HAYWARD®

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

Models H250IDL2, H350IDL2 & H400IDL2

FOR YOUR SAFETY

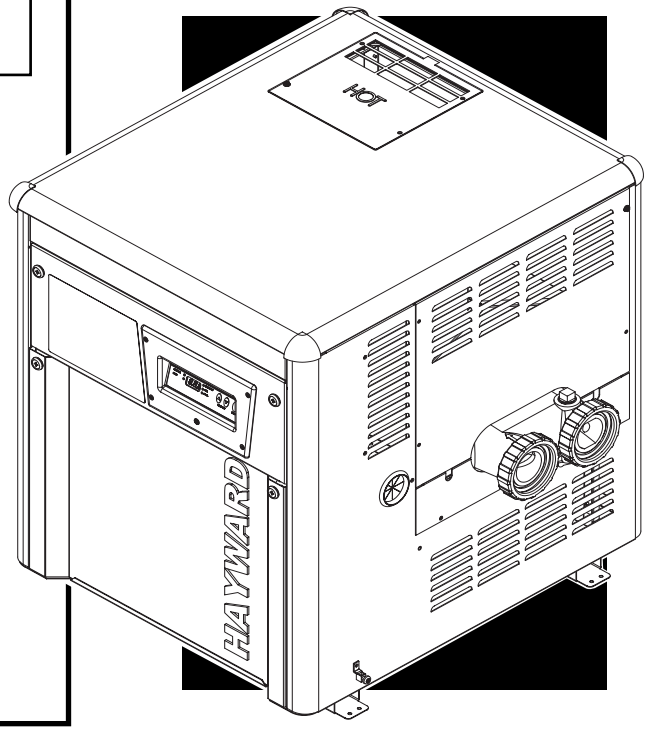
WARNING: If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury, or death.

– Do not store or use gasoline or other flammable vapors or 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.



FOR YOUR SAFETY

This product must be installed and serviced by authorized personnel, qualified in pool/spa heater installation. Improper installation and/or operation can create carbon monoxide gas and flue gases that can cause serious injury, property damage, or death.

For indoor installations, as an additional measure of safety, Hayward strongly recommends installation of suitable Carbon Monoxide (CO) detectors in the vicinity of this appliance and in any adjacent occupied spaces. Improper installation and/or operation will void the warranty.

PATENT NO. 6026804

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Contents

Section I. General Information

Introduction:

This manual contains instructions for installation, operation, maintenance, troubleshooting and parts lists for the safe use of the Model H250IDL, H350IDL and H400IDL Low NO_x 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 water heating equipment. The direct fired finned-tube design of the pool/spa heaters 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 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.

Limited warranty summary:

We warrant the H-Series pool/spa heater to be free from defects in materials and workmanship, and we will within one year from date of installation for all 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 one year from date of such installation for all 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 the workmanship and materials under normal use and service in a single family residential application for a period of (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 included in this manual.

⚠ 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

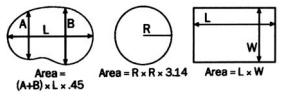
Selecting the correct size heater:

Factors influencing heater sizing include pool/spa size, average wind velocity, ambient temperature, and desired increase in temperature over ambient 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



2. Determine desired pool water temperature (usually 78 - 82º F).
3. Determine average air temperature of coldest month of use.
4. The temperature rise is 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 x average depth x 7½).

The reference table lists the time required in minutes to raise the temperature of the spa/hot by 30ºF, read to the left and select the appropriate heater model.

This guide can be adjusted for other temperature rises. For example, if a 15ºF increase in temperature is desired, simply divide the time for 30ºF 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					
H250	2309	1540	1155	924	770	660
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
H250	15	23	31	38	46	54	61	69	77

Section III. Installation

Equipment inspection:

On receipt of the heater equipment, inspect the heater 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 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 must conform to the National Gas Code ANSI Z223.1 (latest edition) and with the requirements of the authority having jurisdiction. Design Certification of the heater is in compliance with ANSI Z21.56•CSA4.7.

For Canadian installations, the heater is to be installed in accordance with the 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 2,000 feet of elevation above sea level.

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 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 barrier. This heater must be installed also at least five feet from the wall of an above-ground pool.

The heater must be installed such that the location of the vent assembly outlet relative to adjacent public walkways, adjacent buildings, openable windows, and building openings complies with the National Fuel Gas Code, ANSI Z223.1 and/or CAN/CGA B149 Installation Codes.

Flooring:

This heater can be installed on combustible flooring.

Reversible water connections:

This heater is designed so that it can be installed with the water connections located on either the right or left side. Heaters are shipped from the factory with the water connections on the right side. To bring the water connections to the left side, follow step-by-step instructions below and refer to the illustration in Figure 5. These procedures should be performed by a trained service technician before the heater is installed.

1. Remove four (hot) vent screws and remove panel.
2. Remove heater top.
3. Remove screws from left and right side access panels. Remove panels.
4. Remove the front panel.
5. Disconnect high limit wires and reroute them to opposite side of heater. Disconnect the thermistor leads from control panel and pull through intermediate panel.
6. Remove pressure switch and tube.
7. 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-ring may be re-used if not permanently deformed. if installing new O-rings, Jack's 327 Lube may be liberally applied to O-ring to keep it in place during header installation.

8. Remove four screws retaining air deflector, and remove air deflector.
9. Unplug wires and pressure tap tubes from combustion blower.
10. Remove screws retaining flue collector and remove flue collector/combustion blower assembly.
11. Remove screws securing heat exchanger from tube sheets on both front and rear of heater.

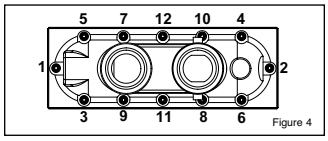
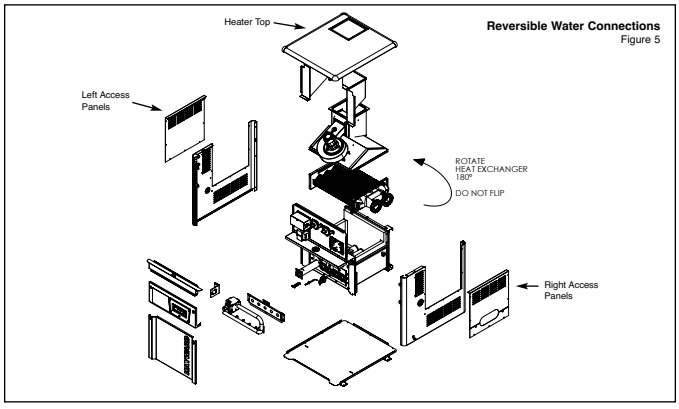


Figure 4



Reversible Water Connections
Figure 5

12. Lift out heat exchanger and rotate it 180 degrees horizontally – **DO NOT FLIP IT OVER.** (This End Up ▲) sticker should be pointing up.
13. Reinstall front header on heat exchanger ("TOP" marking on header should now be on the bottom).
14. Torque header nuts from 5 to 7 ft lbs. in the sequence shown by Figure 4. Do not overtighten.
15. Move the pressure switch tube over to the left side of the heater and route through hole in intermediate panel. Insert tube in header fitting and tighten the ferrule down with the nut.
16. Reattach the high limit wires to the switches. Route thermistor leads through intermediate panel, into control compartment, and plug into control board.
17. Repeat steps 1-4 and 8-11 for reinstallaton.

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 - 24"
Back - 6"
Right side (Water side) - 12"
Left side - 6"

Figure 6

1. Outdoor models 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. 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.
4. Do not install heater where water spray from ground sprinklers can contact heater. Sprinkler water could cause operating problems.
5. Do not install under a deck.
6. 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 7.

1 Square Inch Per 4000 BTU Per Hour		
Input	Combustion Air	Ventilation Air
250,000	62.5 square in.	62.5 square in.
350,000	87.5 square in.	87.5 square in.
400,000	100 square in.	100 square in.

Figure 7

Indoor installation and venting:

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

Indoor Installations
Top - 36"
Front - Unobstructed
Back - 6"
Right side (Water side) - 12"
Left side - 6"
For use on combustible floors.
Do not install in a closet.

Figure 8

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 the 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 9. 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 bottom of the enclosure. The opening 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 10.
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 10.
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 11.
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.

Figure 9

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

Figure 10

1 Square Inch Per 4000 BTU Per Hour		
Input	Combustion Air	Ventilation Air
250,000	62.5 square in.	62.5 square in.
350,000	87.5 square in.	87.5 square in.
400,000	100 square in.	100 square in.

Figure 11

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

Vertical Venting—Negative Pressure:

Locate the pool/spa heater as close as practical to a chimney and gas supply according to the Figures 12 and 13. Size vent according to the venting tables. The maximum vent height should not exceed 50'. The total vent length should not exceed one half of the total vertical vent height. The vent system can have up to three 90 degree elbows. See Figure 16 on page 9.

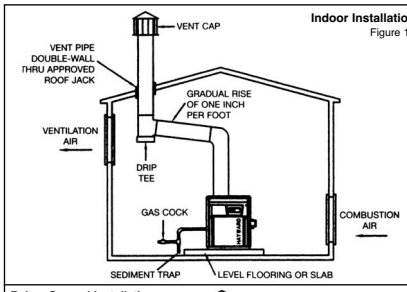
Vent Collar Diameters	
Model	Diameter
H250IDL	6 inches
H350IDL	8 inches
H400IDL	8 inches

The cap opening of the vent must terminate in accordance with Figure 16. The vent cap location shall have a minimum clearance of 4 feet horizontally from electric meters, gas meters regulators and relief openings.

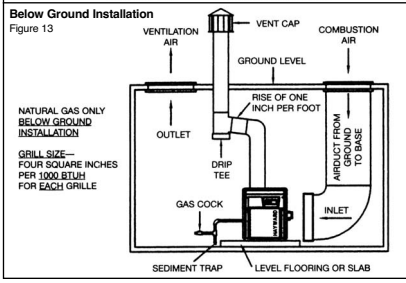
The weight of the vent or chimney must not rest on the heater. Support must be provided in accordance with applicable codes. The vent pipe must be supported to maintain proper clearances from combustibles.

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

Indoor Installation
Figure 12



Below Ground Installation
Figure 13



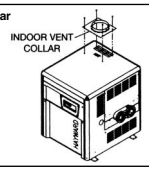
Indoor Adapter Kit Installation:

Before connecting vent to heater, a vent collar must be installed to the heater exhaust outlet, and a drain plug and outlet cover must be installed. These components are contained in the indoor Adapter Kit.

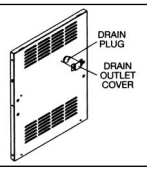
The installation of the kit is done as follows:

1. Remove the 4 screws that fasten the vent cover to the internal vent assembly. Discard the vent cover. Install the vent collar and gasket over exhaust using 4 screws previously removed. See Figure 14.
2. Install plug into drain at rear of heater. Install drain outlet cover over the drain outlet using 2 screws. See Figure 15.
3. Install vent pipe on the indoor vent collar. The collar will accept 6" or 8" vent diameter, depending upon the model of heater. See section titled "Indoor Installation and Venting" for indoor installation and venting guidelines.

Indoor Vent Collar Installation
Figure 14



Drain Outlet Cover Installation
Figure 15



Vent Sizing Table for Vertical Negative Pressure Vending
Figure 16

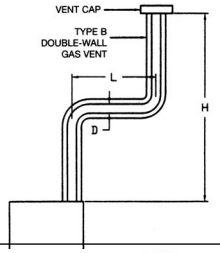
Table 1: Type B Vertical Vent with Type B Vent Connector
Lateral Length (L) must be less than Ω of the Vertical Vent Height (H)
Vent System can have up to three 90 degree elbows.

	H250IDL		H350IDL		H400IDL	
Vent Diameter	Minimum Height (H)	Maximum Hieight (H)	Minimum Height (H)	Maximum Height (H)	Minimum Height (H)	Maximum Hieight (H)
6 in.	8'	50'	Not Recommended	Not Recommended	Not Recommended	Not Recommended
7 in.	6'	50'	6'	Not Recommended	Not Recommended	Not Recommended
8 in.	6'	50'	6'	50'	6'	50'
9 in.	6'	50'	6'	50'	6'	50'
10 in.	6'	50'	6'	50'	6'	50'

Table 2: Type B Vertical Vent with Single Wall Vent Connector
Lateral Length (L) must be less than Ω of the Vertical Vent Height (H)
Vent System can have up to three 90 degree elbows.

	H250IDL		H350IDL		H400IDL	
Vent Diameter	Minimum Height (H)	Maximum Height (H)	Minimum Height (H)	Maximum Height (H)	Minimum Height (H)	Maximum Hieight (H)
6 in.	8'	50'	Not Recommended	Not Recommended	Not Recommended	Not Recommended
7 in.	6'	20'	Not Recommended	Not Recommended	Not Recommended	Not Recommended
8 in.	Not Recommended	Not Recommended	6'	50'	6'	50'
9 in.	Not Recommended	Not Recommended	6'	30'	6'	30'
10 in.	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended

Table 1 is used when sizing Type B double-wall gas vent connected directly to the appliance.

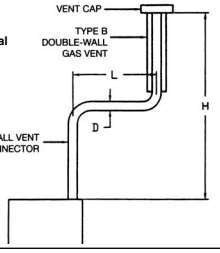


Gas Vent Termination Table

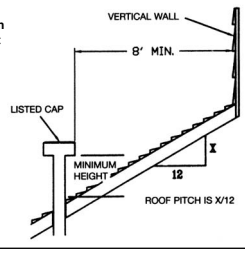
Roof Pitch	Minimum Height
Flat to 7/12	1.0 Feet*
Over 7/12 to 8/12	1.5 Feet
Over 8/12 to 9/12	1.5 Feet
Over 9/12 to 10/12	1.5 Feet
Over 10/12 to 11/12	1.5 Feet
Over 11/12 to 12/12	1.5 Feet
Over 12/12 to 14/12	1.5 Feet
Over 14/12 to 16/12	1.5 Feet
Over 16/12 to 18/12	1.5 Feet
Over 18/12 to 20/12	1.5 Feet
Over 20/12 to 21/12	1.5 Feet

*This requirement covers most installations

Table 2 is used when sizing a single-wall metal vent connector attached to a Type B double-wall gas vent.



The vent termination should not be less than 8 FT. from a vertical wall.



Horizontal or Vertical Venting—Positive Pressure:

The heater can be vented either horizontally or vertically with positive pressure vent system if one of the Special Gas Vent Systems listed in Figure 17 is used. Do not use a draft hood with this heater. The vent system must be installed in accordance with the National Gas Code ANSI Z223.1 or the CAN/CGA B149 Installation Codes, Local Codes and the Vent Manufacturer's Instructions.

See Figure 17 for permissible vent diameters for these heaters.

See Figure 18 for maximum permissible vent lengths.

The Vent System must terminate with a Vent Terminal approved for this Pool Heater. See figure 19 for a list of approved vent terminals.

A Special Gas Vent Adapter Kit must be installed on heater before connecting the Special Gas Vent to the Heater.

Figure 17: **Recommended Special Gas Vent Systems for Horizontal or Vertical Positive Pressure Venting of H250IDL, H350IDL & H400IDL Heaters**

Vent Brand	Manufacturer	Diameter
Saf-T Vent Single Wall Special Gas Vent	Heat-Fab Inc. 130 Industrial Blvd. Turners Falls, MA 01376 (800) 772-0739	6"
Saf-T CI Vent Double Wall Special Gas Vent		

Figure 18: **Maximum Special Gas Vent System Length for H250IDL, H350IDL & H400IDL Heaters**

Number of 90° Elbows	Maximum Length
0	50
1	50
2	40
3	30

Figure 19: **Approved Special Gas Vent Terminals for H250IDL, H350IDL & H400IDL Heaters**

Vent Brand	Horizontal Terminal	Vertical Terminal
Saf-T Vent	9614TERM	5600CI
Saf-T CI Vent		

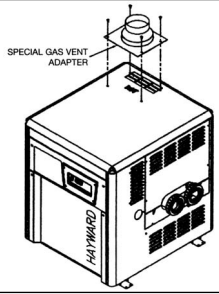
Special Gas Vent Adapter Kit Installation:

A Special Gas Vent Adapter collar must be installed to the heater exhaust outlet, and a drain plug and outlet cover must be installed. These components are contained in the Special Gas Vent Adapter Kit.

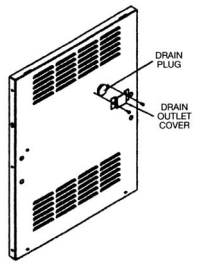
The installation of the kit is done as follows:

1. Remove the 4 screws that fasten the vent cover to the internal vent assembly. Discard the vent cover. Install the vent adapter and gasket over exhaust using 4 screws previously removed. See Figure 20.
2. Install plug into drain outlet at rear of heater. Install drain outlet cover over the drain outlet using 2 screws. See Figure 21.

Special Gas Vent Adapter Installation Figure 20



Drain Outlet Cover Installation Figure 21



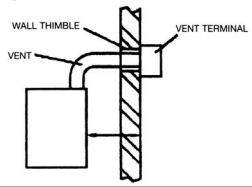
Indoor Installation:

The following installation and service clearances must be maintained from the heater to combustible materials. See Figure 22.

Indoor Installation Figure 22
Top - 36"
Front - Unobstructed
Back - 6"
Right side (Water side) - 12"
Left side - 6"
For use on combustible floors.
Do not install in a closet.

*For installations in which the vent terminates in a wall directly behind the heater, allow 23" between the rear of the heater and the outside of the wall. See Figure 23.

Clearance for Vent Termination in Wall Directly Behind Heater
Figure 23

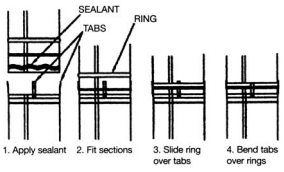


Connecting Special Gas Vent to the Heater:

Attach the Special Gas Vent to the Vent Adapter using the adhesive specified by the vent manufacturer. Do not drill holes or use screws to connect Vent to Vent Adapter.

1. Apply a bead of adhesive, about ⅛" in diameter, completely around the male end of the vent section, between ¼" to ⅜" from the end of the section.
2. Fully insert the male section into the female fitting of the Vent Adapter.
3. Secure vent section Vent Adapter by sliding the ring of the vent section over the tabs of the Vent Adapter and bending the tabs over the ring. See Figure 24.

Attaching Vent to Vent Adapter
Figure 24



Gas supply and piping:

Refer to the charts on Figure 25 for gas pipe sizing for low pressure natural gas, low pressure single state 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	H250	H350	H400
	BTU	250,000	350,000	400,000
	LINE MATERIAL	IRON OR PLASTIC PIPE	IRON OR PLASTIC PIPE	IRON OR PLASTIC PIPE
0 to 50 feet		1"	1½"	1½"
50 to 100 feet		1½"	1½"	1½"
100 to 200 feet		1½"	1½"	1½"
200 to 300 feet		1½"	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	H250	H350	H400
	BTU	250,000	350,000	400,000
	LINE MATERIAL	IRON PIPE	TUBING	IRON PIPE	TUBING
0 to 50 feet		1"	1¼"	1"	—
50 to 100 feet		1"	1¼"	1½"	—
100 to 200 feet		1½"	—	1½"	—
200 to 300 feet		1½"	—	1½"	—

HIGH PRESSURE NATURAL GAS PIPE SIZING "TWO STAGE" SYSTEMS:

HIGH PRESSURE NATURAL GAS PIPE SIZING "FIRST STAGE": (Based upon gas pressure of 2 psig inlet pressure at a pressure drop of 1 psi.)

DISTANCE FROM OUTLET OF 1st STAGE REGULATOR TO INLET OF 2nd STAGE REGULATOR	MODEL	H250	H350	H400
	BTU	250,000	350,000	400,000
	LINE MATERIAL	IRON OR PLASTIC PIPE	IRON OR PLASTIC PIPE	IRON OR PLASTIC PIPE
0 to 50 feet		1/2"	1/2"	1/2"
50 to 100 feet		1/2"	3/4"	3/4"
100 to 150 feet		1/2"	3/4"	3/4"

LOW PRESSURE NATURAL GAS PIPE SIZING "SECOND STAGE": (Based upon gas pressure of 10.5 inches W.C. inlet pressure at a pressure drop of 0.5 inche W.C.)

DISTANCE FROM OUTLET OF 2nd STAGE REGULATOR TO INLET OF GAS VALVE	MODEL	H250	H350	H400
	BTU	250,000	350,000	400,000
	LINE MATERIAL	IRON PIPE	IRON PIPE	IRON PIPE
0 to 10 feet		3/4"	3/4"	3/4"

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

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

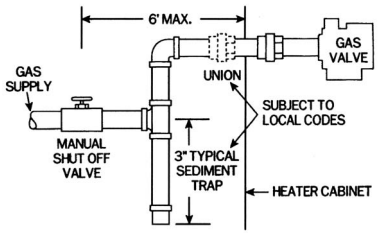
DISTANCE FROM OUTLET OF 1st STAGE REGULATOR TO INLET OF 2nd STAGE REGULATOR	MODEL	H250	H350	H400
	BTU	250,000	350,000	400,000
	LINE MATERIAL	IRON PIPE	TUBING	IRON PIPE	TUBING	IRON PIPE	TUBING
0 to 50 feet		½"	½"	½"	½"	½"	½"
50 to 100 feet		½"	½"	½"	½"	½"	½"
100 to 200 feet		½"	½"	½"	½"	½"	½"

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	H250	H350	H400
	BTU	250,000	350,000	400,000
	LINE MATERIAL	IRON PIPE	TUBING	IRON PIPE	TUBING	IRON PIPE	TUBING
0 to 10 feet		¾"	¾"	¾"	¾"	¾"	¾"

Figure 25

Sediment Trap
Figure 26



All gas installations:

The H-series heater is to be installed with a gas connection located on the left side. Insert the pipe to the gas valve through the grommet 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 26.

A C.S. A. Certified main gas valve shutoff must be installed outside of cabinet and within 6 feet of the heater. Gas shutoff valve must have and 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 overtighten the gas inlet pipe or damage may result. See Figure 26.

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 26.

Do not use flexible appliance connectors on any gas connections unless the connector is C.S.A. approved for outdoor installation, is marked with 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 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 (¾").

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.

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

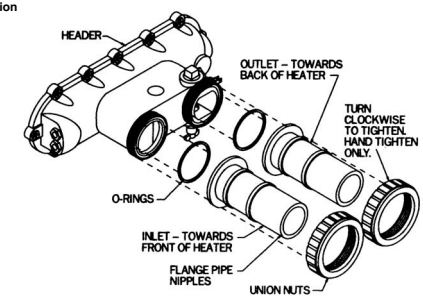
1. The H-Series heater is equipped with CPVC SCH-80 flanged pipe nipples, union nuts, nitrile O-rings for use with 2" pipe connections. Figure 27 shows the method for installing these parts on the header.

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

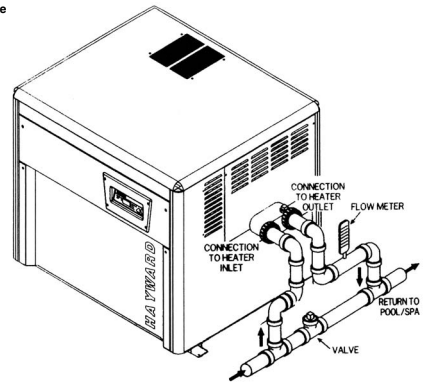
2. The CPVC SCH-80 flanged pipe nipples must be installed on the heater inlet and outlet without modification. CPVC SCH-80 plastic has an ASTM rating of F441 and is NSF approved. The opposite ends of the pipe nipples should be attached to the filtration system as particular installation dictates.
3. Pipe, fittings, valves, and any other element of the filter system may be made of plastic materials, if acceptable by the authority having jurisdiction. If 1½" plastic pipe is used, it will slide directly into the flanged pipe ends.
4. Heat sinks (heat tapes), firemen 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 29.
6. If the normal pump and filter system flow rate exceeds 125 gpm then a manual by-pass valve, as shown in Figure 28, 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 30 shows a typical pool piping diagram and layout for the pool equipment. Figure 31 shows multiple heater usage for very large pools with and without an external by-pass (balancing) valve.

⚠ **NOTE:** Improperly adjusted by-pass valves may result in damage to the heater; this damage is not covered under warranty.

Pipe Nipple Installation
Figure 27



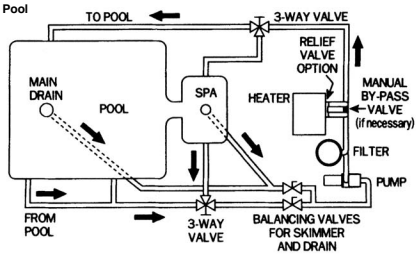
Manual By-pass Valve
Figure 27



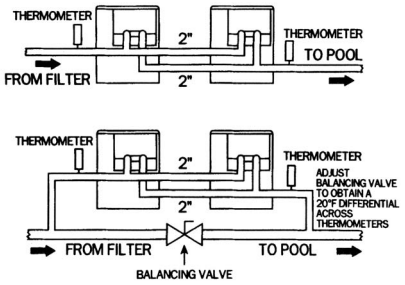
Model	Minimum	Maximum
H250IDL	25	125
H350IDL	40	125
H400IDL	40	125

Figure 29

Typical Plumbing To Pool
Figure 30



Multiple Heater Hookups
Figure 31



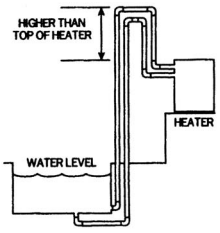
Installation above pool/spa surface:

If the 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 backpressure at the heater to operate the pressure safety switch when filter pump is running.

If heater is installed more than three (3) feet above the surface of pool/spa water, install a loop as shown on Figure 32 to prevent drainage of water in heater during filter change.

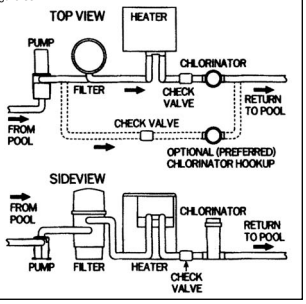
For installation below pool/spa surface, refer to Section IV.

Heater Installation Above Pool
Figure 32



Automatic chlorinators and chemical feeders:

Automatic Chlorinator
Figure 33

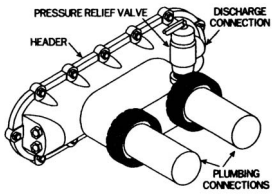


If used, a chlorinator must be installed downstream from the heater in the pool return line and at a lower elevation than the heater outlet connection. See Figure 33. Install a separate positive seal, corrosion resistant check valve between the heater outlet and chlorinator to prevent highly concentrated sanitizers from back-siphoning into the heater. Back-siphoning usually occurs when the pump is shut off and a pressure-section differential is created.

Pressure relief valve:

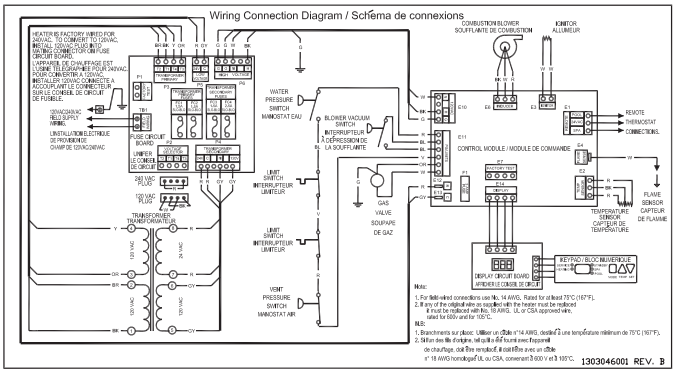
It may be necessary to install a pressure relief valve to conform with local building codes. A ¾" pressure relief valve with a discharge capacity greater than or equal to the BTUH input of the heater and a pressure relief rating less than the heater working pressure is recommended (see rating plate).

Pressure Relief Valve
Figure 34



A ¾" NPT connection is provided in the front header for installation of a pressure relief valve. See Figure 34. 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 drain line. The valve lever should be lifted at least once a year to ensure that the waterway is clear.

Wiring Diagram Figure 35



Electrical connections:

The heater is equipped with a Hot Surface Ignition Control System that automatically lights the burners. An external power supply is required to power the control system.

The heater comes factory-wired for use with a 240 VAC, 60 Hz, field power supply. To convert the heater to 120 VAC, 60 Hz, remove the 240 VAC Voltage Selector Plug from the receptacle on the Fuse Board. Locate the 120 VAC Voltage Selector Plug and install it into the receptacle.

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.

The heater must be electrically grounded and bonded in accordance with local codes, or in the absence of local codes, with National Electrical Code, ANSI/NFPAA 70.

The H-Series heater must be installed with the electrical connections, service entry/remote control, located on the left side of the heater.

Field wiring connections are to be made to the Fuse Board behind the control access panel. Connect the field supply wires to the terminal block on the Fuse Board. Connect the ground wire to the lug adjacent to the Fuse Board. Tighten terminal screws to 8 in-lbs.

Remote control connection:

The heater is equipped for connection to an external 2-wire remote thermostat or a 3-wire remote switch. A 2-wire thermostat has its own temperature sensor for regulating water temperature. A 3-wire remote switch allows the “Pool” or “Spa” modes to be remotely selected.

Connect remote wiring to the terminal block on the Control Module. For a 2-wire remote thermostat, connect one wire to the Pool terminal and the second wire to the 24 VAC terminal. For a 3-wire remote, connect Pool/Low to the Pool terminal, Spa/High to the Spa terminal, and Common to the 24 VAC terminal.

Remote wiring should be run in a separate conduit. For runs less than 30 feet, use 22 AWG wire. For runs over 30 feet, use 20 AWG wire. Runs should not exceed 200 feet.

To configure the heater for 2-wire remote thermostat control, use the “Mode” key of the keypad to put the control in the “Standby” mode. Then press and hold the “Down” and “Mode” keys for 3 seconds until the indication “bo” is shown on the display.

To operate the heater by remote thermostat, the heater’s control must be in either “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.

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 display will show the water temperature. When the remote switch is set to “Spa/High”, the Spa LED will be energized and the display will show the water temperature. The heater will use its internal thermostat to regulate the water temperature to the set point of the mode selected.

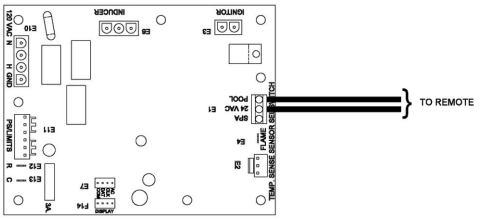
Bypass Operation

Note the following information when setting up the IDL2 for Bypass Operation (control via a remote thermostat).

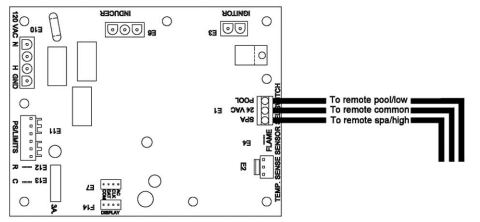
1. Use the keypad to set the IDL2 for Bypass Operation as outlined in the Owner/Operator Manual. No dipswitches are used on this model.
2. When shipped from the factory the mode will be set to “STANDBY” and the thermostat settings for “SPA” and “POOL” will be set at 65° F.
3. During a pre-install prior to pool/pump startup it may be desired to set Bypass Operation before sufficient water pressure is available. In most situations this is now possible with IDL2 heaters that use Version 13 operating software. After powering up the heater the fault code “LO” will illuminate on the display panel. This will be a “soft” lockout resulting from the open contacts on the water pressure switch; the control will accept inputs via the keypad. Follow the process described in the Owner/Operator manual to set Bypass Operation. Bypass Operation cannot be set while any other fault code is displayed until that code is cleared. After setting Bypass Operation (the display will read “bo”) set the heater to “SPA” or “POOL” as needed.
4. The display will continue to show “bo” for 10 seconds, then “LO” will be displayed again.
   a. If the remote thermostat does not generate a call for heat the “LO” error will continue to be a “soft” lockout. The control will accept keypad inputs to change the mode and it will remain in the selected mode when the error code is cleared. The heater will not operate until the error code is cleared.
   b. If the remote thermostat generates a call for heat the “LO” error will be a “hard” lockout. The control will accept keypad inputs to change the mode and it will remain in the selected mode when the error code is cleared or the call for heat is removed. It will not be possible to switch out of Bypass Operation until the error code is cleared.

Connecting a remote:

Connection to 2-Wire Remote Thermostat



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 heater is automatically lit 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 must 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 ½ 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 pressure equal to or less than ½ 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 tubing joints for leaks. Use a soap and water solution. Bubbles forming indicate a leak. **Never use a 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 manifold 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 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.

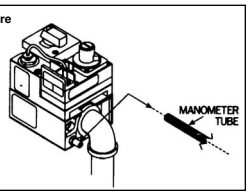
The pressure regulator on all H-Series heaters is preset at the factory and normally needs no adjustment. If gas pressure is inadequate, check for undersize piping between meter and heater or for low capacity gas meter.

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. 3/16" Hex Wrench.
      d. Screwdriver.

SAFETY WARNING: Do not remove the ⅛" plug with the gas valve in the "ON" position. The gas valve must be in the "OFF" position when the plug is removed.

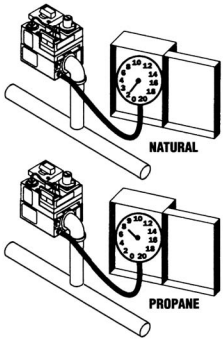
   2. Remove ⅛" plug from gas valve.
   3. Install ⅛" pipe nipple into gas valve.
   4. Attach manometer to the " pipe nipple. See Figure 37.

Gas Pressure
Figure 37



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 7" W.C. (water column pressure). Natural gas must have 2" W.C. See Figure 38.
7. If the gas pressure does not meet the above requirements the regulator must be adjusted.

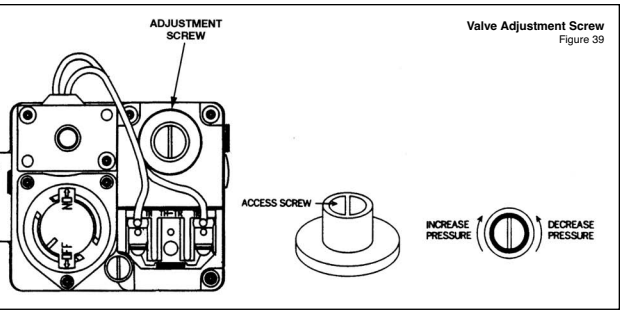
Gas Pressure Reading
Figure 38



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 39.

⚠ **SAFETY WARNING:** Do not remove the ⅛" pipe nipple with the valve in the "ON" position. The valve must be in the "OFF" position when the plug is remove.

   3. Remove the ⅛" pipe nipple and replace ⅛" 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 4.5" W.C. for Natural and 9" W.C. for Propane for the purpose of input adjustment.

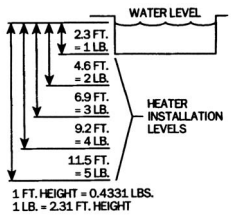


Valve Adjustment Screw
Figure 39

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 “Water Pressure Switch” on Page 33).
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 40



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 arrangement 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 41. 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 to the back of the front access door. The instruction label is shown in Figure 42.

⚠ **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 the 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.

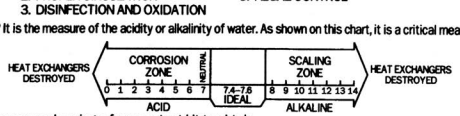
⚠ **NOTE:** Do not use the unit below 40°F temperature without adequate temperature protection. Do not operate heater while an automatic pool cleaner is in use unless the flow rate has been checked as correct under operation with the pool cleaner and a dirty filter.

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 41

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.

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.

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.

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.

Figure 42

⚠ 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 104°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 the 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 a medical history of heart disease, circulatory problems, diabetes, or blood pressure problems should obtain their physician's advice before using spas or hot tubs.

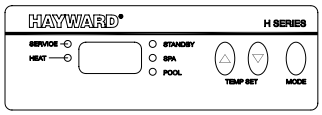
Persons taking medications which induce drowsiness, such as tranquilizers, antihistamines, or anticoagulants, should not use spas or hot tubs.

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 control operation:

Temperature Controls
Figure 43



The heater is equipped with a Temperature Conrol for controlling the Pool and Spa water temperatures. Individual Pool and Spa setpoints can be entered using the keypad. The control also displays the Pool or Spa water temperature and diagnostic information.

Operation:

This new Hayward IDL2 heater has improved operating software and routines that differ from previous IDL2 and IDL models. The key identifier for the improved IDL2 control is the label found at the top of the ignition board in the control box. This label is printed in blue ink and references "VER13" (the updated Version 13 software).

To turn the heater on, press the MODE key to put the heater in the POOL or SPA mode. The POOL LED will illuminate to indicate that the control is in the POOL mode and the water temperature is to be controlled to the pool setpoint. The SPA LED will illuminate to indicate that the control is in the SPA mode and the water temperature is to be controlled to the spa setpoint. The display will show the actual water temperature. The HEAT LED will illuminate whenever the burners have fired and the heater is actively heating the water.

Set Point adjustment:

The set point temperature is displayed by pressing the UP or DOWN keys while in the POOL or SPA mode. The set point will blink while being displayed. Further pressing of the UP or DOWN keys will adjust the set point temperature up or down. The set point can be set between 65˚F and 104˚F.

Fahrenheit versus Celsius:

The temperature can be displayed in Fahrenheit or Celsius. To change the display, first use the MODE key to put the control in STANDBY. Then, press and hold the UP and MODE keys until the display shows the ˚F/˚C selection. Press the DOWN key to toggle between selections. The selection will be selected after 60 seconds, or when the MODE key is pressed.

Sequence of Operation:

This Hayward heater utilizes a microprocessor-based ignition control board and display board to control the heater's operation for your safety and comfort. The ignition module monitors and evaluates inputs from the blower prover switch, the temperature limit switches, the vent pressure switch, the water pressure switch, the water temperature sensors, the flame sensor, and the keypad. The control uses these inputs and internal logic to recognize, act upon, and display the appropriate error codes when necessary.

HEATING MODE

The control continually compares the water temperature with the set point and the high limit temperature. When the water temperature is more than 1° below the set point a call for heat is generated and a heating cycle is initiated.

1. The control checks for open contacts at the blower prover switch.
2. The control energizes the blower at low speed and the igniter. The igniter heat-up time is approximately 20 seconds. The blower is running a pre-purge cycle during this time.
3. The control checks for closed contacts at the blower prover switch.
4. When the igniter reaches the proper temperature a 4-second trial for ignition begins. The control opens the gas valve and monitors flame current.

The igniter is turned off when flame is sensed or after 4 seconds.
5. If flame is sensed for more than 60 seconds the control switches the blower to high speed.
6. The blower prover switch, the temperature limit switches, the vent pressure switch, the water pressure switch, the water temperature sensors, and the flame sensor are constantly monitored during a call for heat to assure the heater is operating properly.
7. When the thermostat is satisfied and the call for heat ends the control immediately de-energizes the gas valve. Flame is extinguished.
8. The control operates the blower during a 30-second post-purge period.

FAILURE TO LIGHT: RETRY

If the first ignition attempt fails during a normal heating cycle the control will make two (2) additional ignition attempts:

1. The control de-energizes the gas valve after the 4-second ignition trial ends.
2. The control operates the blower during a 30-second post-purge period.
3. The control monitors for open contacts at the blower prover switch.
4. The control performs a gas valve relay check.
5. A normal ignition sequence resumes with Item #2 in “Heating Mode” (above). If the third ignition trial fails the control enters a safety lockout (or “hard” lockout) after the post-purge period of the third failed trial.
6. The error code “IF” is displayed and the “SERVICE” indicator is illuminated.
   a. The control automatically resets and clears the “IF” error code without any user intervention after 60 minutes. If there is a call for heat after reset the control will make three (3) trials for ignition. If ignition is not established the control will again enter safety lockout for 60 minutes. This cycle will continue until ignition is established or the call for heat is removed.
   b. The user can reset the control and clear the “IF” error code by pressing the “MODE” button to move through “STANDBY” and return to the previous mode (“SPA” or “POOL”).

LOSS OF FLAME: RECYCLE

If flame is established and then lost the control will make ten (10) attempts at ignition. If flame is lost within ten (10) seconds of ignition the control will respond within 2 seconds. If flame is lost more than ten (10) seconds after ignition the control will respond within 0.8 seconds.

1. The control de-energizes the gas valve and the blower.
2. The control monitors for open contacts at the blower prover switch.
3. The control performs a gas valve relay check.
4. A normal ignition sequence resumes with Item #2 in “Heating Mode” (above).
5. If the tenth ignition trial fails the control enters a safety lockout (or “hard” lockout) after the post-purge period of the tenth failed trial.
6. The error code “IF” is displayed and the “SERVICE” indicator is illuminated.
   a. The control automatically resets after 60 minutes. If there is a call for heat after reset the control will make three (3) trials for ignition. If ignition is not established the control will again enter safety lock out for 60 minutes. If flame is established but is lost the control will make ten (10) attempts at ignition. This cycle will continue until ignition is established or the call for heat is removed.
   b. The user can reset the control and clear the “IF” error code by pressing the “MODE” button to move through “STANDBY” and return to the previous mode (“SPA” or “POOL”).

ADAPTIVE LEARNING ROUTINE

The control uses an adaptive learning routine that optimizes ignition performance and igniter life by regulating the igniter temperature. Excessive temperature at the igniter can cause it to fail prematurely. The control measures supply voltage to determine an initial igniter temperature. After each successful ignition the control reduces igniter temperature slightly until a failed ignition occurs. Once this occurs, the control increases igniter temperature and then maintains this temperature for a series of ignitions. This learning routine is repeated periodically. The control continuously monitors supply voltage and compensates for any changes to igniter temperature.

KEYPAD INPUTS

The control accepts user inputs via the keypad on the front panel.

1. When changing the mode from “STANDBY” to either “SPA” or “POOL” there may be up to a 10-second delay for the blower fan to begin running. The control performs an internal self-test and then verifies that the blower prover switch contacts are open before energizing the blower.
2. It is normal for the heater to display a 1- to 2-second delay in responding to any keypad input.
3. It is normal for the heater to display up to a 5-second delay when the keypad is used to reset the control to clear an error code.
4. The control will accept a mode change during lockout after 5 seconds. The control will continue to display the error code and remain in lockout until it is reset. At reset the control will go to the last saved mode.

Periodic inspection:

The H-Series 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 working 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 of 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-up 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.

Removing Drain Plug: (See figure 44)

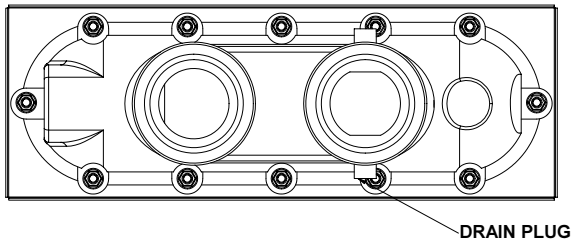
(Above Pool Installations Only)

1. Set the temperature control to “STANDBY”. Turn electricity off.
2. Turn heater gas valve to “OFF” position.
3. Turn gas supply outside of heater off.
4. Be sure circulating pump is off.
5. Remove drain plug from front header and allow all water to drain from heater.
6. Reinstall drain plug.

Spring start-up:

1. Inspect and clean heater, being sure heater is free of leaves and debris prior to start-up.
2. Be sure inlet and outlet piping are properly attached to the unit and 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 gas supply outside of heater on.
5. Set the temperature control to “Pool” or “SPA mode and adjust set point to desired temperature setting.
6. If operating difficulties are encountered, contact a qualified service company for assistance.

Drain Valve Location
Figure 44



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 been previously 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 flame patterns.
4. Main burner orifices.
5. Operating controls.

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

Control Access:

Access to the operating controls is gained by removing the control panel on the front of the heater. See Figure 45.

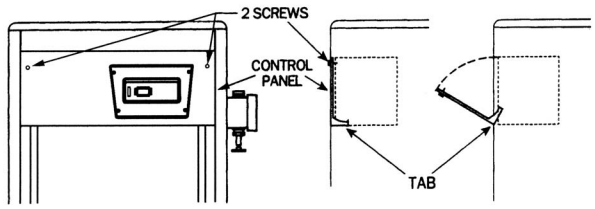
1. Turn the two screws counterclockwise, which secure the control door.
2. Open the control panel to access the operating controls.
3. ⚠ **CAUTION:** Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.
4. Verify proper operation after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

External heat exchanger inspection and cleaning:

Remove the heater top and inspect the external surfaces of the heat exchanger for soot accumulation. If soot has accumulated it must be removed by following the recommended procedure.

1. Remove four main heater top screws.
2. Remove main heater top.
3. Remove screws from left and right side access covers and remove panels.
4. Remove the front door panel.
5. Disconnect the high limit wires from the heat exchanger.
6. Disconnect the thermistor leads from the control panel.
7. Remove the pressure switch and tube from the heat exchanger.
8. Remove four screws retaining air deflector, and remove air deflector.
9. Unplug wires and pressure tap tubes from combustion blower.
10. Remove screws retaining flue collector/combustion blower assembly and remove.
11. Remove heater jacket screws securing heat exchanger.
12. Remove heat exchanger and place on a clean surface.

Control Access
Figure 45



⚠ **WARNING:** It is not recommended that a wire brush be used to remove soot from the heat exchanger. This may cause a spark and ignite the gases trapped within the soot.

Using a soft tipped brush such as a “paint brush” apply a degreaser to the entire heat exchanger surface top and bottom. **Note: If an old style heat exchanger, remove “V” baffles prior to performing any cleaning**. Allow the heat exchanger to sit for a period of time to allow the degreaser to loosen the soot. Wash the heat exchanger using a garden hose ensuring both top and bottom surfaces are thoroughly cleaned. Follow the above procedure steps in reverse to re-install heat exchanger. 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 other problems such as:

- Insufficient air supply
- Inadequate venting
- High or low gas pressure
- Blockage of burner tubes or orifices
- Improper heater location installation
- Incorrect gas supply pipe size
- Excessive water flow through heat exchanger
- LP tank below 30% full.

Combustion Chamber:

The combustion chamber is a “one piece” box. If damaged, the entire chamber must be replaced.

Heat exchanger removal:

1. Turn pump, main gas valve and heater power off.
2. Drain heat exchanger.
3. Remove four screws from vent in top of heater and remove top.
4. Remove access covers from both sides of heater.
5. Remove air deflector shield from around blower.
6. Unplug blower wire connector.
7. Disconnect pressure tap tubes from blower/vent assembly.
8. Remove flue collector assembly.
9. Disconnect water pressure switch tube from header.
10. Disconnect high limit wires from header.
11. Lift heat exchanger assembly straight up off combustion chamber.
12. Installation is the reverse of removal.

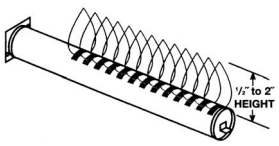
Burner inspection and cleaning:

With the heater on, remove the front door and make a visual inspection of the main burners through the inspection window. The main burner flames should be about ½ to 2 inches in height and should not "lift" off the ports of the burners. See Figure 47.

A normal flame is blue, without yellow tips. Yellow tips or 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 burner and/or orifices.

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.

Main Burner Flame Characteristics
Figure 47



Burner removal: (See Figure 48)

1. Turn pump, gas supply and heater power off.
2. Turn gas valve knob to "OFF".
3. Remove wires and gas line from the heater gas valve.
4. Remove valve mounting bracket.
5. Remove burner manifold. Remove orifice plate.
6. Remove the two screws securing each burner to the intermediate panel.
7. Pull burners out of heater.

Burner Installation: (See Figure 48)

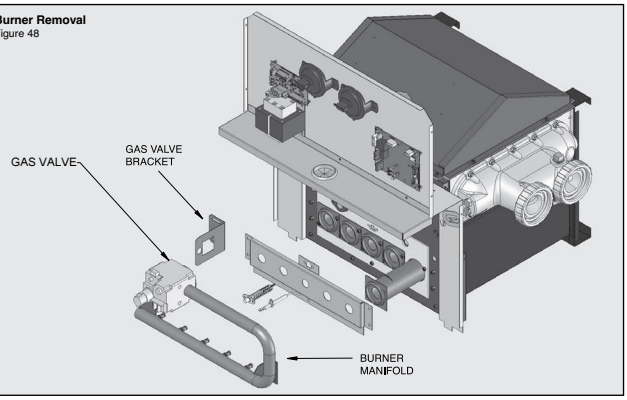
1. Reverse the above procedures for installation.
2. Turn on gas. Use a soapy water solution to check for leaks.
3. Bubbles forming indicate a leak. Never use an open flame (match, lighter, torch, etc.) as a leak could cause explosion or injury.
4. To start heater, follow the lighting instructions on the label inside the cabinet.

Gas valve replacement: (See Figure 48)

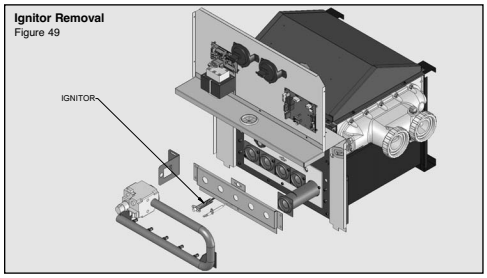
⚠ **WARNING:** Do not attempt to repair gas valve. If found defective, replace entire valve. Attempts to repair it will void warranty.

1. Turn pump, gas supply and heater power off.
2. Disconnect wires to gas valve.
3. Remove gas valve/manifold assembly.
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. Reinstall gas valve/manifold assembly.
7. Reconnect wires to gas valve.

Burner Removal
Figure 48



Ignitor Removal
Figure 49



Ignitor:

To remove ignitor.

1. Turn pump, gas supply and heater power off.
2. Unplug ignitor connector from control module.
3. Remove two screws that retain ignitor.
4. Remove ignitor from combustion chamber.

Reverse the above procedures for installation.

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 appropriate conversion kit, available from the factory. Gas conversions are to be performed only by a qualified service 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 No. 18 AWG UL or CSA approved wire rated at 105°C and 600 V.

Control Module:

The control module is a Silicon Nitride hot surface ignition control with an integral thermostat.

To remove control module:

1. Disconnect all wires from control module.
2. Detach from sheetmetal panel.

Reverse the above procedures for installation.

Display Interface Assembly:

The display interface assembly provides a user interface in the heater. The replacement part is available only as a complete assembly.

To remove display interface assembly:

1. Unplug display interface assembly connector from control module.
2. Remove four screws that retain the plastic bezel to the sheetmetal.
3. Pull entire assembly through the front panel.

Reverse the above procedures for installation.

Fuse Board:

The fuse board provides terminals for field supply wiring and contains fuses for over-currrent protection of the heater's components.

To remove fuse board:

1. Disconnect all wires from fuse board.
2. Detach from sheetmetal panel.

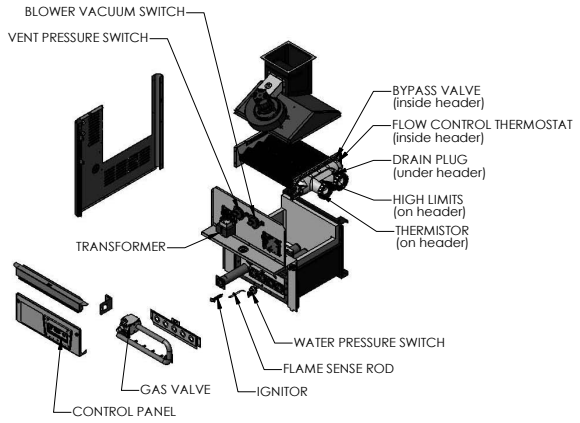
Reverse the above procedures for installation.

Vent Pressure switch:

The vent pressure switch will not allow the heater to continue to operate if the vent becomes blocked. To replace switch:

1. Turn pump, main gas valve and heater power off.
2. Open control panel door.
3. Remove wires, screws and tubing from the switch.
4. Replace with new switch and reverse the above procedures.

Control Locations
Figure 50

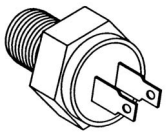


High limits:

The high limit is an automatically resetting safety device wired in series with the thermostat, pressure switch and main gas valve. See Figure 50. The pool heater is equipped with two automatic high limits. The limits are located on the heater header.

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

High Limit
Figure 51



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.

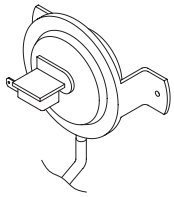
To replace high limits:

1. Turn pump, main gas valve and heater power off.
2. Drain heat exchanger of all water.
3. Remove side access panels.
4. Remove wires from high limits.
5. Unscrew the defective high limit.
6. Replace the high limit and reverse above proce dures.

Blower vacuum switch:

The blower vacuum switch will not allow the heater to fire unless the combustion blower is operating.

Blower Vacuum Switch
Figure 52



To replace switch:

1. Turn pump, gas supply and heater power off.
2. Open control panel door.
3. Remove wires, screws and tubing from the switch.
4. Replace with new switch and reverse the above procedures.

Water 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:

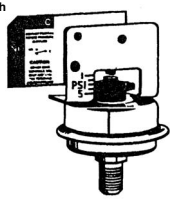
1. Be sure the filter is clean before making the adjustment.
2. With the pump and heater mode switch on, turn the adjustment dial on the pressure switch clock wise, until a click is heard from the gas valve.
3. Turn the adjustment dial counterclockwise ¼ turn.
4. Turn the pump off and on several times. 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, gas supply and heater power off.
2. Drain heat exchanger of all water.
3. Remove heater front door.
4. Remove wires from pressure switch.
5. Using two ½" open end wrenches disconnect the pressure switch from pressure switch tube.
6. Replace pressure switch and reverse above procedures. Use new sealant on pressure switch threads before re-installing.
7. Check for any possible leaks after start-up of unit.

Pressure Switch
Figure 53



Thermistor:

The thermistor monitors the return water temperature.

To replace thermistor:

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

Thermistor
Figure 54

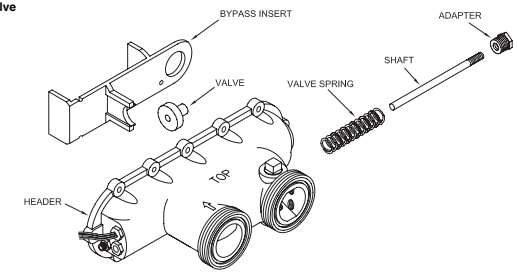
By-pass valve:

The 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 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.

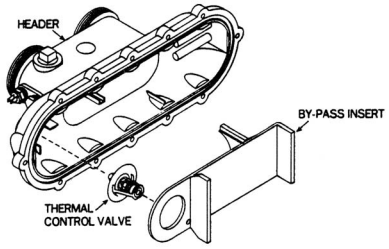
Thermal control valve:

The header also houses a thermal control valve. This valve helps to control condensation forming on 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 bypass hole which will open the high limit contacts.

By-pass Valve
Figure 55



Thermal Control Valve
Figure 56



To replace thermal control valve and/or bypass valve parts:

1. Turn pump, main gas valve and heater power off.
2. Remove drain plug and drain water out of heat exchanger.
3. Remove screws from right access panels and remove.
4. Remove wires from high limit switches on header.
5. Unplug thermistor wire lead from control board.
6. Remove pressure switch tube from header.
7. Loosen union nuts and detach pool plumbing from header.
8. Remove (12) nuts from the header.
9. Remove the header and header o-ring from the heat exchanger.

To replace bypass valve parts:

10. The adapter/shaft assembly and spring are removed by unscrewing the adapter as shown in Figure 55.
11. Remove the plastic bypass insert and valve disk from header.
12. Replace parts with new plastic bypass insert, adapter, shaft, spring, and plastic valve disk.
13. Inspect and ensure valve disk slides freely on the shaft. See Figure 55.
14. Re-install by reversing above procedure.

To replace thermal control valve:

10. Remove plastic bypass insert from header.
11. Remove the thermal control valve from header.
12. 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 56.
13. Inspect and ensure valve disk slides freely on the shaft. See Figure 55.
14. Re-install by reversing above procedure.

Transformer:

The transformer converts the field supply voltage (120 VAC / 240 VAC) to a 120 VAC output for powering the blower and ignitor circuits, and to a 24 VAC output for powering the control module, control circuits, and gas valve.

To replace the transformer:

1. Turn pump, gas supply and heater power off.
2. Remove two screws and open front control panel.
3. Unplug transformer connectors from fuse board.
4. Remove the screws securing transformer to the mounting bracket and remove transformer.
5. Replace the transformer and reverse the above procedures.

Combustion blower:

The combustion blower provides the air that mixes with the gas from the main burners for the combustion process. On initial start-up, the blower operates for 20 seconds to purge gas out of the heater. Then, the main gas valve opens for a period of 4 seconds and the heater lights. The blower operates the entire time the gas valve is open and for 30 seconds after the valve closes.

To replace the combustion blower:

1. Turn pump, main gas valve and heater power off.
2. Remove (hot) vent screws and remove panel.
3. Remove main top.
4. Disconnect wires and hoses attached to the blower.
5. Remove air deflector.
6. Remove screws attaching blower to flue collector.
7. Remove vent from blower.
8. Replace blower.
9. Reverse the above procedures for installation.

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 35 and 36.

Automatic Reset Time

The heater will automatically reset when an error condition is corrected and resume operation as detailed in the table below. The heater can be manually reset using the keypad by cycling the mode button through “STANDBY” and back to the original operating mode (“SPA” or “POOL”).

Error Codes (See chart on page 44)

“LO” Error Code

The Version 13 ignition control features revised logic for the “LO” error code. The “LO” error code indicates that the contacts on one or more of the switches in the limit string are open. The limit string contains the temperature limit switches (2), the vent pressure switch, and the water pressure switch. If the limit string opens the error code “LO” will be displayed. There are two types of “LO” error (note there is no differentiation between the types on the display):

1. “Soft” lockout

When an “LO” error is displayed without a call for heat the control will accept keypad inputs to change the mode, adjust the temperature set points, enter bypass operation, or change from °F to °C. The heater will not operate until the error code is cleared. When the error code is cleared the heater will remain in the selected mode and retain any new temperature set points. If power is interrupted the heater will retain the selected mode and set points. If there is a call for heat “soft” lockout will end and the control will enter “hard” lockout.

2. “Hard” lockout (Safety lockout)

When an “LO” error is displayed and a call for heat is present the control will enter “hard” lockout (safety lockout). The control will only accept keypad inputs to change the mode (to place the heater into “STANDBY” or to reset the control). The heater will not operate until the error code is cleared or the call for heat is removed. When the error code is cleared the heater will remain in the selected mode. If power is interrupted the heater will retain the selected mode in memory.

During a pre-install prior to pool/pump startup the heater will display the “LO” error code because the water pressure switch contacts will be open. This will be a “soft” lockout if the heater remains in “STANDBY” mode or if there is no call for heat in “SPA” or “POOL” modes. If the temperature of the heater is below the factory set points of 65° F, changing the mode from “STANDBY” to “SPA” or “POOL” will generate a call for heat and the control will go into a “hard” lockout. The error code “LO” will be displayed and the control will only accept keypad inputs for mode change until the error code is cleared.

Supply Wiring

If the heater is connected to the line side of the circuit it will be powered at all times. In this situation, when the pump shuts down the heater will display a fault code of “LO”. If there is a call for heat and the pump then re-starts there will be a 2-minute delay for the heater to fire. After the pump has been running for at least 2 minutes there is no delay for heater operation.

Wiring the heater to the load side of the timer or controller will not result in a 2-minute delay if the pump primes quickly enough to activate the heater’s water pressure switch. If the pump is slow to prime the heater may display an “LO” fault code and will take 2 minutes to automatically restart. If the pump has primed, this wait can be avoided by manually clearing the error code via the keypad by changing the mode through the “STANDBY” setting and returning to the initial setting (“SPA” or “POOL”).

When a heater is wired to the line side of the power circuit (continuous power) the blower will not operate when the pump is cycled via a time clock or other switch method.

Internal Wiring

If the heater display is blank after the electrical has been installed check the ribbon cable from the display board leading to the ignition control board. This cable is not polarized and can be inserted upside down if it was removed when electrical was done. Invert the cable on the connector pin and see if the display is now on. The display may read ‘CE’. If it does, remove power from the heater for 1 minute and then re-connect the power.

Troubleshooting Chart

IDL Heater Diagnostic Guide

Code	Fault	Diagnosis Step	Remedy
None	Heater will not power-up.	1. Check for Low & High Voltage Output from Fuse Board	Disconnect plug from P5 connector from Fuse Board. Measure for 24vac between pins of receptacle on Fuse Board. Reconnect plug. Disconnect plug form P6 of Fuse Board. Measure for 120vac between pin 3 and 6 of receptacle on Fuse Board. Reconnect plug. If OK, proceed to section titled "Low voltage circuit fault". Otherwise, proceed to step 2.
		2. Ensure field power supply to heater is turned on.	Measure for field supply voltage across terminals of TB1 terminal block on Fuse Board. If OK, proceed to step 3.
		3. Check for faulty Fuse Board wiring.	Inspect Fuse Board wiring. Ensure all plugs are securely fastened to Fuse Board. If OK, proceed to step 4.
		4. Verify that FC1and FC2 Fuses on Fuse board are not open.	Remove FC1 and FC2 fuses from fuseholder. Measure continuity across fuse. If fuses are open, proceed to section titled "Open FC1 and/or FC2 Fuses". If fuses are OK, reinstall them and proceed to step 5.
		5. Verify that 240vac Voltage Selector Plug is not installed with a 120vac field power supply.	Check that proper Voltage Selector Plug is installed in Fuse Board. If OK, proceed to step 6.
		6. Check for defective Transformer.	Disconnect plug from P4 connector from Fuse Board. Measure for 24VAC between pins 1 & 2 of plug of Transformer and for 120VAC between pins 4 & 6. If 24VAC or 120VAC is not present, replace Transformer. Otherwise, proceed to step 7.
		7. Fuse Board is defective	Replace Fuse Board.
None	Low voltage circuit fault.	1. Check for Low Voltage Output from Fuse Board	Disconnect plug from P5 connector from Fuse Board. Measure for 24vac across pins. Reconnect plug. If OK, proceed to step 2. Otherwise proceed to step 5.
		2. Check for faulty Control Module wiring.	Inspect Control Module wiring. Ensure all plugs are securely fastened to Control Module. If OK, proceed to step 3.
		3. Verify low voltage input to Control Module.	Verify 24vac across R and C terminals on Control Module. If not OK, replace harness. If OK, proceed to step 4.
		4. Verify that F1 Fuse on Control Module is not open.	Remove F1 fuse from fuseholder. Measure continuity across fuse. If OK, replace Control Module. If fuse is open, proceed to section titled " Open FC3 or F1 Fuse".
		5. Verify that FC3 on Fuse Board is not open.	Remove FC3 fuse from fuseholder. Measure continuity across fuse. If fuse is open, proceed to section titled "Open FC3 and/or F1 Fuses". If OK, reinstall fuse and proceed to step 6.
		6. Check for defective Transformer.	Disconnect plug from P4 connector from Fuse Board. Measure for 24VAC between pins 1 & 2 of plug from transformer. If 24VAC is not present, replace Transformer. Otherwise, proceed to step 7.
		7. Fuse Board is defective	Replace Fuse Board.
None	Open FC1 and/or FC2 Fuses.	1. Verify that 120vac Voltage Selector Plug is not installed in with a 240vac field power supply.	Check that proper Voltage Selector Plug is installed. If OK, proceed to step 2. If 120VAC plug is installed and field supply voltage is 240VAC, FC1 and FC2 fuses will have opened. Install the correct Voltage Selector Plug and new FC1 and FC2 fuses.
		2. Check for faulty Transformer wiring.	Inspect Transformer wiring. Ensure insulation on wiring is not worn. If OK, proceed to step 3.
		3. Defective Transformer	Replace Transformer
None	Open FC3 and/or F1 Fuses.	1. Check for faulty Gas Valve wiring.	Inspect Gas Valve wiring. Ensure insulation on wiring is not worn. If OK, proceed to step 2.
		2. Verify that Gas Valve is not defective	Measure for resistance across Gas Valve terminals and between each terminal and ground. If short exists, replace Gas Valve. If OK, proceed to step 3.
		3. Check for faulty Control Module wiring.	Inspect Control Module wiring. Ensure insulation on wiring is not worn. If OK, proceed to step 4.
		4. Control Module is defective.	Replace Control Module.
None	Open FC4 Fuse.	1. Check for faulty Igniter wiring.	Inspect Igniter wiring. Ensure insulation on wiring is not worn. If OK, proceed to step 2.
		2. Check for faulty Blower wiring.	Inspect Blower wiring. Ensure insulation on wiring is not worn. If OK, proceed to step 3.
		3. Check for defective Igniter.	Disconnect Igniter plug from Control Module. Measure resistance across Igniter. If shorted, replace igniter. IF OK proceed to step 4.
		4. Check for defective blower.	Disconnect blower plug from Control Module. Measure resistance across blower windings. Winding resistance across lead should be in the following range: Black-to-White: 10 to 14 ohms, Red-to-White: 18 to 22 ohms. If measured values vary substantially from these values, blower is defective. Replace. Otherwise, proceed to step 5.
		5. Control Module is defective.	Replace Control Module.

Troubleshooting Chart

IDL Heater Diagnostic Guide

Code	Fault	Diagnosis Step	Remedy
BD	Bad Board or Secondary High Voltage Fault	1. Verify that FC4 Fuse on Fuse Board is not open.	Remove FC from fuseholder. Measure continuity across fuse. If OK, reinstall fuse and proceed to step 2. If Fuse is open, proceed to section titled "Open FC4 Fuse".
		2. Verify high voltage output from Fuse Board.	Disconnect plug from P6 connector of Fuse Board. Measure for 120VAC across pins 3 and 5 of P6 receptacle on Fuse Board. If OK, reconnect plug and proceed to step 3. If not OK, go to step 4.
		3. Check for defective Harness.	Disconnect plug from E10 connector of Control Module. Measure for 120VAC across pins 1 and 3 of Plug on Harness. IF OK replace Control Module. If not OK, replace Harness.
		4.Check for defective Transformer.	Disconnect plug from P4 connector of Fuse Board. Measure for 120VAC between pins 4 & 6 of plug from transformer . If OK, proceed to step 5. IF not OK, replace Transformer.
		5. Fuse Board is defective	Replace Fuse Board.
EE	Bad Board	1. Defective Control Module	Replace Control Module.
CE	Communication Error Between Control Module and Display Interface Assembly	1. Check for faulty wiring or connection.	Inspect Display Interface Wiring. Ensure Display Interface Plug is securely attached to Control Module. If OK, proceed to step 2.
		2. Control Module and/or Display Interface Assembly are defective.	Replace Control Module and/or Display Interface Assembly.
IO	Igniter Failure	1. Check for faulty wiring or connection.	Inspect Igniter wiring. Ensure Igniter Plug is securely attached to Control Module. If OK, proceed to step 2.
		2. Igniter is defective.	Replace Igniter.
SB	Keypad Failure	1. Keypad is defective.	Replace Display Interface Assembly.
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 108°F.	Verify set point setting of remote thermostat is below 108°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 to heater is above minimum required (25 GPM for H250IDL, & 40 GPM for H350IDL & H400IDL).
HF	Flame Present with Gas Valve Not Energized.	Gas Valve is defective.	Replace Gas Valve.
BO	Bypass operation.	1. Check to see if Control Module is in Bypass Operation.	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 by using the MODE key to put the heater into STANDBY. Press and hold the DOWN key and then press and hold the MODE key. HOLD down both keys for 3 seconds until the indication "bo" is removed from the display.
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. Verify that water flow is adequate	Verify that water flow rate to heater is above minimum required (25 GPM for H250IDL, and 40 GPM for H350IDL and H400IDL). If OK, proceed to step 3.
		3. Check for faulty wiring or connection.	Inspect water pressure switch wiring. Ensure wire harness terminals are securely fastened to spade terminals on water pressure switch. If OK, proceed to step 4.
		4. Verify state of water pressure switch contacts.	Remove wire leads from water pressure switch and jumper leads. Operate heater. Measure continuity across water pressure switch fault. If open, proceed to step 5. If closed, LO code is not caused by vent pressure switch fault. Remove jumper from wire leads and reconnect wire leads to water pressure switch.
		5. 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 6.
		5. Check for correct water pressure switch setting.	Adjust water pressure switch setting per installation manual. If LO does not clear, proceed to step 6.
		6. Water pressure switch is defective.	Replace water pressure switch.

Troubleshooting Chart

IDL Heater Diagnostic Guide

Code	Fault	Diagnosis Step	Remedy
LO	Vent pressure switch fault.	1. Check for faulty wiring or connection.	Inspect vent pressure switch wiring. Ensure wire harness terminals are securely fastened to spade terminals on vent pressure switch. If OK, proceed to step 2.
		2. Verify state of vent pressure switch contacts.	Remove wire leads from vent pressure switch and jumper leads. Operate heater. Measure continuity across vent pressure switch. If closed, LO code is not caused by vent pressure switch fault. If open, proceed to step 3. Remove jumper from wire leads and reconnect wire leads to vent pressure switch.
		3. Check for restricted for blocked flue.	Ensure that flue is not blocked or restricted. See indoor vent sizing requirements in installation manual. If OK, proceed to step 4.
		4. Vent pressure switch is defective.	Replace vent pressure switch.
	Temperature limit switch fault.	1.Check for faulty wiring or connection.	Inspect temperature limit switch wiring. Ensure wire harness terminals are securely fastened to spade terminals on temperature limit switches. If OK, proceed to step 2.
		2. Verify state of temperature limits' contacts.	Remove wire leads from limit switch 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 for H250IDL, and 40 GPM for H350IDL and H400IDL). If OK, proceed to step 4.
		4. Temperature limit switch is defective.	Replace temperature limit switch.
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 valve indicated on rating plate. If OK, proceed to step 3.
		3. Check for faulty flame sense wiring or connection.	Inspect flame sense wiring. Ensure wire harness terminals are securely fastened to flame sense and to 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.
AC	Blower vacuum switch closed.	1. Check for defective blower on relay or control module.	Disconnect Blower plug from Control Module. With heater off, measure continuity across pins 1 and 2 and across 2 and 3 of receptacle on Control Module. If either pair is closed, control module relay is defective. Replace control module. If OK, proceed to step 2.
		2. Vacuum switch is defective.	Replace blower vacuum switch.
AO	Blower vacuum switch open	1. Check for faulty vacuum switch tubing.	Check tubing and replace if necessary. If OK, proceed to step 2.
		2. Check for faulty vacuum switch wiring or connection.	Inspect vacuum switch wiring. Ensure wire harness terminals are securely fastened to spade terminals on vacuum switch. If Ok, proceed to step 3.
		3. Check for faulty blower wiring or connection.	Inspect blower wiring. Ensure plug on blower is securely fastened to control module. If OK, proceed to step 4.
		4. Check for defective vacuum switch.	Disconnect Blower plug from Control Module. Measure resistance across Blower windings. Winding resistance across lead should be in the following range: Black-to-White: 10 to 14 ohms, Red-to-White: 18 to 22 ohms. If measured values vary substantially from these values, Blower is defective. Replace. If OK, proceed to step 5.
		5. Check for defective blower relay.	Disconnect blower plug from Control Module. Place heater in Pool or Spa mode. Lower set point temperature to generate call for heat. During pre-purge period, measure for 120VAC across pins 1 and 2. If 120VAC is not present, control module relay is defective. Replace control module. If OK, proceed to step 6.
		6. Vacuum switch is defective.	Replace blower vacuum switch.

Parts List

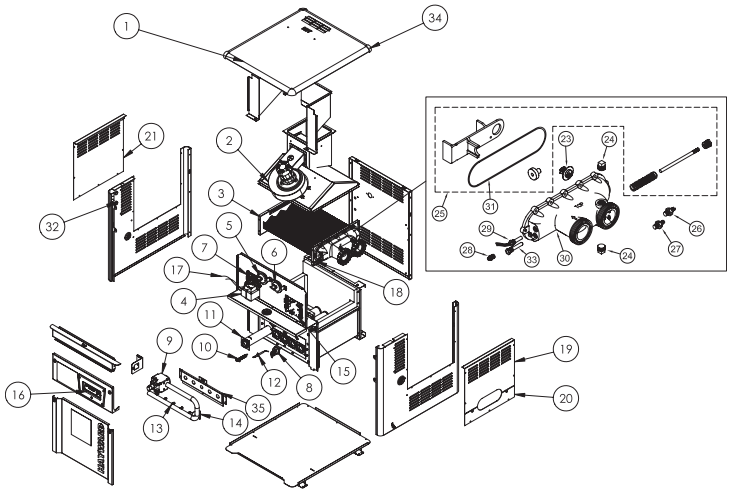
ITEM NO.	PART NO.	DESCRIPTION
1	IDXLJKT1250	TOP JACKET ASY – H250IDL
1.	IDXLJKT1400	TOP JACKET ASY – H350/400IDL
2.	IDXLBWR1930	COMBUSTION BLOWER
3.	IDXLHXA1250	HEAT EXCHANGER ASY – H250IDL
3.	IDXLHXA1400	HEAT EXCHANGER ASY – H350/400IDL
4.	IDXL2TRF1930	TRANSFORMER
5	IDXL2VPS1930	VENT PRESSURE SWITCH
6.	IDXL2BVS1930	BLOWER VACUUM SWITCH
7.	IDXL2FSB1930	FUSE BOARD
8.	HAXPSA1930	PRESSURE SWITCH ASY
9.	IDXLGSV0001	GAS VALVE NATURAL
9.	IDXLGSV0002	GAS VALVE PROPANE
10.	IDXL2IGN1930	SILICON NITRIDE IGNITOR
11.	IDXL2BRN1930	BURNER TUBE
12.	IDXLFLS1930	FLAME SENSOR
13.	IDXLBON1930	BURNER ORIFICE NATURAL GAS - H250/400IDPL2
13.	IDXLBOP1930	BURNER ORIFICE PROPANE - H250/400IDPL2
13.	IDXLBON1931	BURNER ORIFICE NATURAL GAS - H350IDPL2
13.	IDXLBOP1931	BURNER ORIFICE PROPANE - H3501DPL2
14.	HAXMAN1250	GAS MANIFOLD – H250
14.	HAXMAN1400	GAS MANIFOLD – H350/400
15.	IDXL2ICB1931	IGNITION BOARD ONLY
16A.	IDXL2PBA1250	PANEL/BEZEL/KEYPAD ASY - H250IDL2
16A.	IDXL2PBA1400	PANEL/BEZEL/KEYPAD ASY - H350IDL2, H400IDL2
16A.	IDXL2PBA1931	PANEL/BEZEL/KEYPAD ASY - CALIFORNIAN
16B.	IDXL2BKP1930	BEZEL AND KEYPAD ASY
16B.	IDXL2BKP1931	BEZEL AND KEYPAD ASY - CALIFORNIAN
16C.	IDXL2DB1930	DISPLAY BOARD ONLY
17.	IDXLWHM1930	WIRE HARNESS MAIN
18.	HAXWHA0006	WIRE HARNESS HI-LIMITS
19.	IDXLURA1930	UPPER RIGHT ACCESS COVER
20.	IDXLLRA1930	LOWER RIGHT ACCESS COVER
21.	IDXLLAC1930	LEFT ACCESS COVER
23.	HAXFCT1930	FLOW CONTROL THERMOSTAT
24.	CHXPLG1930	¾" NPT BRASS PLUG
25.	HAXBPK1932	BY-PASS VALVE ASSY KIT
26.	HMXHLI2931	HIGH-LIMIT 135°F
27.	HMXHLI2932	HIGH-LIMIT 160°F
28.	CHXPSA1930	PRESSURE SWITCH ADAPTER
29.	CHXTBW1930	BULB WELL
30.	HAXFHD1931	FRONT HEADER ONLY
31.	HAXHOR1930	HEADER O-RING
32.	IHXPHK1930	PLASTIC HARDWARE KIT
33.	IDXLTER1930	THERMISTOR
34	HAXCIA1930	CORNER PIECE KIT (4)
35.	IDXLAOK1250	AIR ORIFICE BRACKET - 250IDL
36.	IDXLAOK1400	AIR ORIFICE BRACKET - 400IDL
37.	IDXL2AOK1250	AIR ORIFICE BRACKET - 250IDL2
38.	IDXL2AOK1400	AIR ORIFICE BRACKET - 400IDL2
39.	IDXL2FSK1930	IDL2 FUSE/CONTROL BOARD FUSE SERVICE KIT (4) (NOT SHOWN)

Parts Illustration

Order repair parts by item number and part description along with the model and serial number of the heater. The model and serial number will be found on the data plate.

Contact your pool/spa dealer, distributor, or Hayward Pool Products, Inc. for repair/replacement parts. Use Hayward parts only.

Figure 57



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 one year from the date of original installation for all 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 malfunctions under normal use and service within one year from the date of original installation for all 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 laws of the state are limited in duration to the term of one (1) year for all 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, nor 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 at its original place of installation and only for the original owner. 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 C.S.A. limit controls or equivalent pressure relief valve.
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 caused 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 or 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 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 notify the Company in writing at either address:

Hayward Pool Products, Inc.
900 Fairmont 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 vary 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 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 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 "flashback" 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 warranty applicable to the FireTile™ components used in the 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 reidential application for a period of five (5) years.

Cut on line

USE THIS FORM ONLY FOR MAKING A CLAIM

LIMITED 1 YEAR POOL/SPA/HOT TUB HEATER CLAIM FORM

Model No. _____ Serial No. _____

Purchaser's Name _____

Installation Address _____

City/State/Zip _____

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 _____

Error Codes:

Display	Description	Information
bD	Internal fault/power-up error	On initial trial for ignition. Automatic reset is immediate once the gas valve relay check results are acceptable.
bD	Gas valve sensed as “ON” error	If valve is open when it should be closed the heater will shut down and go into lockout. Blower will operate until error condition is corrected. Automatic restart 2 minutes after error is corrected.
bD	Gas valve sensed as “OFF” error	If valve is closed but flame is sensed the blower will run for 5 s then start a new ignition sequence. If error occurs 10 times during a call for heat the control will go into lockout. Automatic reset is 60 minutes.
bD	Data retrieval error	If control input data is corrupted the heater will shut down and go into lockout.
HF	Flame present with gas valve “OFF” error	If flame is sensed with the gas valve off the control will go into lockout. The blower will run until error condition is corrected. When corrected, control will run blower for 5 s then automatically restart after 2 minutes.
PF	Electrical supply wiring error	This code will display if 120V polarity is reversed, low voltage is detected, or if the ground path is not sufficient. Reset is immediate after error is corrected.
AO	Prover switch open error	If the blower prover switch does not close after the blower starts the control will stop the ignition trial go into lockout. The blower will continue to run. Automatic reset is immediate after the switch closes.
AO	Prover switch open when expected closed error	If the blower prover switch opens unexpectedly during operation the control will shut down and attempt to re-light. If the switch does not close after the blower starts the control will go into lockout with the blower running. Automatic reset is immediate after error is corrected.
AO	Prover switch open during post-purge error	If the blower prover switch opens during the post-purge cycle (heater is not firing) the control will display the error code. The post-purge cycle will be completed once the blower prover switch closes.
AC	Prover switch closed when expected open error	If the blower prover switch is closed before blower start-up the control will not start the blower. Automatic reset is immediate when the switch opens.
IO	Igniter open error	If the control is not in lockout and senses that the igniter circuit is open when the blower is running the control will turn off the blower and go into lockout. Automatic restart 2 min after error is corrected.
SF	Thermistor error	An excessive temperature difference between the two thermistors (5 °F or more) or an “out of bounds” condition on both sensors (less than 10°F or greater than 180°F) will result in the error code. Automatic restart is 2 minutes after the error is corrected.
HS	Excessive water temperature error	If water temperature exceeds 105°F the heater will shut down and go into lockout. Automatic restart is 2 minutes after water temp. drops below 105°F.
Sb	Keypad button stuck closed error	If one of the keypad buttons is closed (or pressed) for more than 30 s the error code will be displayed but the control will continue to function. The error code will be cleared when the condition is corrected.
IF	Ignition failure error	If the control exceeds the maximum number of ignition retries or recycles the heater will shut down and go into lockout. Automatic reset is 60 minutes.
CE	Communication error	If communication between the ignition board and the display board is not established within 3 s of power-up an error will be displayed. After communication is established, if it is lost for 30 s, the error will be displayed. The error code will be cleared upon a valid data exchange between boards.
LO	Limit string open error	If the limit string opens the heater shuts down and goes into lockout. Automatic restart is 2 minutes after the error condition is corrected and the limit string closes. See below for more detail.

Refer to the troubleshooting guide to correct the faults described in the above table.