Increase Pressure.
	Restricted Gas Flow.	Clean Pilot Orifice Or Tubing.
	Weak Thermopile.	Replace Thermopile.
JACKET SURFACE TEMPERATURES EXCESSIVE.	Broken Refactory.	Replace Refactory.
LIME SCALE.	By-Pass Valve Stuck Open.	Inspect By-Pass Movement And Repair.
	Thermal Control Valve Not Working.	Check For Movement. Replace If No Movement.
	Water Chemistry Out Of Balance.	See Section On Pool Water Chemistry.
	Unecessary External Manual By-Pass Installed Or Out Of Adjustment.	Close Manual By-Pass Valve And Remove Or Adjust Properly. See Section On By-Pass Valve.
HEATER WILL NOT BRING POOL TO DESIRED TEMPERATURE.	Gas Line Too Small.	Check Gas Pipe Size In Figure 20.
	Heater Too Small.	Check Sizing Chart. Install Larger Heater If Necessary.
	Time Clock Is Set Incorrectly.	Reset Time Clock.
	Filter Not Cleaned Often Enough.	Clean Filter More Frequently.
	Thermostat Out Of Adjustment Or Defective.	Test Thermostat. Replace If Necessary.
	Pressure Switch Inoperative.	Test Pressure Switch. Replace If Necessary.
LEAKING HEAT EXCHANGER.	Overly Acid Water Or Freeze-Up.	Replace Heat Exchanger And Maintain Water Chemistry Properly.
LEAKING AT WELL.	Overly Acid Water Or Freeze-Up.	Replace Well. Maintain Water Chemistry.
LEAKING AT UNION NUT CONNECTIONS. OVERHEATED O-RINGS (BRITTLE).	Heater Continues To Run After Pump Shuts Off.	See Pressure Switch Adjustment. Replace Leaking O-Rings.
	Refactory Damage.	Replace Refactory.

Heater Will Not Fire - (Millivolt)

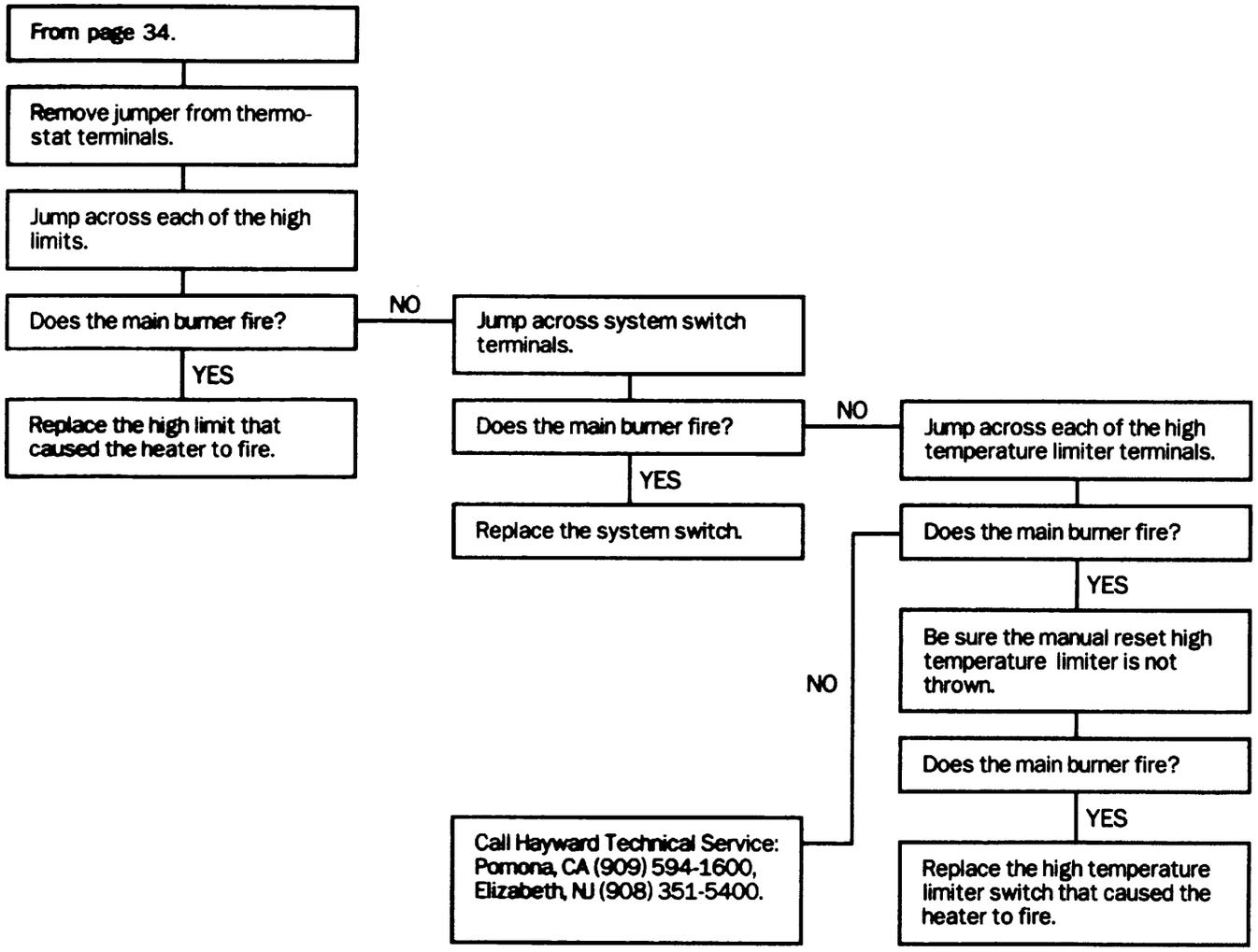
⚠WARNING: For qualified service personnel ONLY!

This procedure assumes that the filter system is operating. Jumper wires are used for system checkout only. Remove all jumper wires following system checkout or damage to heater may result.



⚠WARNING: For qualified service personnel ONLY!

This procedure assumes that the filter system is operating. Jumper wires are used for system checkout only. Remove all jumper wires following system checkout or damage to heater may result.



Troubleshooting Chart (Electronic)

H-Series Heater Diagnostic Guide

Code	Fault	Diagnosis Step	Remedy
LO	Water Pressure Switch Fault	1. Verify that pump is running.	This is a normal display when the pump is off. Turn pump on. LO code should clear. If LO does not clear, proceed to step 2.
		2. Check for faulty wiring or connection.	Inspect water pressure switch wiring. Ensure wire harness terminals are securely fastened to spade terminals. If OK, proceed to step 3.
		3. Verify state of water pressure switch contacts.	Remove wire leads from switch and jumper leads. Measure continuity across switch with pump on. If closed, LO code is not caused by water pressure switch fault. If open, proceed to step 4. Remove jumper from wire leads and reconnect wire leads.
		4. Ensure that low pump pressure does not exist.	Clean filter or clear blockages. Check position of valves in plumbing system. If OK, proceed to step 5.
		5. Check for correct water pressure switch setting.	Adjust switch setting per installation manual. If LO does not clear, proceed to step 6.
		6. Water pressure switch is defective.	Replace water pressure switch.
	Automatic Temperature Limiter Switch Fault	1. Check for faulty wiring or connection.	Inspect switch wiring. Ensure wire harness terminals are securely fastened to spade terminals. If OK, proceed to step 2.
		2. Verify state of temperature limiter switch's contacts.	Remove wire leads from switch and jumper leads. Operate heater. Measure continuity across switch. If closed, LO code is not caused by temperature limiter switch fault. If open, proceed to step 3 for outdoor units, and step 4 for indoor units. Remove jumper from leads and reconnect leads to temperature limiter.
		3. Check for high winds or severe downdrafting.	Check for high winds or severe downdrafts. If present, install HWS High Wind Stack. Otherwise proceed to step 5.
		4. Check for restricted or blocked vent on indoor units.	Check for restricted or blocked vent. If OK, proceed to step 5.
		5. Check for sooted or damaged heat exchanger.	Check for sooted or damaged heat exchanger. If OK, proceed to step 6.
		6. Temperature limiter switch is defective.	Replace temperature limiter switch.
	Manual Temperature Limiter Switch Fault	1. Check for faulty wiring or connection.	Inspect switch wiring. Ensure wire harness terminals are securely fastened to spade terminals. If OK, proceed to step 2.
		2. Verify state of temperature limiter switch's contacts.	Remove wire leads from temperature limiter switch and jumper leads. Operate heater. Measure continuity across temperature limiter switch. If closed, LO code is not caused by temperature limiter switch fault. If open, proceed to step 3 for outdoor units, and step 4 for indoor units. Remove jumper from leads and reconnect leads to temperature limiter.
		3. Check for high winds or severe downdrafting.	Check for high winds or severe downdrafts. If present, install HWS High Wind Stack. Otherwise proceed to step 5.
		4. Check for restricted or blocked vent on indoor units.	Check for restricted or blocked vent. If OK, proceed to step 5.
		5. Check for sooted or damaged heat exchanger.	Check for sooted or damaged heat exchanger. If OK, proceed to step 6.
		6. Reset switch.	Reset switch. If switch trips again, proceed to step 7.
		7. Temperature limiter switch is defective.	Replace temperature limiter switch.
	Limit Switch Fault	1. Check for faulty wiring or connection.	Inspect limit switch wiring. Ensure wire harness terminals are securely fastened to spade terminals. If OK, proceed to step 2.
		2. Verify state of temperature limits' contacts.	Remove wire leads from limit switches and jumper leads. Operate heater. Measure continuity across limit switches. If closed, LO code is not caused by temperature limit switch fault. If open, proceed to step 3. Remove jumper from leads and reconnect leads to temperature limits.
		3. Verify that water flow is adequate.	Verify that water flow rate to heater is above minimum required (25 GPM). If OK, proceed to step 4.
		4. Temperature limit switch is defective.	Replace limit switch.

Troubleshooting Chart

H-Series Heater Diagnostic Guide

Code	Fault	Diagnosis Step	Remedy
BO	Bypass Operation	1. Check state of #2 dip switch on back of control module.	This is a normal display when heater is being controlled by a remote thermostat. No service is required. If heater is not being controlled by remote thermostat, change setting of #2 dip switch to "Off" position.
IF	Ignition Failure	1. Ensure gas supply shutoff valves are open.	Ensure that main gas shutoff installed adjacent to heater is open. Ensure that knob on gas valve inside unit is in "On" position. If OK, proceed to step 2.
		2. Check for low gas supply pressure.	Ensure inlet gas supply pressure exceeds minimum value indicated on rating plate. If OK, proceed to step 3.
		3. Check for faulty igniter wiring or connection.	Inspect igniter wiring. Ensure igniter plug is securely plugged into back of control module. If OK, proceed to step 4.
		4. Check for faulty gas valve wiring or connection.	Inspect gas valve wiring. Ensure wire harness terminals are securely fastened to spade terminals on gas valve. If OK, proceed to step 5.
		5. Check for gas valve failure or gas valve relay failure.	1. Measure voltage across gas valve during trial for ignition. If 24 vac is present and gas valve does not open, gas valve is defective. Replace gas valve.
			2. If 24 vac is not present, gas valve relay on control module is defective. Replace control module.
SF	Temperature Sensor Input Failure	1. Check for faulty wiring or connection.	Inspect sensor wiring. Ensure sensor is plugged into back of control module. If OK, proceed to step 2.
		2. Sensor is defective.	Replace temperature sensor.
HS	Maximum Return Water Temperature Exceeded	1. Pool water temperature exceeds 104° F.	Verify set point setting of remote thermostat is at or below 104° F. If set point setting of remote thermostat is OK, or if heater is not configured for remote thermostat proceed to step 2.
		2. Verify that water flow is adequate.	Verify that water flow rate to heater is above minimum required.
HF	Flame Sense Fault	1. Flame sense failure.	Replace igniter.

Parts List - Millivolt

ITEM NO.	PART NO.	DESCRIPTION
1.	HAXJKT1150	Jacket Top Asy. - 150
1.	HAXJKT1200	Jacket Top Asy. - 200
1.	HAXJKT1250	Jacket Top Asy. - 250
1.	HAXJKT1300	Jacket Top Asy. - 300
1.	HAXJKT1350	Jacket Top Asy. - 350
1.	HAXJKT1400	Jacket Top Asy. - 400
1.	HAXJKT1251*	Jacket Top Asy. - 250
1.	HAXJKT1301**	Jacket Top Asy. - 300
1.	HAXJKT1351***	Jacket Top Asy. - 350
1.	HAXJKT1401†	Jacket Top Asy. - 400
2.	HAXDHO1930	DHO Insert
3.	DHI150	Indoor Drafthood - 150
3.	DHI200	Indoor Drafthood - 200
3.	DHI250	Indoor Drafthood - 250
3.	DHI300	Indoor Drafthood - 300
3.	DHI350	Indoor Drafthood - 350
3.	DHI400	Indoor Drafthood - 400
3.	HWS150	High Wind Stack - 150 (Not Shown)
3.	HWS200	High Wind Stack - 200 (Not Shown)
3.	HWS250	High Wind Stack - 250 (Not Shown)
3.	HWS300	High Wind Stack - 300 (Not Shown)
3.	HWS350	High Wind Stack - 350 (Not Shown)
3.	HWS400	High Wind Stack - 400 (Not Shown)
4.	HAXHXA1150	Heat Exchanger Asy. - 150
4.	HAXHXA1200	Heat Exchanger Asy. - 200
4.	HAXHXA1250	Heat Exchanger Asy. - 250
4.	HAXHXA1300	Heat Exchanger Asy. - 300
4.	HAXHXA1350	Heat Exchanger Asy. - 350
4.	HAXHXA1400	Heat Exchanger Asy. - 400
5.	HAXWHA0002	Rear Wire Harness, MV
	HAXWHA0006††	Rear Wire Harness, MV
6.	HAXFOR1930	O-Rings
7.	HAXNIP1930	Flange Pipe Nipples
8.	HAXNUT1930	Union Nuts
9.	HAXBPI1930	By-Pass Insert
	HAXBPI1931††	By-Pass Insert
10.	HAXFCT1930	Flow Control Thermostat
11.	CHXPLG1930	3/4" NPT Brass Plug
12.	HAXBPV1930	By-Pass Valve
13.	HAXVSG1930	Valve Spring
14.	HAXSFT1930	Brass Shaft
15.	HAXADP1930	Brass Adapter
16.	HAXHLI1930	Hi-Limit 135° F
17.	HMXHLI2932	Hi-Limit 160° F
18.	CHXDRV1930	Drain Valve Asy.
19.	CHXPSA1930	Pressure Switch Adapter
20.	CHXTBW1930	Bulb Well
	HAXTBW1930▲▲	Bulb Well
21.	HAXFHD1930	Front Header Only
	HAXFHD1931††	Front Header Only
22.	HAXLAC1930	Left Access Cover
23.	HAXURA1930	Upper Right Access Cover
24.	HAXLRA1931	Lower Right Access Cover
25.	HAXPHK1930	Plastic Hardware Kit
26.	HAXTLK1930	Temperature Limiters Kit
27.	HAXTBK1931	2-Pole Terminal Block
28.	HAXPLG1931	3/8" Brass Plug
29.	CHXGRL1930	TA-2 Ground Lug
32.	HAXPSA1930	Pressure Switch Asy.
33.	CHXTST1930	Thermostat
34.	HAXLDK1930	LED Kit
35.	CHXTSW1930	System Switch Single
35.	CHXTSW1931	System Switch Dual
36.	HAXCPA1150	Control Panel Asy. - 150 MV
36.	HAXCPA1200	Control Panel Asy. - 200 MV
36.	HAXCPA1250	Control Panel Asy. - 250 MV
36.	HAXCPA1300	Control Panel Asy. - 300 MV
36.	HAXCPA1350	Control Panel Asy. - 350 MV
36.	HAXCPA1400	Control Panel Asy. - 400 MV
36.	HAXCPA2150▲	Control Panel Asy. - 150 MV
36.	HAXCPA2200▲	Control Panel Asy. - 200 MV
36.	HAXCPA2250▲	Control Panel Asy. - 250 MV
36.	HAXCPA2300▲	Control Panel Asy. - 300 MV
36.	HAXCPA2350▲	Control Panel Asy. - 350 MV
36.	HAXCPA2400▲	Control Panel Asy. - 400 MV
37.	HAXGSV0001	Gas Valve, MV Natural Gas
37.	HAXGSV0003	Gas Valve, MV Propane
37.	HAXGSV0004	Gas Valve, DS Propane
37.	HAXGSV0005	Gas Valve, DS Natural Gas
38.	HAXMAN1150	Gas Manifold - 150
38.	HAXMAN1200	Gas Manifold - 200
38.	HAXMAN1250	Gas Manifold - 250
38.	HAXMAN1300	Gas Manifold - 300
38.	HAXMAN1350	Gas Manifold - 350
38.	HAXMAN1400	Gas Manifold - 400
39.	HAXBRN1930	Burner Tube
40.	HAXBON1930	Burner Orifice Natural Gas
40.	HAXBON1931	Burner Orifice Natural Gas HA
40.	HAXBOP1932	Burner Orifice Propane
40.	HAXBOP1931	Burner Orifice Propane HA
41.	HAXBMA1151	Burner - Manifold Asy. 150 MV NA
41.	HAXBMA1152	Burner - Manifold Asy. 150 MV LP
41.	HAXBMA1201	Burner - Manifold Asy. 200 MV NA
41.	HAXBMA1202	Burner - Manifold Asy. 200 MV LP
41.	HAXBMA1251	Burner - Manifold Asy. 250 MV NA
41.	HAXBMA1252	Burner - Manifold Asy. 250 MV LP
41.	HAXBMA1301	Burner - Manifold Asy. 300 MV NA
41.	HAXBMA1302	Burner - Manifold Asy. 300 MV LP
41.	HAXBMA1351	Burner - Manifold Asy. 350 MV NA
41.	HAXBMA1352	Burner - Manifold Asy. 350 MV LP
41.	HAXBMA1401	Burner - Manifold Asy. 400 MV NA
41.	HAXBMA1402	Burner - Manifold Asy. 400 MV LP
41.	HAXBMA1403	Burner - Manifold Asy. 400 DS NA
41.	HAXBMA1404	Burner - Manifold Asy. 400 DS LP
42.	HAXFAD1150	Front Access Door Asy. - 150
42.	HAXFAD1200	Front Access Door Asy. - 200
42.	HAXFAD1250	Front Access Door Asy. - 250
42.	HAXFAD1300	Front Access Door Asy. - 300
42.	HAXFAD1350	Front Access Door Asy. - 350
42.	HAXFAD1400	Front Access Door Asy. - 400
44.	HAXPLT1931	Pilot Natural Gas
44.	HAXPLT1932	Pilot Propane
45.	HAXTRK1930	Pilot Tube Replacement Kit
46.	HAXHOR1930	Header O-Ring
47.	HAXRHD1930†††	Rear Header Only
48.	HAXPLG1931	1/4" Brass Plug
49.	HAXCIA1930	Corner Piece Kit (4)
50.	HAXFHA1930†††	Front Header Asy.
	HAXFHA1931	Front Header Asy.
	- HAXRFK1930	Retro Fit Kit (Not Shown)
	- HAXWHA0001	Wire Harness, Main MV (Not Shown)

* - Used, Starting At Serial No. 00421078

** - Used, Starting At Serial No. 00320178

*** - Used, Starting At Serial No. 00424651

† - Used, Starting At Serial No. 00424851

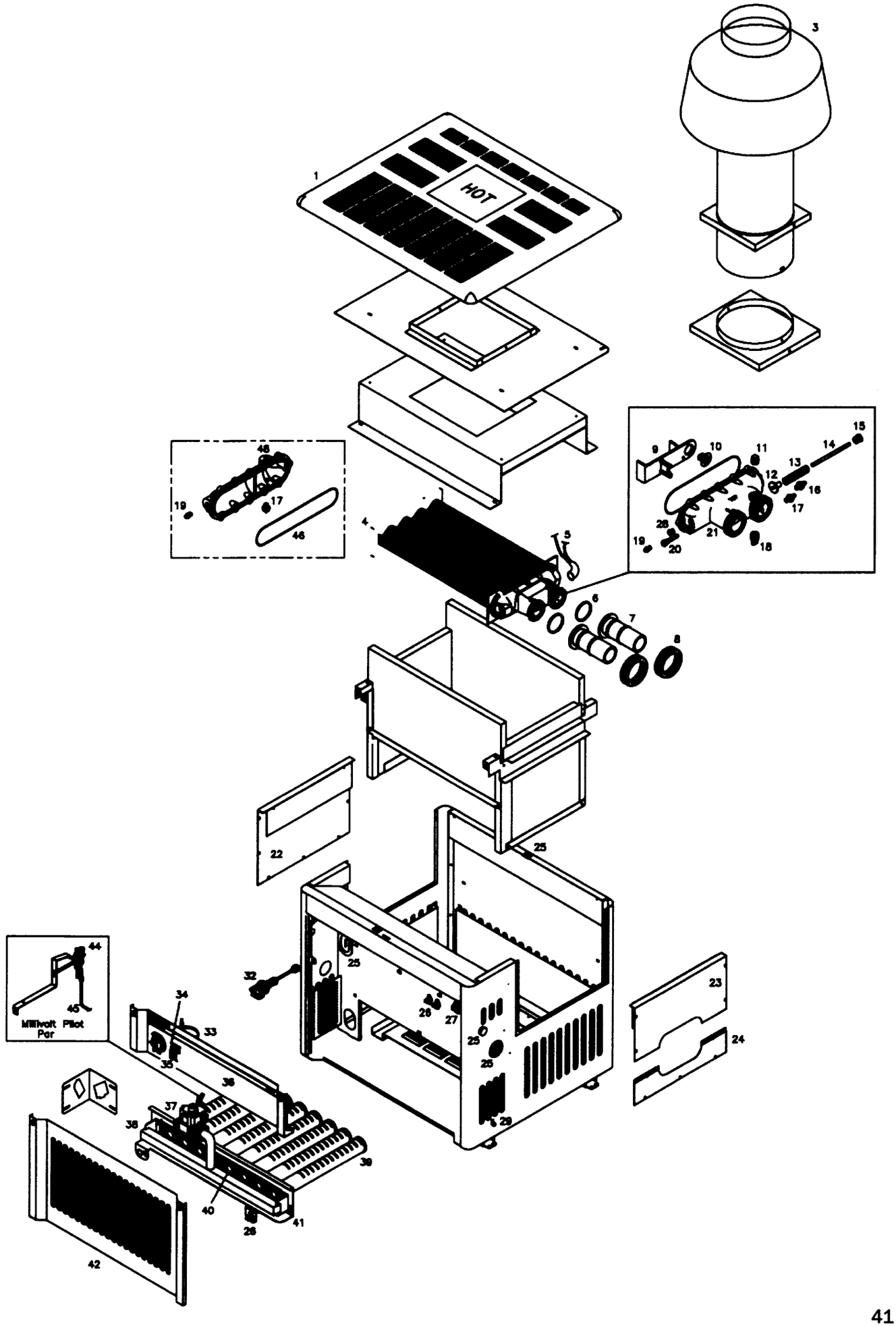
†† - Used On Heaters, Made After 10/28/00

††† - For Heaters, Made Before 10/28/00

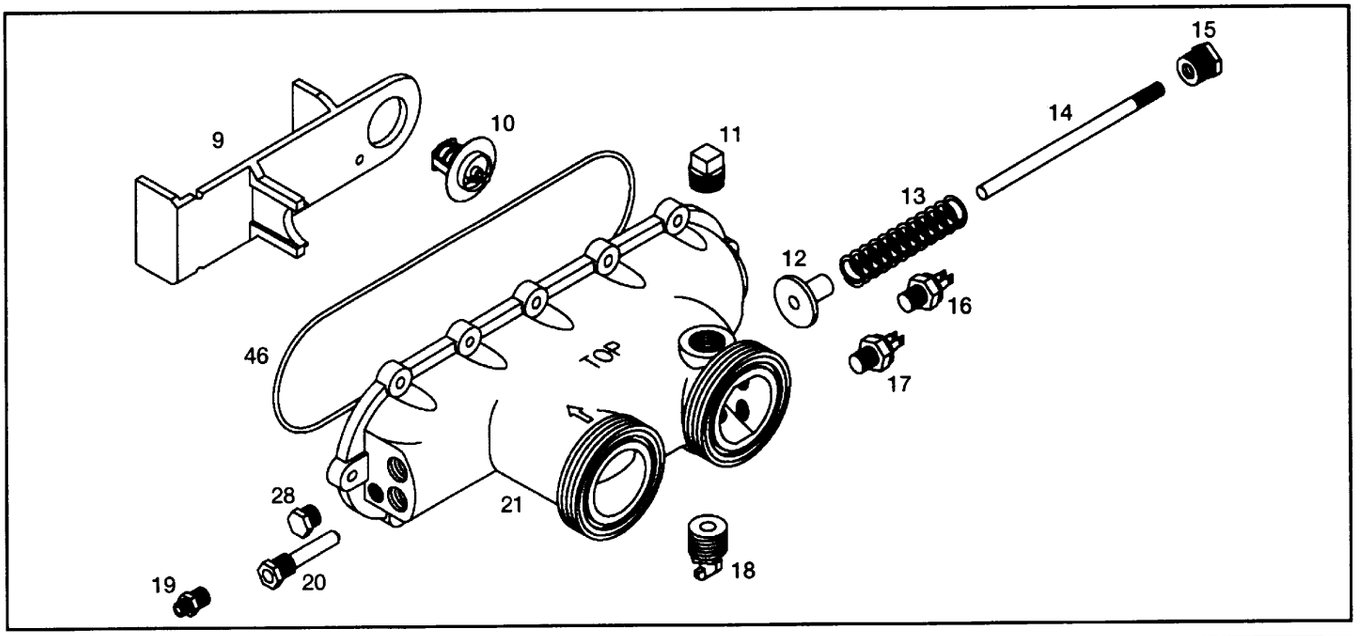
▲ - Used On Heaters, Made After 5/8/98

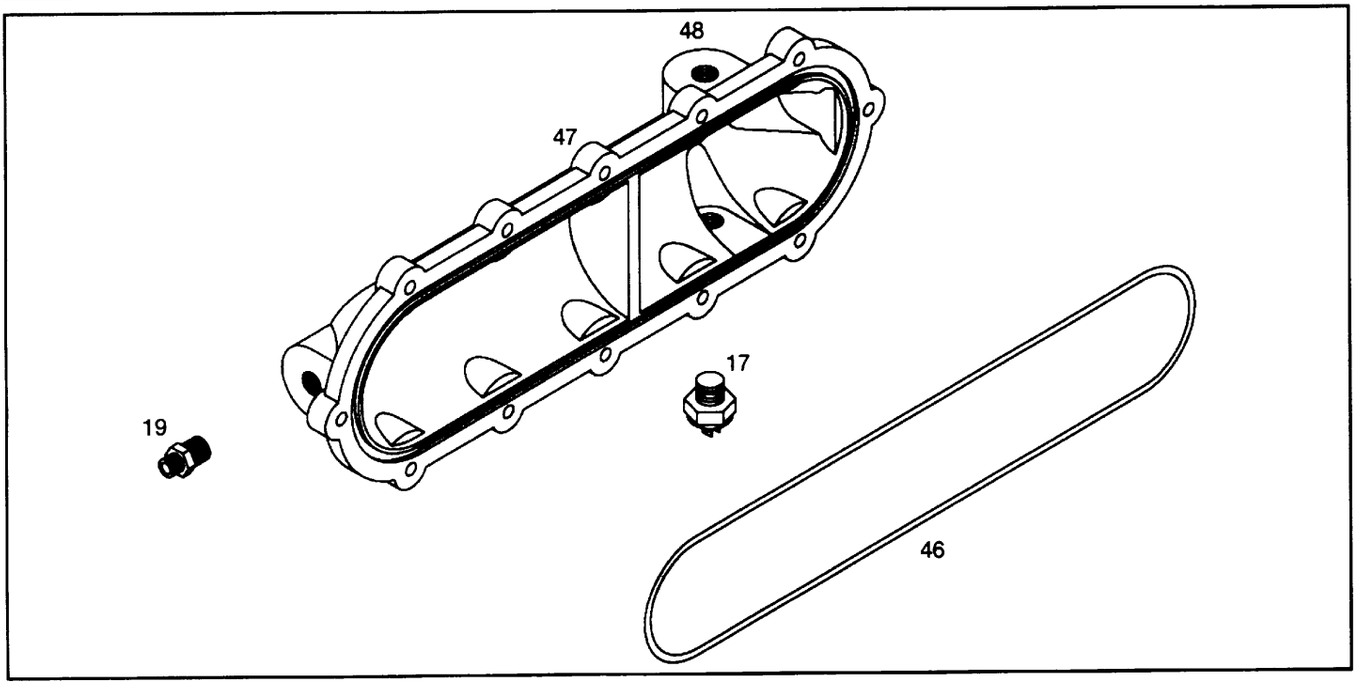
▲▲ - Used On Heaters, Made After 6/1/01

Parts Illustration - Millivolt

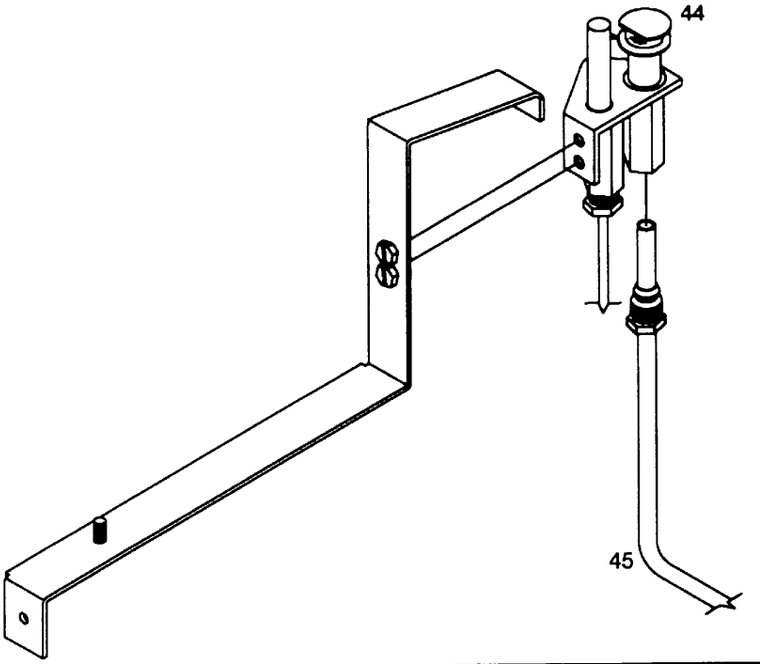


Parts Illustration - Millivolt





Millivolt Pilot Parts

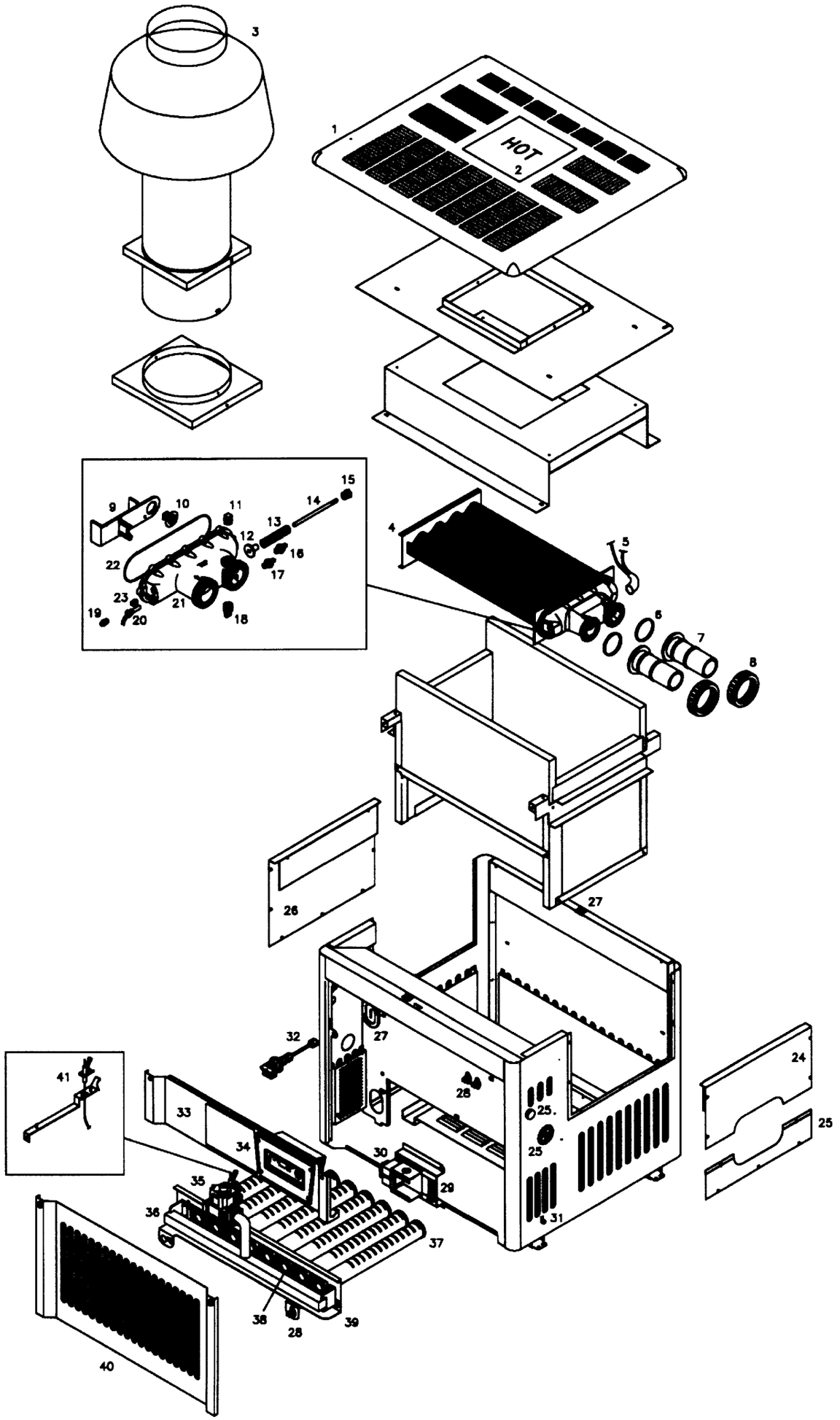


Parts List - Electronic Ignition

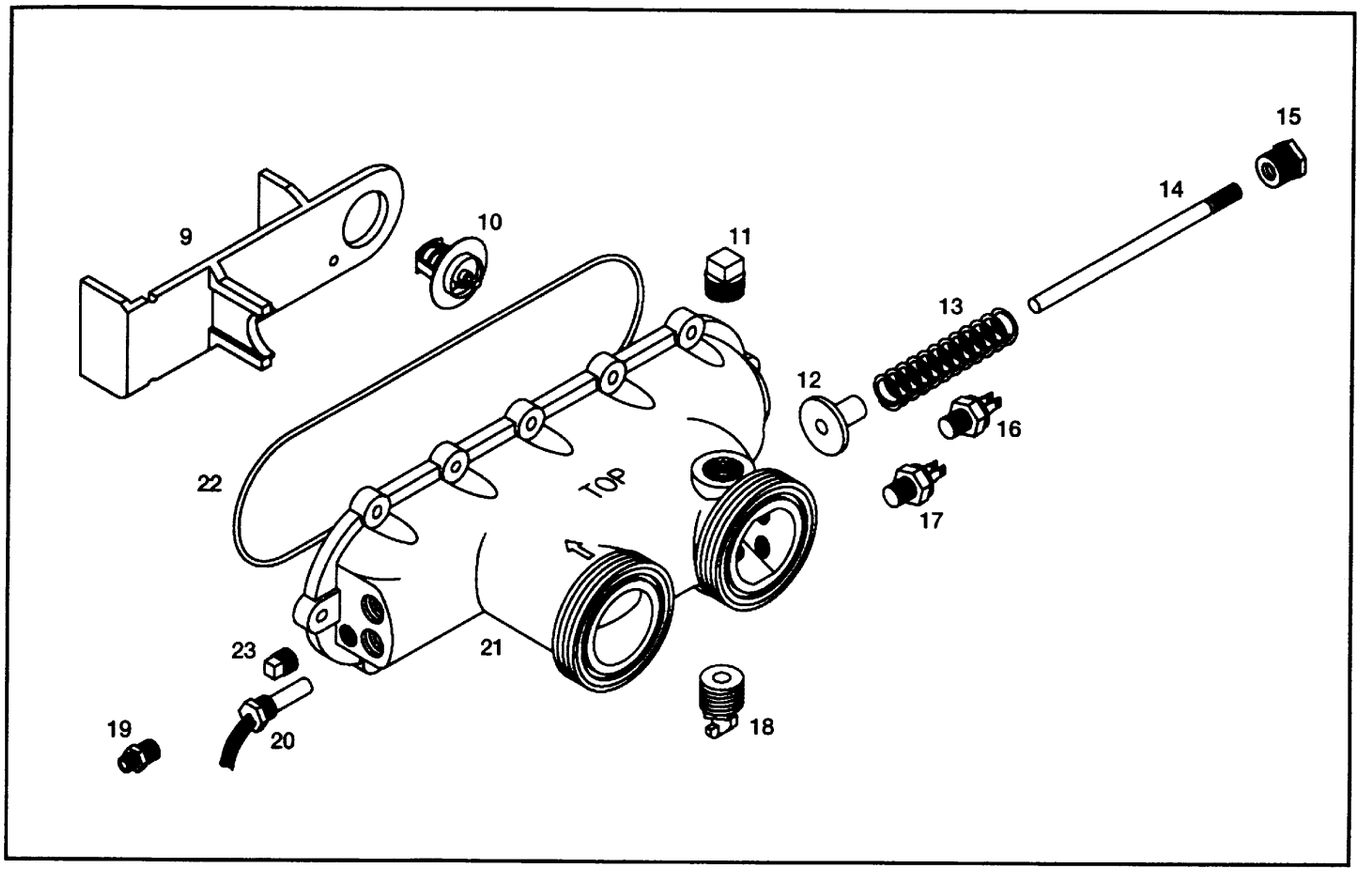
ITEM NO.	PART NO.	DESCRIPTION
1.	HAXJKT1150	Jacket Top Asy. - 150
1.	HAXJKT1200	Jacket Top Asy. - 200
1.	HAXJKT1251	Jacket Top Asy. - 250
1.	HAXJKT1301	Jacket Top Asy. - 300
1.	HAXJKT1351	Jacket Top Asy. - 350
1.	HAXJKT1401	Jacket Top Asy. - 400
2.	HAXDHO1930	DHO Insert
3.	DHI150	Indoor Drafthood - 150
3.	DHI200	Indoor Drafthood - 200
3.	DHI250	Indoor Drafthood - 250
3.	DHI300	Indoor Drafthood - 300
3.	DHI350	Indoor Drafthood - 350
3.	DHI400	Indoor Drafthood - 400
3.	HWS150	High Wind Stack - 150 (Not Shown)
3.	HWS200	High Wind Stack - 200 (Not Shown)
3.	HWS250	High Wind Stack - 250 (Not Shown)
3.	HWS300	High Wind Stack - 300 (Not Shown)
3.	HWS350	High Wind Stack - 350 (Not Shown)
3.	HWS400	High Wind Stack - 400 (Not Shown)
4.	HAXHXA1150	Heat Exchanger Asy. - 150
4.	HAXHXA1200	Heat Exchanger Asy. - 200
4.	HAXHXA1250	Heat Exchanger Asy. - 250
4.	HAXHXA1300	Heat Exchanger Asy. - 300
4.	HAXHXA1350	Heat Exchanger Asy. - 350
4.	HAXHXA1400	Heat Exchanger Asy. - 400
5.	HAXWHA0007	Rear Wire Harness, DS
6.	HAXFOR1930	O-Rings
7.	HAXNIP1930	Flange Pipe Nipples
8.	HAXNUT1930	Union Nuts
9.	HAXBPI1931	By-Pass Insert
10.	HAXFCT1930	Flow Control Thermostat
11.	CHXPLG1930	3/4" NPT Brass Plug
12.	HAXBPV1930	By-Pass Valve
13.	HAXVSG1930	Valve Spring
14.	HAXSFT1930	Brass Shaft
15.	HAXADP1930	Brass Adapter
16.	HAXHLI1930	Hi-Limit 135° F
17.	HMXHLI2932	Hi-Limit 160° F
18.	CHXDRV1930	Drain Valve Asy.
19.	CHXPSA1930	Pressure Switch Adapter
20.	IDXLTER1930	Thermistor
21.	HAXFHD1931	Front Header Only
22.	HAXHOR1930	Header O-Ring
23.	HAXPLG1931	3/8" Brass Plug
24.	HAXURA1930	Upper Right Access Cover
25.	HAXLRA1931	Lower Right Access Cover
26.	HAXLAC1930	Left Access Cover

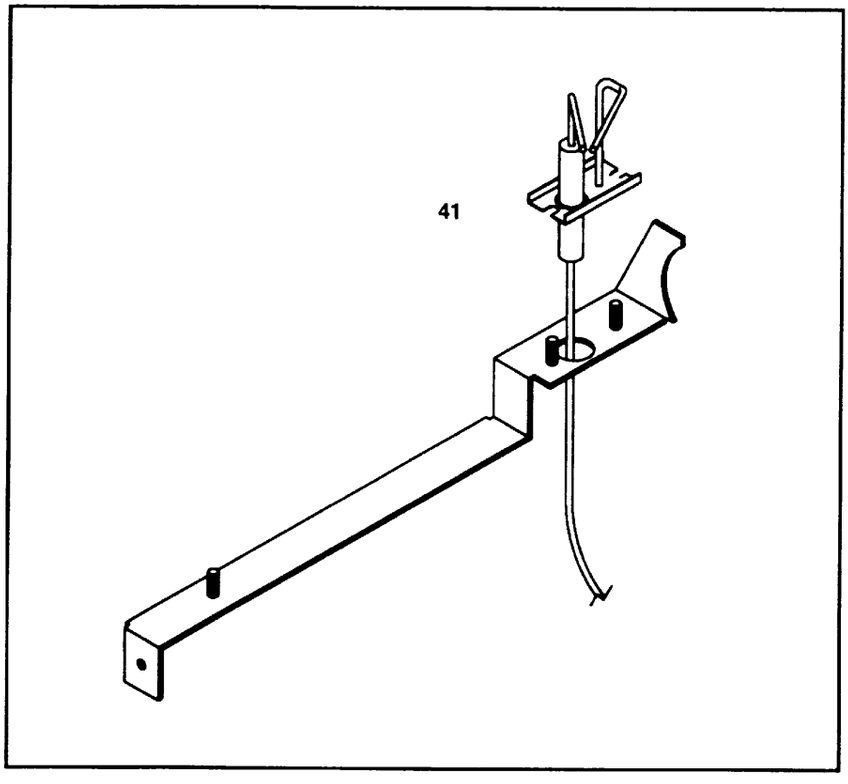
ITEM NO.	PART NO.	DESCRIPTION
27.	HAXPHK1930	Plastic Hardware Kit
28.	HAXTLK1930	Temperature Limiters Kit
29.	IDXLTMB1931	5-Pole Terminal Block
30.	CHXTRF1930	Transformer
31.	CHXGRL1930	TA-2 Ground Lug
32.	HAXPSA1930	Pressure Switch Asy.
33.	HAXCPA3151	Control Panel Asy. - 150 DS
33.	HAXCPA3201	Control Panel Asy. - 200 DS
33.	HAXCPA3251	Control Panel Asy. - 250 DS
33.	HAXCPA3301	Control Panel Asy. - 300 DS
33.	HAXCPA3351	Control Panel Asy. - 350 DS
33.	HAXCPA3401	Control Panel Asy. - 400 DS
34.	HAXCPA1930	Control Bezel Asy.
35.	HAXGSV0004	Gas Valve, DS Propane
35.	HAXGSV0005	Gas Valve, DS Natural Gas
36.	HAXMAN1150	Gas Manifold - 150
36.	HAXMAN1200	Gas Manifold - 200
36.	HAXMAN1250	Gas Manifold - 250
36.	HAXMAN1300	Gas Manifold - 300
36.	HAXMAN1350	Gas Manifold - 350
36.	HAXMAN1400	Gas Manifold - 400
37.	HAXBRN1930	Burner Tube
38.	HAXBON1930	Burner Orifice Natural Gas
38.	HAXBON1931	Burner Orifice Natural Gas HA
38.	HAXBOP1932	Burner Orifice Propane
38.	HAXBOP1931	Burner Orifice Propane HA
39.	HAXBMA1153	Burner - Manifold Asy. 150 DS NA
39.	HAXBMA1154	Burner - Manifold Asy. 150 DS LP
39.	HAXBMA1203	Burner - Manifold Asy. 200 DS NA
39.	HAXBMA1204	Burner - Manifold Asy. 200 DS LP
39.	HAXBMA1253	Burner - Manifold Asy. 250 DS NA
39.	HAXBMA1254	Burner - Manifold Asy. 250 DS LP
39.	HAXBMA1303	Burner - Manifold Asy. 300 DS NA
39.	HAXBMA1304	Burner - Manifold Asy. 300 DS LP
39.	HAXBMA1353	Burner - Manifold Asy. 350 DS NA
39.	HAXBMA1354	Burner - Manifold Asy. 350 DS LP
39.	HAXBMA1403	Burner - Manifold Asy. 400 DS NA
39.	HAXBMA1404	Burner - Manifold Asy. 400 DS LP
40.	HAXFAD1150	Front Access Door Asy. - 150
40.	HAXFAD1200	Front Access Door Asy. - 200
40.	HAXFAD1250	Front Access Door Asy. - 250
40.	HAXFAD1300	Front Access Door Asy. - 300
40.	HAXFAD1350	Front Access Door Asy. - 350
40.	HAXFAD1400	Front Access Door Asy. - 400
41.	HAXIGN1931	Igniter Asy.
-	HAXWHA0008	Wire Harness, Main DS (Not Shown)

Parts Illustration - Electronic Ignition



Parts Illustration - Electronic Ignition





Hayward Pool Heater Certificate Of Limited Warranty

Limited heater warranty:

TERMS AND COVERAGE: We warrant our pool heater to be free from defects in workmanship and materials under normal use and service. Pursuant to this warranty and subject to the Conditions and Exceptions indicated below:

1. We will replace (cost of freight, installation, cost of fuel,and service labor at user's expense) with the prevailing comparable model, or, at our option, repair any pool/spa heater that leaks under normal use and service within two years from the date of original installation for single family residential users and one year for all other users.
2. In addition, we will replace (cost of freight, installation, cost of fuel, and service labor at user's expense) or, at our option, repair any part or parts of the pool/spa heater which malfunction under normal use and service within two years from the date of original installation for single family residential users and one year for all other users.

LIMITATION ON IMPLIED WARRANTIES: WE ARE NOT LIABLE FOR ANY CONSEQUENTIAL DAMAGES FOR BREACH OF ANY WRITTEN OR IMPLIED WARRANTY OF THIS PRODUCT. Implied warranties, including the WARRANTY OF MERCHANTABILITY and all other implied warranties that may arise from course of dealing or usage of trade imposed on the sale of this heater under the laws of the state are limited in duration to the term of two (2) years for single family residential users and one (1) year for all other users. There are no warranties which extend beyond the description on the face hereof. We shall not in any event be held liable for any special, indirect or consequential damages.

EXPENSE OF DELIVERY AND INSTALLATION: Each pool heater or replacement part to be furnished under this warranty shall be furnished at our nearest distribution center. We shall not pay, nor be responsible for shipping or delivery charges to the place of installation, not for labor charges or other costs of removal or installation. Every defective heater or part replaced under this warranty shall become our property, and as such, must be returned to our distribution center with transportation charges paid by the user. Any replacement pool heater furnished under this warranty shall remain in warranty only for the unexpired portion of this warranty.

CONDITIONS AND EXCEPTIONS: This warranty applies only to the pool/spa heater at its original place of installation and only for the original owner. This warranty applies only to heaters installed for SINGLE FAMILY RESIDENTIAL APPLICATIONS. (Heaters installed for commercial, multi-family and other uses will be warrantied for a period of one year from date of installation.) It does not apply if the pool heater is installed in violation of any applicable code or ordinance, or is not installed, operated and maintained in accordance with our instructions, or is misused, damaged by accident, weather, act of God, freezing, water void and/or excess pressure, altered or disconnected. It does not apply with respect to:

1. A heater not equipped with Certified AGA limit controls or equivalent pressure relief valve, installed in accordance with applicable ordinance;
2. A heater operated with settings in excess of and/or with fuel not conforming to those shown on rating plate;
3 A heater on which the serial numbers have been altered, defaced or removed;
4. Leaks arising from defective installation;
5. Production of noise, odors or discolored (rusty, etc.) water;
6. Leakage substantially contributed to by sediment, lime precipitate and/or higher than normal dissolved solids (ph above 7.8) in the tank, copper tubes or water ways;
7. Leakage substantially contributed to by corrosive elements in the atmosphere (such as the storage of chlorine or other chemicals);
8. Leakage caused substantially or contributed to by corrosive pool water in an acid condition (ph below 7.2);
9. Damage caused substantially or contributed to by an external source of energy;
10. A pool/spa heater is a water containing device. Leakage of water from this device can be expected at some time due to malfunction of the limitations of the service life of various components. Do not install this product where such leakage can cause damage. MANUFACTURER IS NOT RESPONSIBLE OR LIABLE FOR ANY COSTS INCURRED BY SUCH DAMAGE.

IN NO CASE ARE WE TO BE HELD LIABLE FOR DAMAGE TO SURROUNDING AREA OR PROPERTY CAUSED BY LEAKAGE OR MALFUNCTION.

HOW TO CLAIM UNDER THIS WARRANTY: The original owner, upon discovering the defect, must present the attached completed warranty claim card with proof of purchase either to the dealer or notifiy the Company in writing at either address:

Hayward Pool Products, Inc.
900 Fairmount Avenue
Elizabeth, NJ 07207
or
Hayward Pool Products, Inc.
2875 Pomona Boulevard
Pomona, CA 91768

Upon receipt of such notification we shall decide whether to repair such parts or replace any pool heater, reserving at all times the right to inspect in order to verify any claimed defect. We also reserve the right to have our representatives make any inspections, repairs, or to furnish replacements. This warranty is intended as a legally binding obligation of the Company, enforceable in the courts. This warranty may give you specific legal rights which may very from state to state.

LIMITATION ON LIABILITY: All intended representations have been expressly set forth in this document. This warranty may not be extended by oral or any other additional representations, written sales information, drawings or otherwise. Our liability, in the event of leakage or other malfunction, is strictly limited to repair or replacement of the defective heater or part, as provided herein and the Company is not responsible hereunder for incidental or consequential property damage or personal injury, interim loss of use of the heater, inconvenience or other consequential or incidental costs or damages. The Company neither assumes, nor authorizes any person or firm to assume for us, any further liability or obligation in connection with the sale, installation, use, maintenance or existence of the heater.

SAFETY WARNING: Pool heaters are heat producing appliances and to avoid damage or injury in the event of possible overheating of the outer jacket (1) no materials should be stored against the jacket and (2) care should be taken to avoid unnecessary contact (especially by children) with the jacket. When lighting a gas heater, the lighting instructions must be followed exactly to prevent possible "flash-back" of excess gas in the heater. Electronic ignition heaters and electric heaters must have the power shut off when making adjustments to, servicing, or coming into contact with the heater. UNDER NO CIRCUMSTANCES SHOULD FLAMMABLE MATERIALS, SUCH AS GASOLINE OR PAINT THINNERS, BE USED OR STORED IN THE VICINITY OF THE HEATER OR IN ANY LOCATION FROM WHICH FUMES COULD REACH THE HEATER. For your comfort, enjoyment and safety, please read the enclosed operating instructions carefully.

FireTile™ five year limited warranty:

TERMS AND COVERAGE: This warranty is an extended limited warranty applicable to the FireTile™ components used in the combustion chamber of your pool/spa heater. All terms, conditions, limitations and exceptions of the regular pool heater limited warranty remain in force, apply to this warranty, and are incorporated herein by reference.

Under the terms of this special FireTile™ limited warranty, we will replace (cost of freight, installation, cost of fuel, and service labor at user's expense) any components of your pool/spa heater made of FireTile™ which fail from defects in workmanship and materials under normal use and service in a single family residential application for a period of five (5) years.

USE THIS ONLY FOR MAKING A CLAIM.

LIMITED 2 YEAR POOL/SPA/HOT TUB HEATER CLAIM CARD

Model No. _____ Serial No. _____

Purchaser's Name _____

Installation Address _____

City and State _____

Single Family Residential Use Yes ☐ No ☐ If no, fill in use _____

Dealer's Name _____

Address _____

Date of Installation _____

Note to Dealer: Fill in the following information on replacement heater:

Model No. _____ Serial No. _____ Date Installed _____

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Notes

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