HAYWARD®

POOL AND SPA/HOT TUB HEATERS
H150FDAU, H250FDAU, & H400FDAU MODELS
FOR USE IN AUSTRALIA

SERVICE & INSTALLATION MANUAL

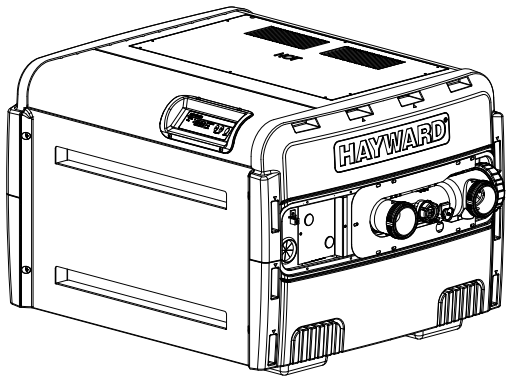
FOR YOUR SAFETY

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

U.S. PATENT NOS. 6,026,804 & 6,321,833 & 7,971,603

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SAFETY INFORMATION

Basic safety precautions should always be followed, including the following: Failure to follow instructions can cause severe injury and/or death.

This is the safety-alert symbol. When you see this symbol on your equipment or in this manual, look for one of the following signal words and be alert to the potential for personal injury.

WARNING warns about hazards that could cause serious personal injury, death or major property damage and if ignored presents a potential hazard.

CAUTION warns about hazards that will or can cause minor or moderate personal injury and/or property damage and if ignored presents a potential hazard. It can also make consumers aware of actions that are unpredictable and unsafe.

ATTENTION indicates special instructions that are important but not related to hazards.

READ AND FOLLOW ALL INSTRUCTIONS IN THIS OWNER'S MANUAL AND ON EQUIPMENT.
IMPORTANT SAFETY INSTRUCTIONS
Before installing or servicing this electrical equipment, turn power supply OFF.
KEEP SAFETY LABELS IN GOOD CONDITION AND REPLACE IF MISSING OR DAMAGED.

WARNING – To reduce risk of injury, do not permit children to use or climb on the heater, pumps or filters. Closely supervise children at all times. Components such as the filtration system, pumps, and heaters must be positioned to prevent children from using them as a means of access to the pool.

CAUTION – This heater is intended for use on permanently installed swimming pools and may also be used with spas. Do NOT use with storable pools. A permanently installed pool is constructed in or on the ground or in a building such that it cannot be readily disassembled for storage. A storable pool is constructed so that it is capable of being readily disassembled for storage and reassembled to its original integrity.

Though this product is designed for outdoor use, it is strongly recommended to protect the electrical components from the weather. Select a well drained area, one that will not flood when it rains. It requires free circulation of air for cooling. Do not install in a damp or non-ventilated location.

WARNING – It is required that licensed electricians do all electrical wiring. Risk of Electric Shock. Hazardous voltage can shock, burn, cause death or serious property damage. To reduce the risk of electric shock, do NOT use an extension cord to connect unit to electric supply. Provide a properly located outlet. All electrical wiring MUST be in conformance with applicable local and national codes and regulations. Before working on this unit, turn off power supply to the heater.

WARNING – To reduce the risk of electric shock replace damaged wiring immediately. Locate conduit to prevent abuse from lawn mowers, hedge trimmers and other equipment.

WARNING – Failure to bond to pool structure will increase risk for electrocution and could result in injury or death. To reduce the risk of electric shock, the electrician must comply with installation instructions and must bond the heater accordingly. In addition, the licensed electrician must also conform to local electrical codes for bonding requirements.

USE ONLY HAYWARD GENUINE REPLACEMENT PARTS

NOTES TO THE ELECTRICIAN:

Use a solid copper conductor, 8 AWG or larger. Run a continuous wire from external bonding lug to reinforcing rod or mesh. Connect a No. 8 AWG solid copper bonding wire to the grounding lug provided on the heater and to all metal parts of swimming pool or spa, and to all electrical equipment, metal piping (except gas piping), and conduit within 5 ft. (1.5 m) of inside walls of swimming pool or spa. IMPORTANT -Reference applicable local and national electric codes for all wiring standards including, but not limited to, grounding, bonding, and other general wiring procedures.

⚠ WARNING – Suction Entrapment Hazard.
Suction in suction outlets and/or suction outlet covers which are damaged, broken, cracked, missing, or unsecured can cause severe injury and/or death due to the following entrapment hazards:

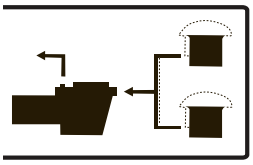
Hair Entrapment- Hair can become entangled in suction outlets.

Limb Entrapment- A limb inserted into an opening of a suction outlet or suction outlet cover that is damaged, broken, cracked, missing, or not securely attached can result in a mechanical bind or swelling of the limb.

Body Suction Entrapment- A differential pressure applied to a large portion of the body or limbs can result in an entrapment.

Evisceration/ Disembowelment - A vacuum applied directly to the intestines through an unprotected suction outlet sump or suction outlet cover which is damaged, broken, cracked, missing, or unsecured can result in evisceration (disembowelment).

Mechanical Entrapment- There is potential for jewelry, swimsuit, hair decorations, finger, toe or knuckle to be caught in an opening of a suction outlet or suction outlet cover resulting in mechanical entrapment.



⚠ WARNING - To reduce the risk of entrapment hazards:

- When suction outlets are less than a 18” x 23” equivalent, a minimum of two functioning suction outlets per pump must be installed. Suction outlets in the same plane (i.e. floor or wall), must be installed a minimum of three feet (3’) [1 meter] apart, as measured from near point to near point.
- Dual suction outlets shall be placed in such locations and distances to avoid “dual blockage” by a user.
- Dual suction fittings shall not be located on seating areas or on the backrest for such seating areas.
- The maximum system flow rate shall not exceed the flow rating of any listed (AS 1926.3-2010(+A1)) suction outlet cover installed.
- Never use the Pool or Spa if any suction outlet component is damaged, broken, cracked, missing, or not securely attached.
- Replace damaged, broken, cracked, missing, or not securely attached suction outlet components immediately.
- Install two or more suction outlets per pump in accordance with latest APSP (formally NSPI) Standards and CPSC guidelines. Follow all applicable National, State, and Local codes.

WARNING – Failure to remove pressure test plugs and/or plugs used in winterization of the pool/spa from the suction outlets can result in an increase potential for suction entrapment as described above.

WARNING – Failure to keep suction outlet components clear of debris, such as leaves, dirt, hair, paper and other material can result in an increase potential for suction entrapment as described above.

WARNING – Suction outlet components have a finite life, the cover/grate should be inspected frequently and replaced at least every ten years or if found to be damaged, broken, cracked, missing, or not securely attached.

WARNING – All suction and discharge valves MUST be OPEN when starting the circulation system. Failure to do so could result in severe personal injury and/or property damage. All drains and suction outlets MUST have properly installed covers, securely attached using the screws supplied with the covers. If screws are lost, order replacement parts from your supplier.

WARNING – **Hazardous Pressure.** Pool and spa water circulation systems operate under hazardous pressure during start up, normal operation, and after pump shut off. Stand clear of circulation system equipment during start up. Failure to follow safety and operation instructions could result in violent separation of the pump housing and cover due to pressure in the system, which could cause property damage, severe personal injury, or death. Before servicing pool and spa water circulation system, all system and pump controls must be in off position and filter manual air relief valve must be in open position. Before starting system pump, all system valves must be set in a position to allow system water to return back to the pool. Do not change filter control valve position while system pump is running. Before starting system pump, fully open filter manual air relief valve. Do not close filter manual air relief valve until a steady stream of water (not air or air and water) is discharged.

WARNING – **Separation Hazard.** Failure to follow safety and operation instructions could result in violent separation of pump components. Strainer cover must be properly secured to pump housing with strainer cover lock ring. Before servicing pool and spa circulation system, manual air relief valve must be in open position. Do not operate pool and spa circulation system if a system component is not assembled properly, damaged, or missing. Do not operate pool and spa circulation system unless filter air relief valve body is in locked position in filter upper body.

WARNING – Never operate or test the circulation system at more than 40 PSI.

WARNING – Fire and burn hazard. Motors operate at high temperatures and if they are not properly isolated from any flammable structures or foreign debris they can cause fires, which may cause severe personal injury or death. It is also necessary to allow the motor to cool for at least 20 minutes prior to maintenance to minimize the risk of burns.

WARNING – Failure to install according to defined instructions may result in severe personal injury or death.

WARNING – The following "Safety Rules for Hot Tubs" recommended by the U.S. Consumer Product Safety Commission should be observed when using the spa.

1. Spa or hot tub water temperatures should never exceed 104°F [40°C]. A temperature of 100°F [38°C] is considered safe for a healthy adult. Special caution is suggested for young children. Prolonged immersion in hot water can induce hyperthermia.
2. Drinking of alcoholic beverages before or during spa or hot tub use can cause drowsiness, which could lead to unconsciousness and subsequently result in drowning.
3. Pregnant women beware! Soaking in water above 100°F [38°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.
4. 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 4°F (2.2°C).
5. Persons taking medications, which induce drowsiness, such as tranquilizers, antihistamines or anticoagulants, should not use spas or hot tubs.
6. 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 working order.
7. Persons with a medical history of heart disease, circulatory problems, diabetes or blood pressure problems should obtain a physicians advice before using spas or hot tubs.
8. Hyperthermia occurs when the internal temperature of the body reaches a level several degrees above normal body temperature of 98.6°F [37°C]. The symptoms of Hyperthermia include: drowsiness, lethargy, dizziness, fainting, and an increase in the internal temperature of the body.

The effects of Hyperthermia include:

1. Unawareness of impending danger.
2. Failure to perceive heat.
3. Failure to recognize the need to leave the spa.
4. Physical inability to exit the spa.
5. Fetal damage in pregnant women.
6. Unconsciousness resulting in danger of drowning.

DEFINITIONS:

Suction Outlet –	The term Suction Outlet is a fitting, fitting assembly, cover/grate and related components that provide a means for water to exit the pool and into the pump circulating system.
Inches of Mercury (in Hg) -	A unit for measuring pressure below atmospheric ("suction" or "vacuum") (1.0 inch Hg = .491 PSI)
Main Drain –	See Suction Outlet
PSI –	An abbreviation for pounds per square inch.

INTRODUCTION:

This manual contains instructions for installation, operation, maintenance, troubleshooting, and parts lists for the safe use of the swimming pool/spa/hot tub heaters. Hayward strongly recommends that the installer read the manual before installing the swimming pool/spa/hot tub heater. If after reviewing the manual any questions remain unanswered, contact the factory or local representative. Following heater installation, the installer should leave all manuals with the consumer for future reference.

LIMITED WARRANTY SUMMARY:

Hayward warrants the pool/spa/hot tub heater to be free from defects in materials and workmanship, and 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. Hayward 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, Hayward will provide a replacement part. 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.

⚠ **ATTENTION:** If the pool/spa/hot tub 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.

MAINTAINING PROPER WATER CHEMISTRY:

⚠ **WARNING: Failure to Maintain Proper Water Chemistry May Cause Premature Heat Exchanger Damage or Failure**

The heat exchanger in your Hayward pool heater is made from the highest quality of copper and nickel (Cupronickel) materials. The premium materials and the exacting processes used in the manufacture of the heat exchanger is state of the art in pool heater design and manufacture. Yet, it remains vital that the heat exchanger be protected from damaging or corrosive chemicals, insufficient water flow or improperly balanced water chemistry. Heat exchanger damage or failure resulting from improper flow, improperly balanced pool water or the improper addition of sanitizers into the water is NOT covered under the terms of your warranty.

The following factors are critical to heat exchanger protection. Follow these guidelines to help prevent pre-mature damage or failure to your heater and heat exchanger.

1. WATER FLOW THROUGH HEATER

Water must be flowing through the heater at the minimum rated flow rate during operation. Check that the pump is operating and the system is filled with water and purged of all air prior to starting the heater. The minimum rated flow rates are listed on page 26. Some installations may require an adjustment to the water pressure switch for proper low-flow protection. Test your system and if necessary, adjust the water pressure switch as described on page 35.

2. POOL/SPA WATER CHEMISTRY

The chemistry balance and mineral content of swimming pool water changes daily due to the addition of pool and sanitizing chemicals, bather loads, rain, runoff and the amount of sun - to name a few. Improper chemistry balance and mineral content can cause scaling and deposits to form on pool walls, in the filtration system, in the heat exchanger tubes and additionally can promote corrosive action to all metals in the water path. Changing spa water regularly and maintaining the correct chemical balance in your pool/spa will keep the pool/spa safe and sanitary, and will help protect the heat exchanger. Use a 4-way pool/spa water test kit to check your water frequently (at least weekly). Use the following guidelines to help protect your heater's heat exchanger:

	Recommended Level	Effect of Low Levels	Effect of High Levels
Chlorine	1 - 3 ppm	hazy water, algea growth, bacteria causing infections	swimmer irritation, bleaching of clothes/hair, corrosive to heat exchanger
Bromine	2 - 4 ppm		
pH	7.4 - 7.6	corrosive to heat exchanger, swimmer irritation	cloudy water, scaling of heat exchanger, reduced sanitizer effectiveness
Total Alkalinity	80 - 120 ppm	corrosive to heat exchanger, large fluctuations in pH	scaling of heat exchanger
Calcium Hardness	200 - 400 ppm	corrosive to heat exchanger	scaling of heat exchanger
Salt	2700 - 5000 ppm	poor salt chlorinator performance	corrosive to heat exchanger

3. SKIMMER CHLORINATION

Placing chlorine or bromine tablets directly into the skimmer may result in high chemical concentrations flowing through the heater. DO NOT place chlorine or bromine tablets in the skimmer.

4. CHLORINATOR INSTALLATION

Chlorinators must be installed downstream of the heater, and a check valve must be installed between the heater and chlorinator to prevent high chemical concentrations from back flowing into the heater. Make sure your piping arrangement meets the chlorinator installation requirements shown on page 27.

5. BYPASS

Until water chemistry is properly balanced, and if your piping has a bypass valve installed for the heater, open the bypass so that corrosive and potentially damaging water will not flow through the heater and therefore the heat exchanger. Close the bypass valve once the water is properly balanced. Failure to close the bypass valve when attempting to operate the heater will result in extensive damage to the heat exchanger. Ensure water flow through the heater is restored before operating the heater. A bypass feature is also advantageous for service needs and for the ability to remove the heater from the water path when not heating. Refer to page 26 for further information.

EQUIPMENT INSPECTION:

On receipt of the heater, inspect the heater carton(s) for damage. If any carton(s) is damaged, note it when signing for it. Remove the heater from the carton(s) inspect it and advise the carrier of any damages at once.

IMPORTANT NOTICE:

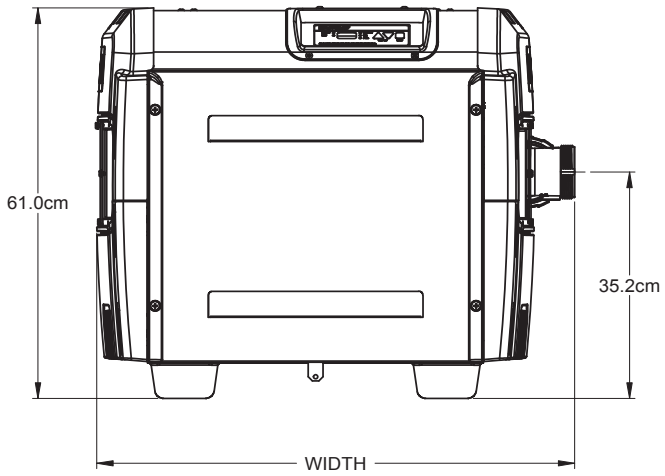
The installation instructions are intended for the use of a qualified technician, specifically trained and experienced in the installation of this type of heating equipment. Some states or provinces require that installation be licensed. If this is the case in the state or province where heater is located,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

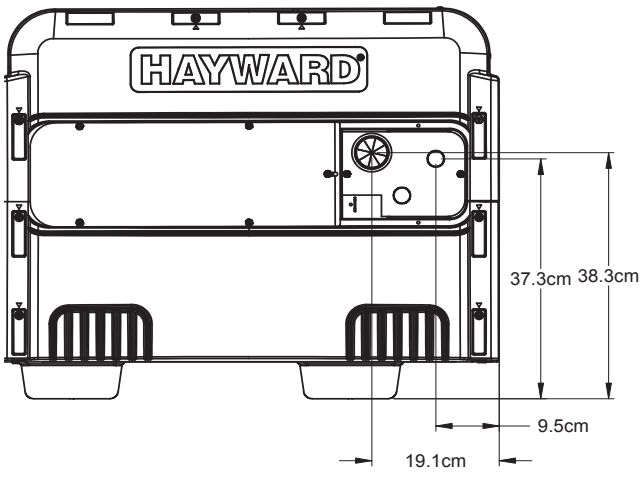
CONFORMANCE WITH CODES:

This appliance shall be installed only by authorised persons and in accordance with the manufacturer's installation instructions, local gas fitting regulations, municipal building codes, electrical wiring regulations, local water supply regulations, AS 5601.1-2010 - Gas Installations and any other statutory regulations.

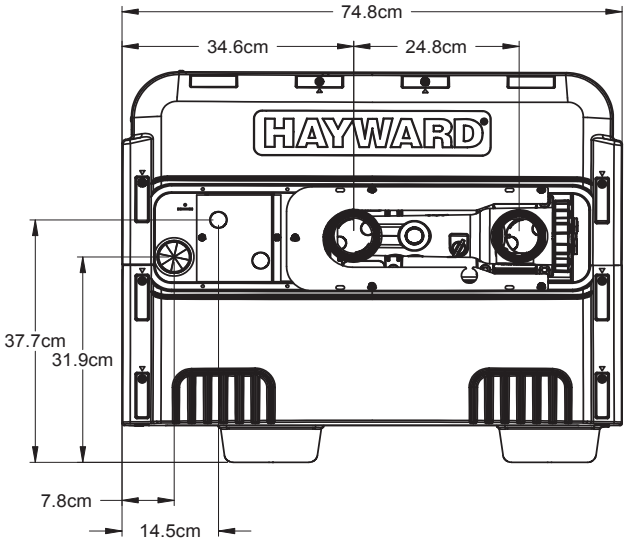
Model Number	Heater Capacity	Gas Type	Heater Width	Packaged Weight
H150FDAU	158 MJ/h	Natural/Propane	54.6 cm	64 kg
H250FDAU	264 MJ/h	Natural/Propane	71.1 cm	75 kg
H400FDAU	422 MJ/h	Natural/Propane	92.7 cm	89 kg



FRONT



LEFT



RIGHT

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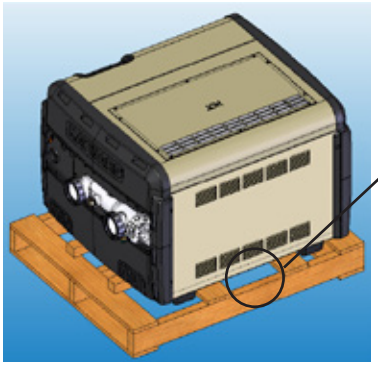
UNCRATING THE HEATER:

To remove the shipping carton from the heater:

1. Remove the corrugated carton from the heater. The carton, top pad, bottom pad, and the four corner posts can be recycled.
2. There are three (3) screws total used to secure the heater to the wood pallet. All three must be removed to separate the heater from the pallet. One (1) is located in the lower rear of the heater as shown in Figure 1.
3. To access the other two (2) screws, open the front access panel by removing the black phillips-head screw. Then remove the two (2) screws which hold the heater base pan to the pallet as shown in Figure 2.
4. Lift the heater clear of the corrugated bottom pad and off of the pallet.

ATTENTION: Do not drop the heater from a pickup truck tailgate to the ground. This may damage the heater.

Figure 1

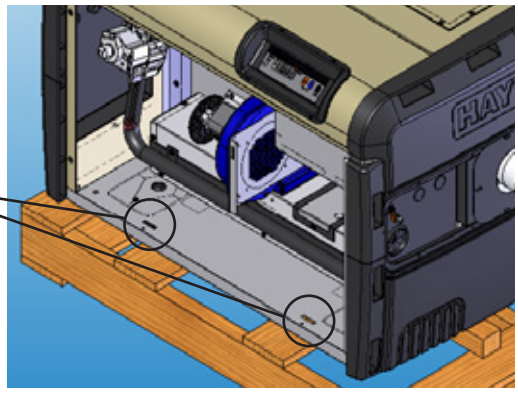


The screw through the rear shipping bracket is located in this area. Remove the screw.

It is not necessary to remove the bracket or the rear louvered panel.

Figure 2

Remove the (2) shipping screws and discard bottom corrugated tray.



LOCATING THE HEATER:

This heater is intended for outdoor installation at an altitude below 610 M (2,000 ft) only.

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

This heater must be installed at least 1.5 meters from the inside wall of a pool (in-ground or above-ground)/ spa/hot tub unless separated from the pool/spa/hot tub by a solid barrier.

The heater must be installed such that the location of the exhaust gas 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/NFPA 54) and/or CAN/CGA B149 installation codes.

Table 1
Outdoor Installation Clearances

Heater Panel	Required Clearance
Top	Unobstructed
Front	24 inches (600mm)
Back	6 inches (150mm)
Water Connection Side	12 inches (300mm)
Side Opposite Water Connection	6 inches (150mm)

Outdoor installation and service clearances:

The heater must be installed outdoors such that the installation and service clearances from combustible materials shown in Table 1 are maintained. This heater may be installed on combustible floors.

1. The heater is self-venting and does 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 (1) meter from the top of the appliance. The area under the overhang must be open on (3) sides.
4. Do not install the heater where water spray from ground sprinkler can contact the heater. The water could splash on the controls causing electrical damage.
5. Do not install under a deck.
6. Do not install within 0.6 m of any outdoor HVAC equipment.
7. Do not install where water may run-off a roof into the heater. A gutter may be needed to protect the heater.
8. Any enclosure around the heater must provide a combustion air vent commencing within 30 cm of the bottom of the enclosure. The vent opening shall have a minimum free area of 645 mm^2 per 4,000 btu/hr input rating of all gas appliances in the enclosure. See Table 1.

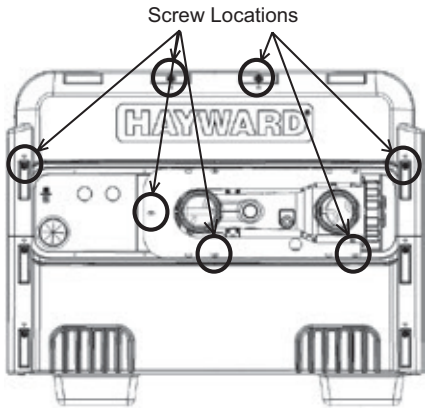
FLOORING:

This heater may be installed on either non-combustible or combustible flooring. Ultralite™ or equivalent concrete-over-foam HVAC pads are acceptable.

REVERSIBLE WATER CONNECTIONS:

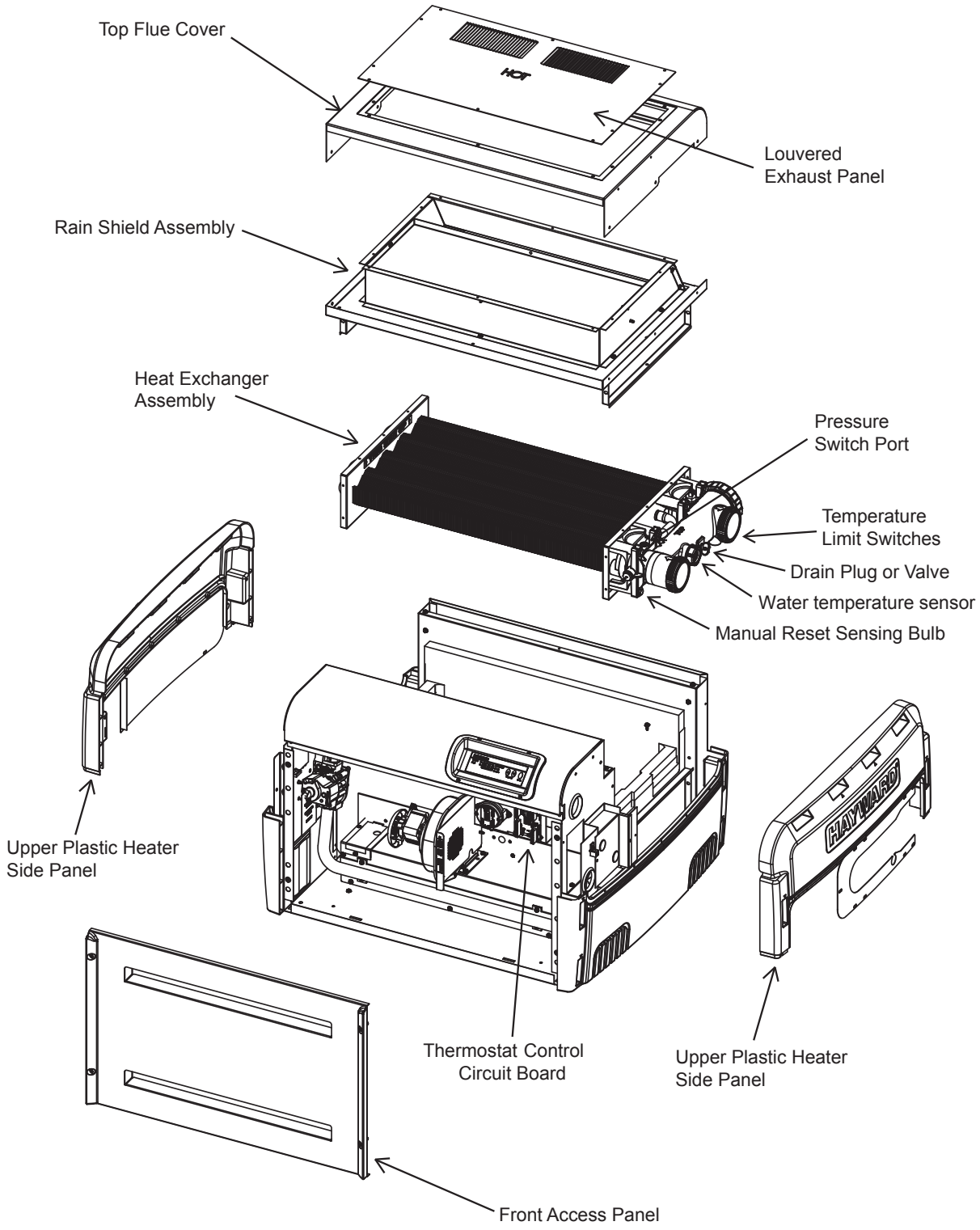
This heater is designed so that it can be installed with the water connections located on either the right or left side. Heaters are factory-shipped with right-side water connections. To move the connections to the left side follow the instructions below and see Figure 4. A trained service technician should perform these steps before the heater is installed.

Figure 4:



1. Before beginning, be aware that it is not necessary to remove the water header from the heat exchanger. When this procedure is complete, the water inlet will be located at the BACK of the heater. The water outlet will be located at the FRONT.
2. Remove screws and remove both of the upper plastic heater side panels (see Figures 5). Note the wires that pass through a hole in the heater side panel go through a split-bushing, which will allow separation of the wires from the panel without disconnecting them.
3. Disconnect the 2 wires connecting the heater wire harness to the heat exchanger header. One is located on the water pressure switch and one is located on the temperature limit switch, both on the top of the header. Pull these wires into the heater cabinet from the hole in the right-hand metal side panel in the heater, and re-route them out through the left-hand metal side panel in the heater.
4. Remove countersunk screws on the heater top and remove louvered exhaust panel on heater top (see Figure 15).
5. Remove the heater top flue cover by removing 3 screws on each side of the heater (see Figure 5).
6. Remove screws and remove rain shield assembly (see Figure 5). Note that there are screws which hold the rain shield assembly to the heat exchanger tube sheets, which also must be removed.
7. Remove the front access panel (see Figure 5).
8. Disconnect water temperature sensor plug from the thermostat control board located inside the heater (see Figure 5).
9. Pull the water temperature sensor wires out of the heater cabinet through the hole in the right-hand metal side panel.
10. Remove the manual reset high limit sensing bulb from the bulbwell in the header (see Figure 5) and pull the bulb and capillary tube into the heater cabinet and re-route them through the left-hand metal side panel.
11. Lift and rotate the heat exchanger. Do not flip. Use care when setting the heat exchanger in place not to damage the white sealing gaskets or combustion chamber.
12. Route the water temperature sensor wires into the heater cabinet through the hole in the left-hand metal side panel, and re-connect to the ignition control board.
13. Re-connect the heater wire harness to the water pressure switch and temperature limit.
14. Reverse the above steps to reassemble the heater.

Figure 5


Top Flue Cover
Louvered
Exhaust Panel
Rain Shield Assembly
Heat Exchanger
Assembly
Pressure
Switch Port
Temperature
Limit Switches
Drain Plug or Valve
Water temperature sensor
Manual Reset Sensing Bulb
Upper Plastic Heater
Side Panel
Thermostat Control
Circuit Board
Upper Plastic Heater
Side Panel
Front Access Panel

Gas Supply and Piping:
Refer to the charts below in Figure 6 for gas pipe sizing for low pressure natural gas, low pressure propane gas, two-stage natural gas and two-stage propane gas systems.

Figure 6: GAS PIPE SIZE
Follow local gas codes for proper gas line material selection (copper, iron, plastic, etc.)

LOW PRESSURE NATURAL GAS PIPE SIZING: (Based upon an inlet gas pressure of 3.45 kPa or less at a pressure drop of 125 Pa)

Distance from Gas Meter to Heater Gas Valve Inlet	Model	H150FDAU	H250FDAU	H400FDAU
	MJ/hr input	158	264	422
	Line Material	Iron or Plastic Pipe	Iron or Plastic Pipe	Iron or Plastic Pipe
0 to 15 m		3/4"	1"	1-1/4"
15 to 30 m		1"	1-1/4"	1-1/4"
30 to 60 m		1-1/4"	1-1/4"	1-1/2"
60 to 90 m		1-1/4"	1-1/2"	2"

LOW PRESSURE PROPANE GAS PIPE SIZING: (Based upon an inlet gas pressure of 2.75 kPa or less at a pressure drop of 125 Pa)

Distance from Tank Regulator Outlet to Heater Gas Valve Inlet	Model	H150FDAU		H250FDAU		H400FDAU	
	MJ/hr input	158		264		422	
	Line Material	Iron Pipe	Tubing	Iron Pipe	Tubing	Iron Pipe	Tubing
0 to 15 m		3/4"	7/8"	1"	1-1/8"	1"	-
15 to 30 m		3/4"	1-1/8"	1"	1-1/8"	1-1/4"	-
30 to 60 m		1"	1-1/8"	1-1/4"	-	1-1/4"	-
60 to 90 m		1"	-	1-1/4"	-	1-1/2"	-

HIGH PRESSURE "2-STAGE" SYSTEMS

HIGH PRESSURE NATURAL GAS PIPE SIZING "FIRST STAGE": (Based upon an inlet gas pressure of 13.8 kPa or less at a pressure drop of 6.8 kPa)

Distance from Outlet of 1st Stage Regulator to Inlet of 2nd Stage Regulator	Model	H150FDAU	H250FDAU	H400FDAU
	MJ/hr input	158	264	422
	Line Material	Iron or Plastic Pipe	Iron or Plastic Pipe	Iron or Plastic Pipe
0 to 15 m		1/2"	1/2"	1/2"
15 to 30 m		1/2"	1/2"	3/4"
30 to 45 m		1/2"	1/2"	3/4"

LOW PRESSURE NATURAL GAS PIPE SIZING "SECOND STAGE": (Based upon an inlet gas pressure of 2.5 kPa or less at a pressure drop of 125 Pa)

Distance from Outlet of 2nd Stage Regulator to Heater Gas Valve Inlet	Model	H150FDAU	H250FDAU	H400FDAU
	MJ/hr input	158	264	422
	Line Material	Iron or Plastic Pipe	Iron or Plastic Pipe	Iron or Plastic Pipe
0 to 3 m		3/4"	3/4"	3/4"

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

HIGH PRESSURE PROPANE GAS PIPE SIZING "FIRST STAGE": (Based upon an inlet gas pressure of 68 kPa or less at a pressure drop of 6.9 kPa)

Distance from Tank Regulator Outlet to Heater Gas Valve Inlet	Model	H150FDAU		H250FDAU		H400FDAU	
	MJ/hr input	158		264		422	
	Line Material	Iron Pipe	Tubing	Iron Pipe	Tubing	Iron Pipe	Tubing
0 to 15 m		1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
15 to 30 m		1/2"	1/2"	1/2"	1/2"	1/2"	5/8"
30 to 45 m		1/2"	1/2"	1/2"	1/2"	1/2"	5/8"

LOW PRESSURE PROPANE GAS PIPE SIZING "SECOND STAGE": (Based upon an inlet gas pressure of 2.75 kPa or less at a pressure drop of 125 Pa)

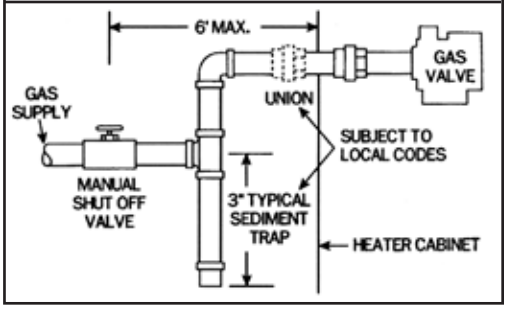
Distance from Tank Outlet to 2nd Stage Regulator to Heater Gas Valve Inlet	Model	H150FDAU		H250FDAU		H400FDAU	
	MJ/hr input	158		264		422	
	Line Material	Iron Pipe	Tubing	Iron Pipe	Tubing	Iron Pipe	Tubing
0 to 15 m		1/2"	5/8"	1/2"	3/4"	3/4"	7/8"

GAS SUPPLY INSTALLATION:

The heater is shipped from the factory with the gas connection located on the left-hand side of the heater cabinet. Insert the pipe to the gas valve through the grommet in the cabinet side (see Figure 8.) A union should be installed outside the heater cabinet for easy removal of the gas manifold assembly during service.

An AGA approved main gas shutoff valve must be installed outside the cabinet and within 1.8 m of the heater. This valve must have an I.D. large enough to supply the proper amount of gas volume to the heater. See Figure 7. If BSP threads are to be used, the included BSP to NPT adapter will be required to attach the piping to the gas valve. NPT threads are located on the side of the adapter with the chamfer on the inside diameter.

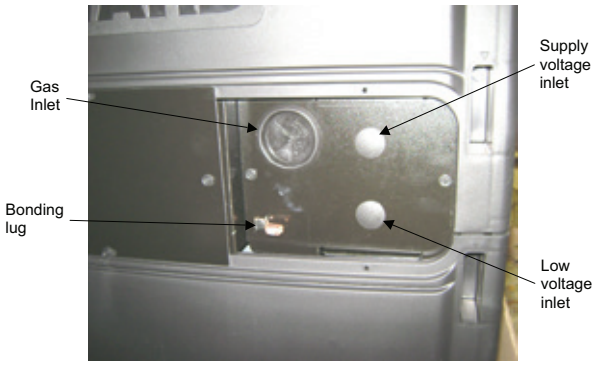
Figure 7. Field Gas Piping



ATTENTION: Apply joint compound (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.

ATTENTION : Do not use flexible appliance connectors on any gas connections unless the connector is CSA 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).

Figure 8. Left Side Gas and Electricity Connection



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 (3/4" NPT).

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

Questions on 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 the 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, AS/NZS 5601.1-2010 Gas Installations and applicable local codes. If the 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.

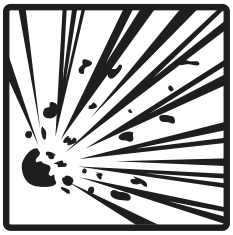
ATTENTION: Whenever a high-pressure double regulation system is utilized for propane gas, consult a propane expert for accurate pipe and pressure sizing. Make sure that 1st and 2nd stage regulators are large enough to handle the BTUH input listed for the heater(s) being used.
Hayward will not be responsible for heaters that soot up due to improper gas line or propane tank sizing resulting in improper gas volume.

WATER PIPING:

The 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, seawater (PPM>6000), or other non-potable waters.

Do not install any restriction in the water pipe between the heater outlet and the pool/spa with the exception of:

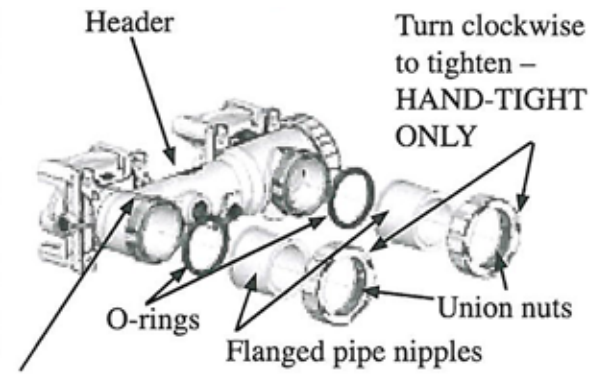
1. **three-way switching valve**
2. **in-line chlorinator**
3. **chlorinator check valve**



WARNING: **EXPLOSION HAZARD** Blockage of water flow from heater return to pool may result in fire or explosion causing property damage, personal injury, or loss of life.

The heater is equipped with CPVC flanged pipe nipples, union nuts, and O-rings for use with 2" or 2-1/2" pipe connections. Figure 9 shows the method for installing these parts on the header.

Figure 9: Pipe nipple



Note inlet/outlet markings molded into header

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

The CPVC flanged pipe nipples must be installed on the heater inlet and outlet without modification.

Pipe, fittings, valves, and any other element of the filter system may be made of plastic materials, if acceptable to the authority having jurisdiction.

Heat sinks, heat tapes, firemen switches, and check valves are not required on the heater. 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.

The built-in bypass inside the header will maintain proper flow through the heat exchanger if the flow rate is within the range for the heater. See Figure 10 on page 19.

The minimum flow rate is to be calculated or measured with the infloor cleaning system in use, if the pool is so equipped, as well as any other jets or other demands on the water flow.

If the normal pump and filter system flow rate exceeds 475 L/min then a manual bypass valve must be installed as shown in Figure 11. Damage caused by flow rates outside this range will void the manufacturer's warranty.

The installation is as follows:

1. Install a flow meter on the outlet line of the heater.
2. Adjust the manual bypass valve until the flow rate is within the flow rate range specified for the heater.
3. Once the valve is set, note the position and remove the valve handle to prevent further adjustment.

Figure 10
Allowable Water Flow Rate Range

Model	Minimum Flow Rate (L/min)	Maximum Flow Rate (L/min)
H150FDAU	75	475
H250FDAU	95	475
H400FDAU	115	475

ATTENTION: Improperly adjusted manual bypass valves will result in damage to the heater if the flow rates are not maintained as specified in Figure 10 under all operating conditions. The heat exchanger will fail and this damage will not be covered under the Hayward warranty.

Figure 12 illustrates a typical pool piping diagram and layout for the pool equipment.

Figure 13 illustrates a multiple heater installation for very large pools with and without a manual bypass valve.

Figure 11: Manual Bypass valve

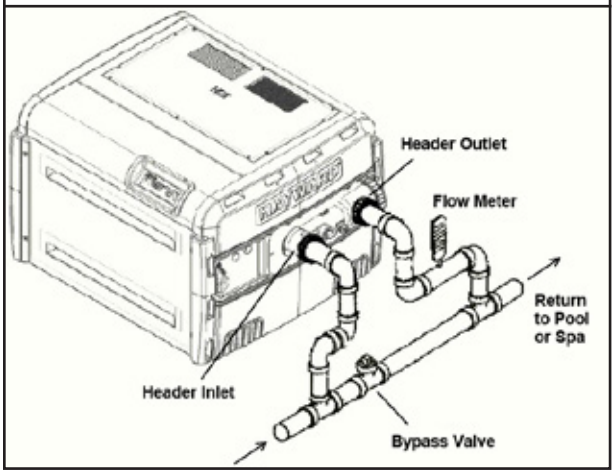


Figure 12: Typical plumbing to pool

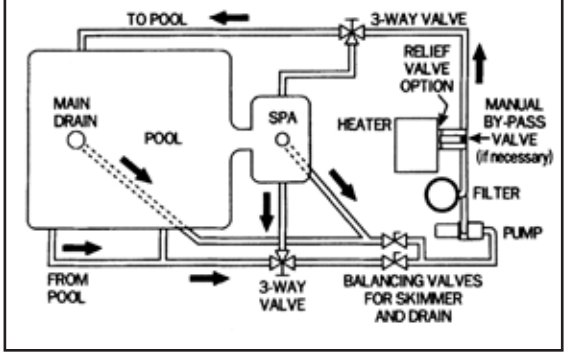
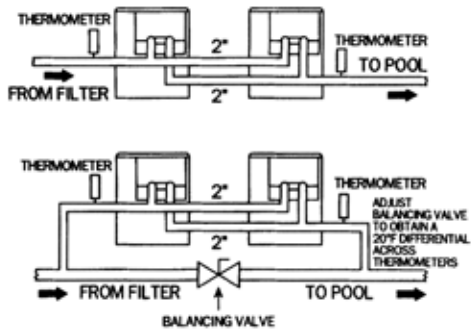


Figure 13: Multiple heater system



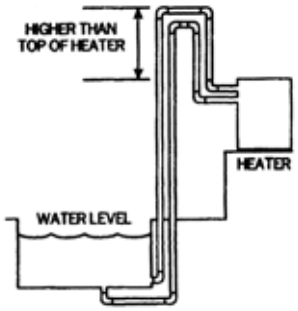
INSTALLATION ABOVE POOL/SPA SURFACE:

If the heater is installed less than one (1) meter above the surface of the pool/spa water, install eyeball fittings or directional flow fittings on the end of the return water line to the pool/spa to create adequate back pressure at the heater to operate the pressure safety switch when the filter pump is running.

If the heater is installed more than one (1) meter above the surface of the pool/spa water, install a loop as shown in Figure 19 to prevent drainage of water in the heater during a filter change.

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

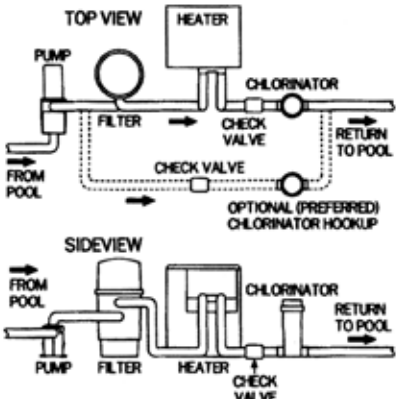
Figure 14: Heater installation above pool/spa



AUTOMATIC CHLORINATORS AND CHEMICAL FEEDERS:

If used, a chlorinator must be installed downstream from the heater in the pool return line and at a lower elevation than the heater as shown in Figure 15. Install a separate positive seal corrosion resistant check valve between the heater outlet and the chlorinator to prevent highly concentrated sanitizers from backsiphoning into the heater. Backsiphoning usually occurs when the pump is shut off and a pressure differential is created.

Figure 15: Automatic chlorinator



ELECTRICAL SPECIFICATIONS :

WARNING: It is required that licensed electricians do all electrical wiring. Risk of Electric Shock. Hazardous voltage can shock, burn, and cause death or serious property damage. To reduce the risk of electric shock, do NOT use an extension cord to connect unit to electric supply. Provide a properly located electrical receptacle. All electrical wiring MUST be in conformance with applicable local and national codes and regulations. Before working on heater, turn off power supply.

GENERAL INFORMATION :

Wiring connections must be made as shown in the wiring diagram found inside the heater cabinet, and as shown in Figure 19. The heater must include a definite means of grounding and bonding. There is a ground lug inside the control box and a bonding lug on the side of the heater.

MAIN POWER :

WARNING - Power connections supplied to the heater must be in accordance with AS/NZ 3000 and local electric codes.

BONDING :

CAUTION - This heater must be connected to a bonding grid with a solid copper conductor wire gauge 8 AWG or larger. All Hayward heaters are designed for copper conductors only. Most codes require that all metallic components of a pool structure, including reinforcing steel, metal fittings and above ground equipment, be bonded together with a solid copper conductor wire gauge 8 AWG or larger. The heater, along with pumps and other pool equipment must be connected to this bonding grid. A bonding lug is provided on the side of the heater to ensure that this requirement is met.

ELECTRICAL CONNECTIONS:

The heater is equipped with a direct spark ignition control system that automatically lights the burners. An external power supply is required to power the control system. The heater is shipped from the factory wired for use with 240 VAC, 50 Hz field power supply.

All wiring connections to the heater must be made in accordance with the latest edition of AS/NZ 3000, unless local code requirements specify otherwise.

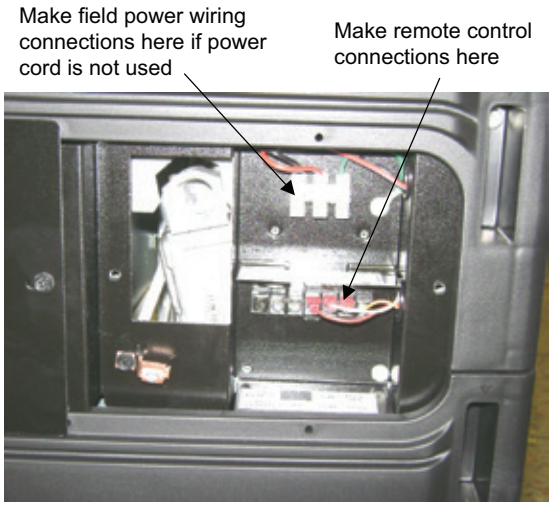
The heater must be electrically grounded and bonded in accordance with local code, or in the absence of local codes, with AS/NZ 3000.

The heater may be installed with the electrical service and remote control entering the heater cabinet on either the left or right sides of the heater.

The heater is equipped with (4) openings for electrical entry. Any unused openings must be plugged (these are supplied).

Field power wiring connections are to be made using the supplied 240V power cord or to the terminal block located in the upper compartment inside the junction box (see Figures 16 and 17). The heater has 2 junction boxes (one on each side of the heater). Only one junction box should be used for field power wiring.

Figure 16: Location of field power wiring terminal block and remote control terminal block



(junction box cover not shown)
(left side shown, right side is similar)

Figure 17: Junction Box Wiring

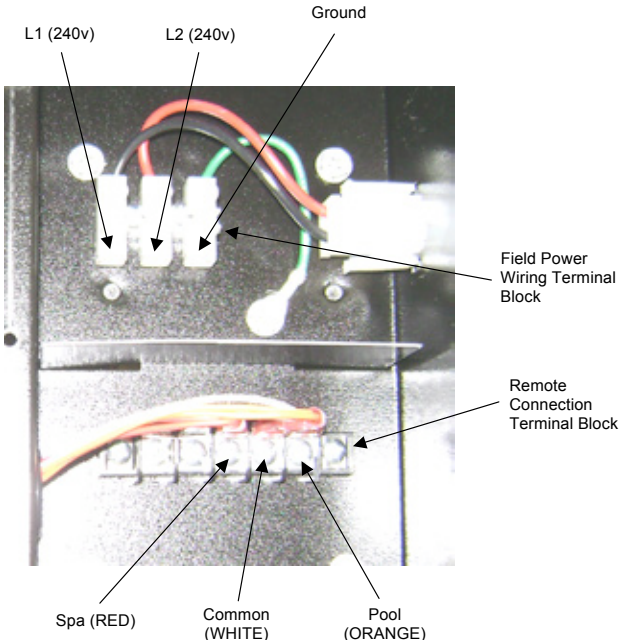


Figure 18: Control Panel Layouts

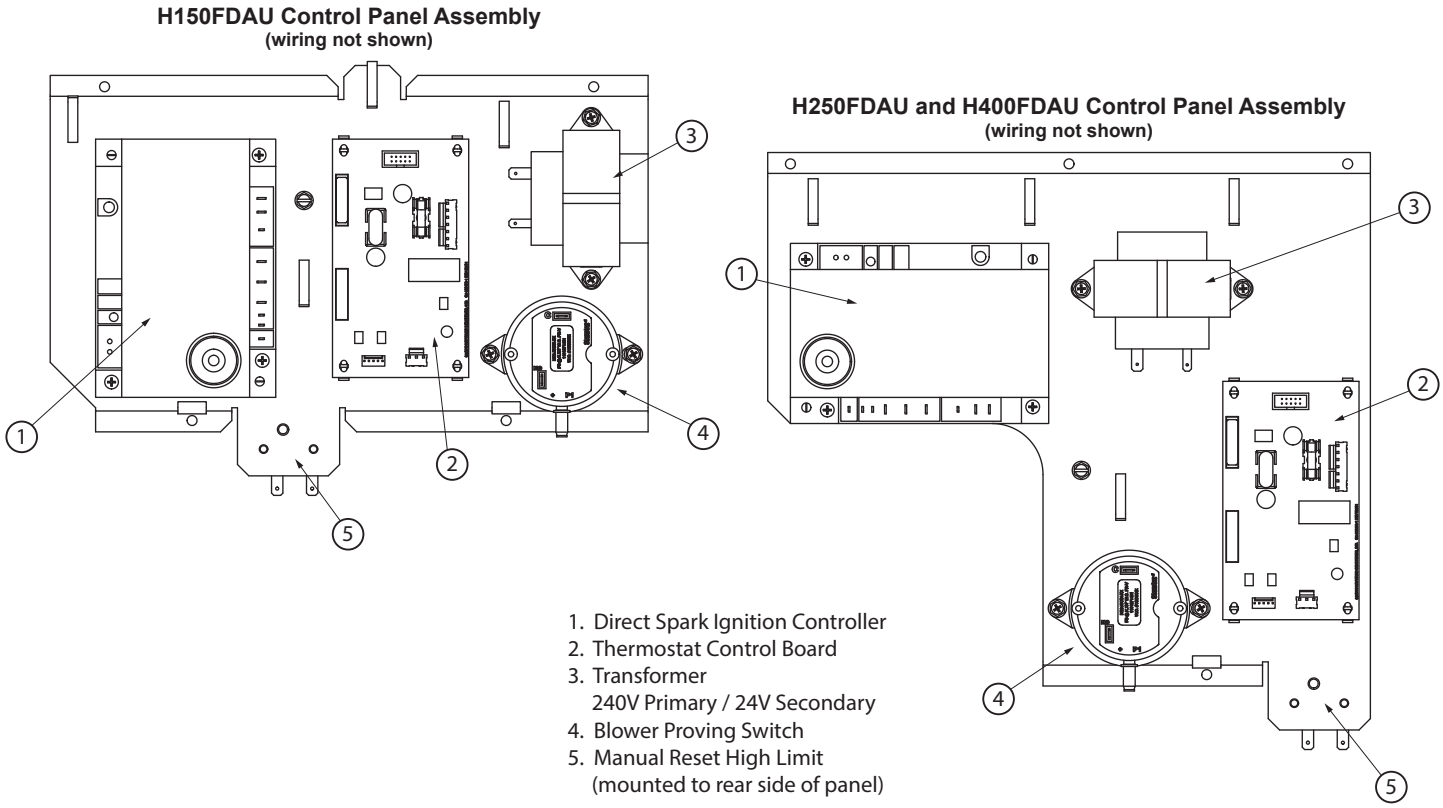
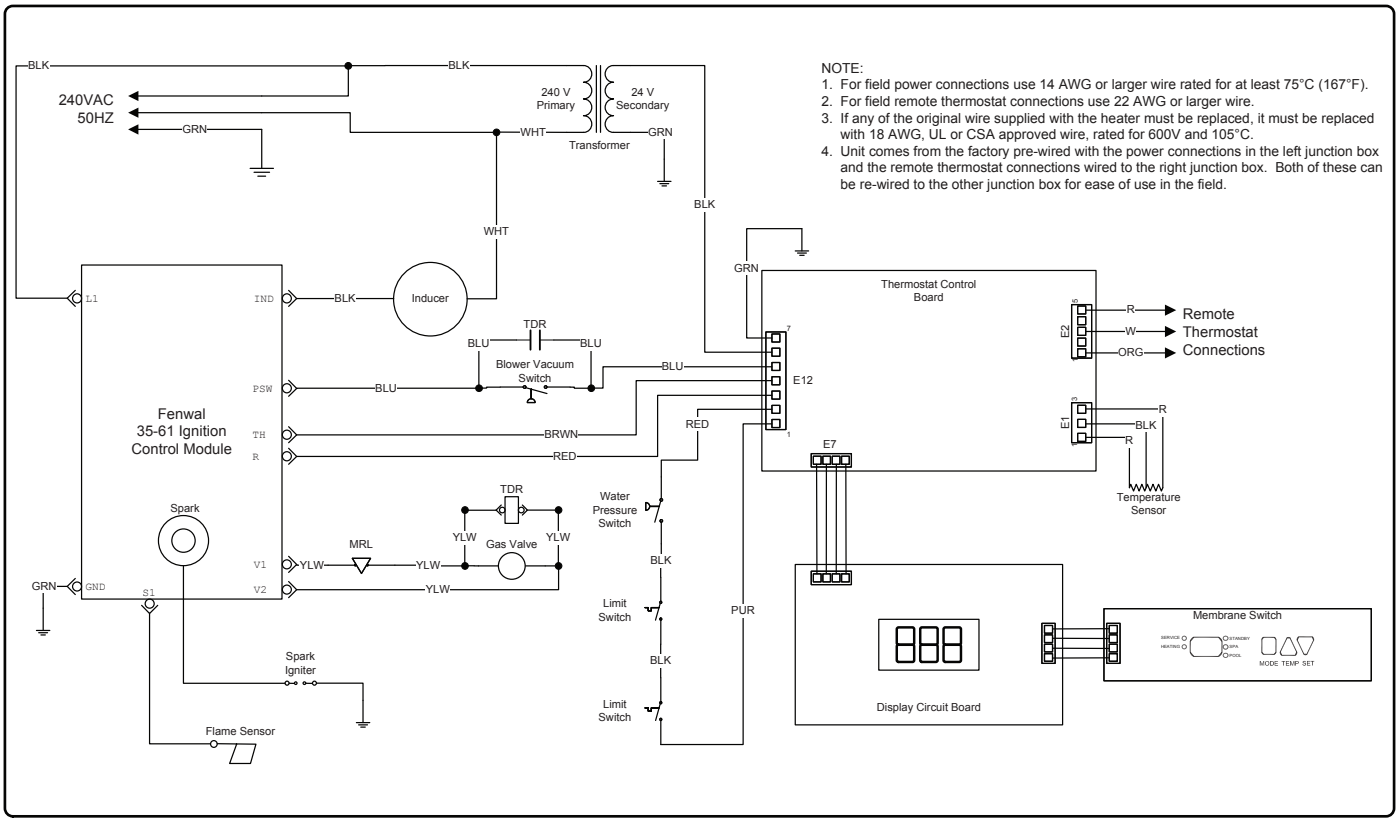


Figure 19: Wiring connection diagram.



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" models to be remotely selected. Connect remote wiring to the terminal block located in the lower compartment inside the junction box (see Figures 16 and 17). The heater has 2 junction boxes (one on each side of the heater). Only one junction box should be used for remote wiring. Do not remove the wires connected to the remote connection terminal block. Remote wiring must be run in a separate conduit. Use 22 AWG wire for runs less than 30 feet. Use 20 AWG wire for runs over 30 feet. The maximum allowable run is 200 feet.

2-WIRE REMOTE CONTROL CONNECTION:

Before using the heater with a 2-wire remote thermostat, the user must first configure the TCM. To configure the TCM, the user first presses the "MODE" button to select "STANDBY" mode. The user then presses and holds both the "DOWN" and "MODE" buttons for 3 seconds until the display shows "bo", indicating "Bypass Operation" mode. At the remote control wiring terminal block located in the lower compartment inside one of the junction boxes on either side of the heater, connect one of the two remote thermostat wires to the terminal adjacent to the White wire ("24V") and the other wire to the terminal adjacent to the Orange wire ("POOL"). To operate the heater with the 2-wire remote thermostat the user must select either "SPA" mode or "POOL" mode by pressing the "MODE" button. In "Bypass Operation" mode, the status of the remote thermostat directly controls calls for heat. Specifically, a closed thermostat contact results in a call for heat, an open contact no call for heat. TCM set points are ignored. However, the TCM continues to monitor water temperature and will intervene to ensure the normal maximum limit is not exceeded. Also, the heater's string of limit switches (water pressure switch and two temperature switches) is still active. To deactivate the heating cycle, the user presses the "MODE" button to return to "STANDBY" mode. To exit "Bypass Operation" mode, the user selects "STANDBY" mode, then presses and holds both the "DOWN" and "MODE" buttons for 3 seconds (until the display no longer shows "bo"). Note that "Bypass Operation" mode is maintained through a power down/up cycle.

3-WIRE REMOTE CONTROL CONNECTION:

A remote "SPA/POOL" selection switch can be connected to the TCM via the remote control wiring terminal block located in the lower compartment inside one of the junction boxes on either side of the heater. Connect the appropriate wires from the remote switch to the terminals adjacent to the Orange wire ("POOL"), White wire ("24V"), and the Red wire ("SPA"). To operate the heater with the 3-wire remote switch, the user must select "STANDBY" mode by pressing the "MODE" button. When in "STANDBY" and when the remote switch is set to "Pool/Low", the "POOL" LED will be illuminated and the water temperature will be displayed. Similarly, when the remote switch is set to "Spa/High", the "SPA" LED will be illuminated and the water temperature will be displayed. Note that the "STANDBY" LED will also be illuminated to indicate that the heater is now in "3-wire remote switch control" mode. The TCM will regulate the water temperature to the set point of the mode selected. To deactivate the heating cycle, the user presses the "MODE" button to return to "STANDBY" mode.

Figure 20: Lighting & Operating Instructions label

FOR YOUR SAFETY READ BEFORE LIGHTING

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

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

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

WHAT TO DO IF YOU SMELL GAS

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

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

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

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

OPERATING INSTRUCTIONS

1. STOP! Read the safety information on this label.
2. Change the "MODE" on the control panel to "STANDBY".
3. Remove the heater's front access panel.
4. This appliance is equipped with an ignition device which automatically lights the burner. 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 thru 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 the gas control knob clockwise ↷ to "OFF".
4. Replace the heater's front access panel.

POUR VOTRE SÉCURITÉ LIRE AVANT L'ALLUMAGE

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

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

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

QUE FAIRE EN PRÉSENCE D'ODEURS DE GAZ:

- Ne pas essayer d'allumer l'appereil.
- 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 "FERMÉ" (OFF).

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, répéterles étapes 2 à 10. Si l'appareil refuse toujours de "FERMÉ" fonctionner, dissipe. Suivre les instructions *Pour tourner le gaz à l'appareil* et appeler votre technicien de service ou votre 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.

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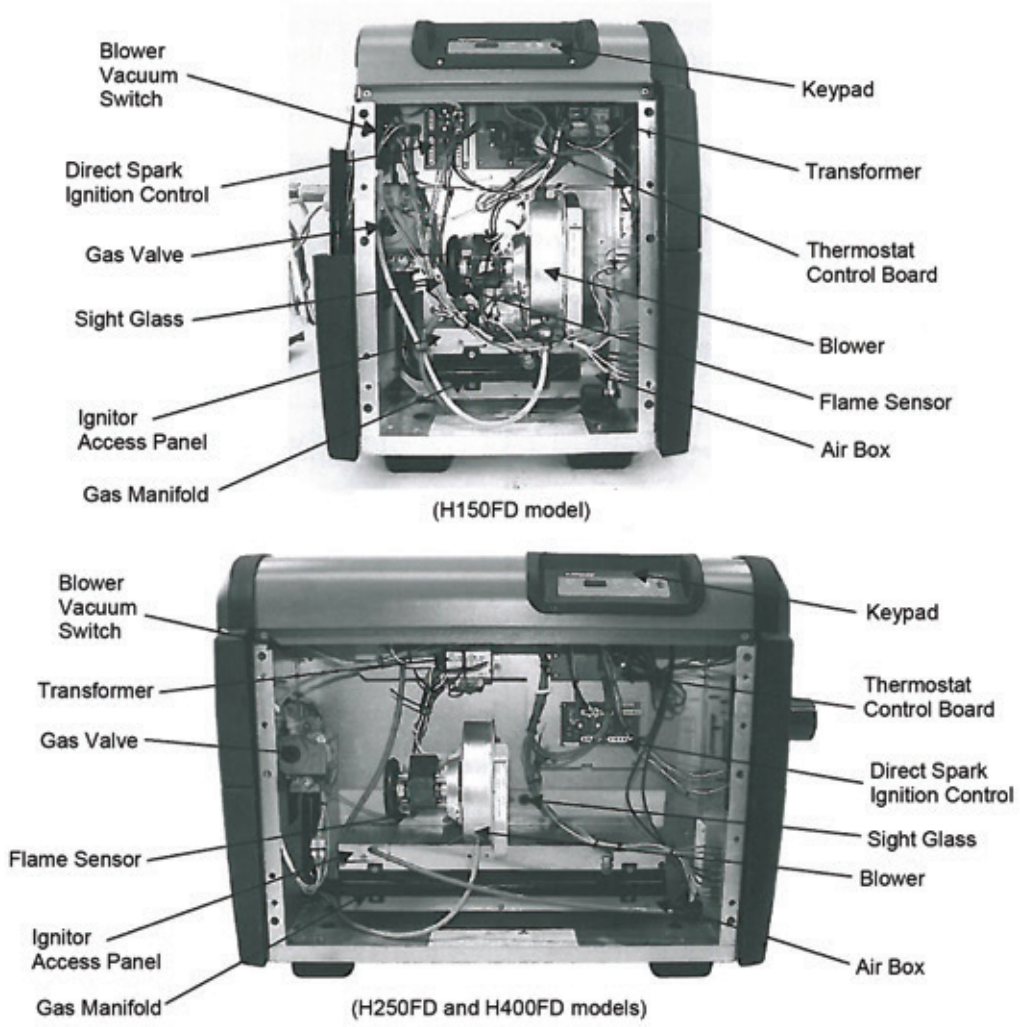
SECTION III. INSTALLER CHECK-OUT AND START-UP:

Some of the following procedures will require the heater to be operating. Full lighting and shutdown instructions are included on the lighting and operating label affixed to the inside of the front access panel. The heater automatically lights in response to a call for heat, and automatically shuts down when that call for heat is satisfied.

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 the heater.

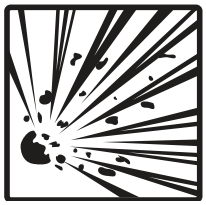
Figure 21: Location of components



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 during any pressure testing of that system at test pressure 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.



WARNING: EXPLOSIVE HAZARD. The use of an open flame to check for gas leaks could cause an explosion resulting in severe injury and/ or death.
Shut off gas and fix even the smallest leak right away. Be sure to leak test the heater gas manifold fittings using the above procedure once the heater is in operation.

GAS PRESSURE TESTING:

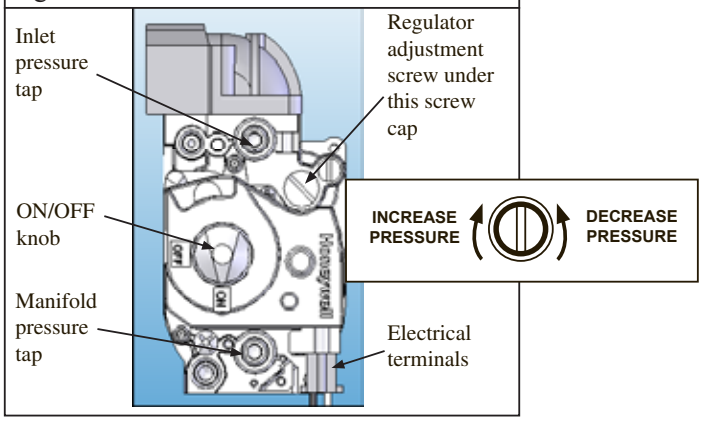
The following gas pressure requirements are important to the proper operation of the burners in gas heaters. Improper gas pressure or gas volume will create the following conditions:

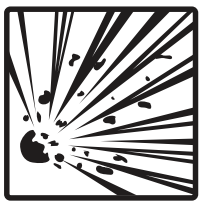
1. Flame burns totally yellow.
2. Flame lifts off burner.
3. Heat exchanger soots up. The gas pressure regulator on all heaters is preset at the factory, but the setting should be verified by the installer to ensure proper operation.

If gas pressure is inadequate, check for undersize piping between the gas meter and the heater or for a low-capacity gas meter. Gas pressure test procedure:

1. Obtain the necessary equipment:
   a. Manometer to read pressure
   b. Small flat screwdriver
2. Using the screwdriver, remove the screw in the manifold pressure tap.
3. Attach the manometer to the pressure tap.
4. Turn on the water system and start the heater following the lighting & operating instructions on the label affixed inside the front access panel. If there is more than one pool/spa heater connected to the gas supply line, turn each of those appliances "ON" while testing the heater.
5. Take a pressure reading with the heater running, the value should agree with those in Figure 23.
   If the pressure is within the range shown, then no further adjustment is needed.
6. If the gas pressure does not meet the above requirements the regulator must be adjusted.
7. Gas pressure regulator adjustment procedure:
   a. Remove the screw cap over the regulator adjustment screw (see Figure 22).
   b. Turn the regulator adjustment screw clockwise to increase pressure and counterclockwise to decrease pressure.
   c. Replace the screw cap over the regulator adjustment screw.

Figure 22: Gas Valve

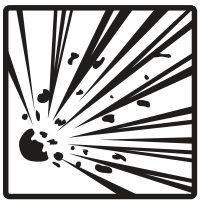




WARNING EXPLOSION HAZARD: Do not remove the screw from the tap with the valve in the "ON" position. The valve must be in the "OFF" position when the screw is removed. Removal of the screw with the gas valve "ON" could cause an explosion resulting in severe injury and/or death.

9. Remove the manometer and replace the screw. If proper pressure cannot be achieved by adjusting the gas valve regulator, the installer must contact the gas supplier and request that the inlet pressure to the heater be set to within the gas pressure range shown in Figure 23.

Figure 23: Correct gas pressures (kPa)		
Fuel	Natural	Propane
Manifold	0.45-0.50	1.70-1.75
Inlet, Minimum	1.12	2.24
Inlet, Maximum	2.61	3.24



WARNING EXPLOSION HAZARD: Gas pressures in excess of those listed in Fig. 23 could cause a gas leak or diaphragm rupture. Gas leakage could cause an explosion resulting in severe injury or death.

WATER PRESSURE SWITCH TEST / ADJUSTMENT PROCEDURE:

The pressure switch is preset at the factory for most typical, deck level installations. When the heater is located above or below the level of the pool or spa, the pressure switch may require adjustment to compensate for the change in static head pressure. The following procedure is recommended when the switch needs adjustment and/or is replaced:

For Installations with Heater Above Water Level:

1. Be sure the filter is clean before making the adjustment.
2. Turn "ON" the filter pump and ensure all air is out of the water lines, and ensure water flow rate is at least the rated minimum (see Figure 10).
3. Turn "ON" the heater and adjust the thermostat to create a call for heat.
4. If the heater does not light, adjust the pressure switch by turning the adjustment knob on the pressure switch counter-clockwise, until the heater lights. Turning the adjustment knob counterclockwise decreases the pressure needed to close the switch.
5. Check the function of the pressure switch by turning the filter pump on and off several times. The pool heater should turn off immediately when the pump is turned off. Never allow the heater to operate with less than the minimum rated water flow rate.

For Installations with Heater Below Water Level:

1. Be sure the filter is clean before making the adjustment.
2. Turn "ON" the filter pump and ensure all air is out of the water lines, and ensure water flow rate is at least the rated minimum (see Figure 10).
3. Turn "ON" the heater and adjust the thermostat to create a call for heat.
4. Turn the adjustment knob on the pressure switch clockwise, until the heater turns off, then turn the knob ¼ turn counter-clockwise, so that the heater turns back on. Turning the adjustment knob clockwise increases the pressure needed to close the switch.
5. Check the function of the pressure switch by turning the filter pump on and off several times. The pool heater should turn off immediately when the pump is turned off. Never allow the heater to operate with less than the minimum rated water flow rate.

TWO-SPEED PUMP:

In a few cases the pressure from a two-speed pump is below the 1- pound minimum required to operate the water pressure switch on 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 the heater. If the pump and piping arrangement are such that the required 1-pound minimum pressure cannot be obtained, do not attempt to operate the heater. Correct the installation.

TEMPERATURE CONTROL OPERATION:

This model of Hayward gas fired pool/spa heater is equipped with a temperature control module (TCM) and a direct spark ignition control module (DSICM) for automatically controlling pool and spa water temperatures. The TCM has three components, the Display/Control Board with its attached Keypad and the IO/Power Supply Board. The TCM keypad & display are located on the top edge of the front panel, and are used to enter Pool and Spa set points. This display also indicates water temperature and, if needed, diagnostic information (error codes). The IO/Power Supply Board is located inside the heater, behind the removable front panel.

Figure 24: Keypad

The DSICM manages the ignition of the burner and ensures safe operation by constantly monitoring the flame and the blower fan. This module is also located behind the removable front panel.

OPERATION: SET POINT ADJUSTMENT

Set point temperature is displayed by momentarily pressing the “UP” or “DOWN” buttons while in “POOL” or “SPA” mode. The set point for the selected mode will blink while it is displayed. Further pressing of the “UP” or “DOWN” buttons will adjust the set point temperature up or down as desired. To accept the adjustment, press the “MODE” button (or the adjustment will be automatically accepted in 10 seconds). The set point range is 18ºC to 40ºC.

FAHRENHEIT VERSUS CELSIUS:

The temperature can be displayed in Celsius or Fahrenheit. To change the display, use the “MODE” button to place the heater in “STANDBY”. Then press and hold the “UP” and “MODE” buttons until the display shows the °C/°F selection. Press the “DOWN” button to toggle between selections. To accept the selection, press the “MODE” button (or the selection will be automatically accepted in 10 seconds).

HEATING MODE:

The TCM provides a “thermostatic” temperature control action by continually comparing the temperature of the water returning from the pool or spa with set point and calling-for-heat or not. Specifically, when the water temperature is more than 0.55ºC (1ºF) below set point a call-for-heat is generated and a heating cycle is initiated.

1. The DSICM checks the blower vacuum switch for open contacts.
2. The blower is then energised and once the vacuum switch contacts close, a pre-purge delay begins.
3. Following the pre-purge period (15 seconds), the gas valve is energised and sparks commence for the trial for ignition period (4 seconds).
4. When the flame is detected during the trial for ignition, sparks are shutoff immediately and the gas valve remains energised.
5. The thermostat, vacuum switch and the burner flame are all constantly monitored to assure the system continues to operate properly.
6. When the thermostat is satisfied and the call-for-heat ends, the gas valve is de-energised immediately.
7. The DSICM senses the loss of flame and initiates a post-purge period (15 seconds) before de-energising the blower.

KEYPAD INPUTS:

In normal use, the user activates the heating cycle by moving from "STANDBY" mode to "SPA" or "POOL" mode by pressing the "MODE" button. The TCM & DSICM will regulate the water temperature to the set point of the mode selected. To deactivate the heating cycle, the user presses the "MODE" button again (once or twice) to return to "STANDBY" mode.

FAILURE TO LIGHT — RETRY:

If the first ignition attempt fails during a normal heating cycle, the DSICM will make two (2) additional ignition trials before going into lock-out. The gas valve will be de-energised immediately, and the blower will be turned off following the post-purge period.

FLAME FAILURE — RE-IGNITION:

If the established flame signal is lost, the DSICM will respond with 0.8 seconds. The HV spark will be energised for a trial ignition period in an attempt to relight the burner. If the burner does not light, the DSICM will de-energise the gas valve. The DSICM will make two (2) more attempts to relight the burner. If the burner does not relight, the DSICM will go into lock-out (as above in "Failure to Light"). If the flame is re-established, normal operation resumes.

BLOWER AIRFLOW PROBLEMS:

Blower air flow is continually monitored during an ignition sequence by the vacuum switch. If during the initial call-for-heat the switch contacts are in the closed position for 30 seconds without the blower being energised, an air flow fault will be declared and the control will remain in this mode with the combustion blower off.

If the pressure switch remains open for more than 30 seconds after the blower output is energised, an air flow fault will be declared and the DSICM will stay in this mode with the blower on, waiting for the pressure switch to close. When proper air flow is detected from the vacuum switch, the DSICM begins the pre-purge period with a normal ignition sequence following.

If the air flow signal is lost while the burner is firing, the DSICM will immediately de-energise the gas valve and the blower will remain on. If the call-for-heat remains, the DSICM will wait for proper air flow to return. If proper air flow is not detected after 30 seconds an air flow fault signal will be declared. If proper air flow is detected at any time, a normal sequence will being with the pre-purge period.

FLAME FAULT:

If at any time the gas valve fails to close completely and maintains a flame, the flame sense circuit will detect it and energise the blower. Should the gas valve later close completely removing the flame signal, the blower will be turned off following the post-purge period.

DSICM FAULT CONDITIONS:

Error Mode:	**LED Indication:**
Internal control failure	Steady On
Air flow fault	1 Flash
Flame with no call for heat	2 Flashes
Ignition lockout	3 Flashes

AUTOMATIC RESET TIME:

The heater will automatically reset when an error condition is corrected and resumes operation as detailed in Figure 52: TCM ERROR CODES.

Alternatively, the heater can be manually reset using the keypad by pressing the “MODE” button to cycle through “STANDBY” and back to the original mode (“SPA” or “POOL”).

If the DSICM is in lock-out and if the thermostat is still calling-for-heat after one hour, the DSICM will automatically reset and attempt to ignite the burner again.

PERIODIC INSPECTION:

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

1. Periodically check the venting on outdoor heaters. The heater’s venting areas (the louvered top panel) must never be obstructed in any way and minimum clearances must be observed to prevent restriction of combustion and ventilation air. Remember that shrubs grow and in time may obstruct a heater’s venting areas.
2. Check the venting of indoor heater 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 the heater is operating on propane gas, the 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 the tank resulting in inadequate gas volume.
6. If another appliance is added to the gas line at a later date, consult the local gas company to be sure the gas line will have the capacity to supply both units at full input rating 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, it must be removed and the entire heater must be replaced.
8. An inspection program is a good preventative maintenance measure. Keep this manual in a safe place for future reference for yourself as well as for a service technician to consult when inspecting or servicing the heater. Additional inspection procedures to be performed by a qualified service technician are covered in Section VI of this manual.

WINTERIZATION:

In moderate climates, 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 it is out of service, to prevent damage to the heater and piping. Draining the heat exchanger is recommended as part of the season’s shutdown procedures.

ATTENTION: A heater damaged by freezing is not covered under the Hayward warranty.

REMOVING THE DRAIN PLUG:

This procedure applies to installations where the heater is located higher than the pool water level. If it is necessary to drain a pool heater located below the pool water level, you must either partially drain the pool, or isolate the pool heater from the pool using valves.

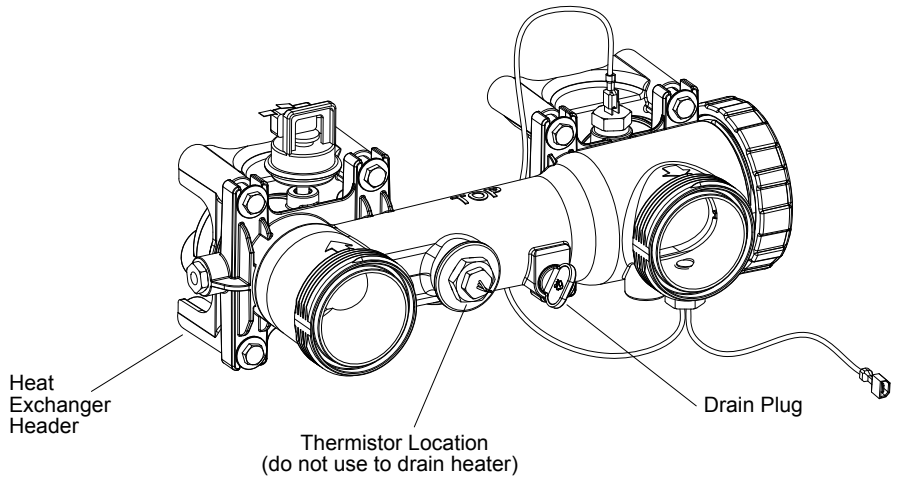
1. See Figure 25 for the location of the drain valve on the header.
2. Set the keypad to "STANDBY".
3. Turn the electricity "OFF" at the circuit breaker.
4. Turn the heater gas valve "OFF" using the knob on the valve.
5. Turn the heater's gas supply "OFF" at the main shut-off valve outside the heater cabinet.
6. Be sure the circulating pump is "OFF".
7. Remove the drain plug from the heater and allow all water to drain from the heater.
8. Reinstall the drain plug.

SPRING START-UP:

1. Inspect and clean the heater, being sure the heater is free of leaves and debris prior to startup.
2. Be sure inlet and outlet piping are properly attached to the heater and the drain valve is closed.
3. Turn the filtration system pump "ON" and allow the system to run long enough to purge all the air from the lines.
4. Turn the gas supply to the heater "ON".
5. Set the temperature control using the keypad to "POOL" or "SPA" and adjust the set point to the desired temperature setting.
6. If operating difficulties are encountered, contact a qualified service company for assistance.

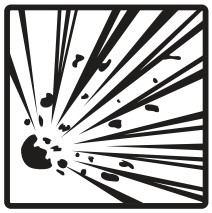
ATTENTION: Heater installation, checkout, and start-up should now be completed. BE SURE to leave the Owner's Manual with the pool owner.

Figure 25: Drain plug location



GENERAL:

ATTENTION: Only qualified service technicians, with 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 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: EXPLOSION HAZARD Do not attempt to repair any components of this heater. Do not modify the heater in any manner. To do so may result in a malfunction that could result in death, personal injury, or property damage. Check with the consumer to see if any part of the heater has been under water. Replace any part of the control system and any gas control that has been under water.

MAINTENANCE:

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

1. External heat exchanger
2. Internal heat exchanger
3. Main burner flame patterns
4. Main burner orifices
5. Operating controls

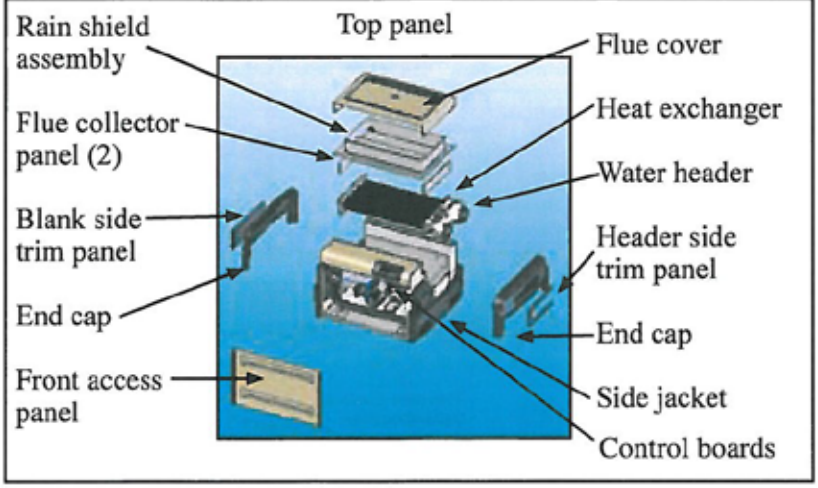
Inspection procedures are covered below. Some of the procedures will require disconnecting and removing wires in the control compartment. See “Control access”.

CONTROL ACCESS:

To access the operating controls as shown in Figure 26:

1. Remove the screw from the front access panel.
2. Label all wires prior to disconnection when servicing controls.
3. If there are questions when reconnecting the wires, refer to the wiring diagram in Figure 19.
4. Verify proper operation after servicing.
5. After service is complete, assembly is the reverse of Steps 1-2 above.

Figure 26: Panel removal for various maintenance procedures. (Note: not all panels need to be removed for every procedure, follow the written instructions in Section VI.)



USE ONLY HAYWARD GENUINE REPLACEMENT PARTS

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. Turn pump, main gas valve, and heater power "OFF".
2. Remove the trim panels at each end of the heater. Each is secured with (4) screws.
3. Remove upper end caps on both ends of the heater. Each cap is attached with (4) screws, located inside the slots at the top and side of the part.
4. Remove the louvered top panel. There are (3) screws at each end of the top panel, and (2) screws in back.
5. Remove the rain shield. There are (12) screws on the top surface of this panel.
6. Remove the flue collector side panels on both ends of the heater. Each panel is secured with (2) screws that are accessed from the outside of the heater.
7. Remove the front access panel. It is secured with (1) screw.
8. Disconnect the water pressure switch leads at the switch, which is located on the water header.
9. Disconnect the limit leads at each limit, which are located on the underside of the water header.
10. Disconnect the thermistor lead from the ignition control board inside the control box. Pull it out of the control box and free of the heater chassis.
11. Remove manual reset sensing bulb from bulbwell and move so that the capillary tube will not be damaged.
12. Lift and remove the heat exchanger. Place it on a clean surface.

WARNING: BURN HAZARD Do not use a wire brush to remove soot from the heat exchanger. This could cause a spark and ignite the gases trapped within the soot.

14. Using a soft-tipped brush, such as a paint brush, apply a degreaser to the entire heat exchanger surface (top and bottom). 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 the top and bottom surfaces are cleaned. Follow the steps above in reverse order to reinstall the heat exchanger. Although the heat exchanger should be cleaned of soot and reinstalled, the fact that sooting occurred should be investigated, as it may indicate other problems such as:

- Insufficient air supply
- Inadequate venting
- High or low gas pressure
- Blockage of burner tubes or orifices
- Blockage of blower inlet
- Low voltage supply causing blower to "spin" slower
- 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 single-piece casting. If damaged, the entire chamber must be replaced.

HEAT EXCHANGER REMOVAL:

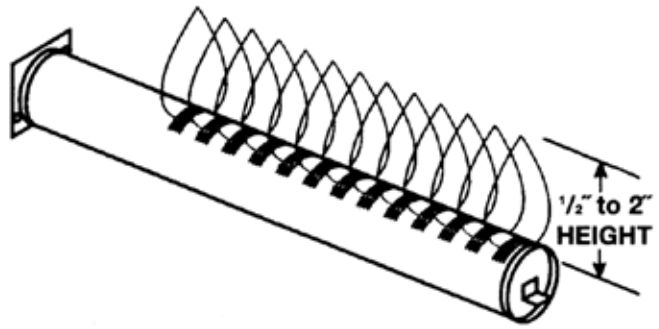
Follow steps 1-12 under "External heat exchanger inspection and cleaning" in this section.

BURNER INSPECTION AND CLEANING:

With the heater "ON", remove the front access panel and make a visual inspection of the main burners through the sight glass (see Figure 21). The main burner flames should be about ½" to 2" in height and should not "lift" off the burner ports (see Figure 27).

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 supply. Spider nests in the burner and/or gas orifices may also cause yellow tips.

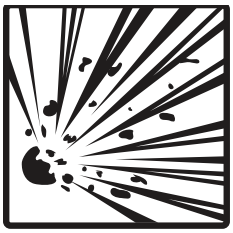
Figure 27: Burner Flame characteristics



BURNER REMOVAL AND REPLACEMENT:

Refer to Figures 21 and 27 as needed.

1. Turn pump, gas supply, and heater power "OFF".
2. Turn gas valve knob "OFF".
3. Remove the front access panel. It is secured with (1) screw.
4. Disconnect the union joint in the gas supply piping outside the heater cabinet.
5. Disconnect the wiring terminals from the gas valve.
6. Disconnect the wiring terminals from the blower.
7. Remove the gas manifold assembly. It is attached to the air box using (4) screws.
8. Remove the screws from the igniter access panel and pull it out of the way. Do not disconnect the wires.
9. Remove the air box cover. Do not remove the blower from the air box cover.
10. Remove the (2) screws securing each burner to the combustion chamber front.
11. Pull the burners straight out of the heater.
12. Reverse the above procedure to install the burners.
13. Turn the gas supply "ON". Use a soapy water solution to check for leaks.
14. Bubbles forming indicate a leak.
15. To start the heater, follow the instructions on the label inside the front access panel (see Figure 20).



WARNING: EXPLOSION HAZARD The use of an open flame to check for gas leaks could cause an explosion resulting in severe injury and/or death

GAS VALVE REPLACEMENT:

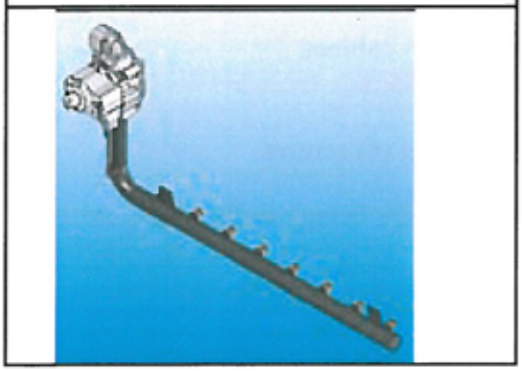
Refer to Figure 21, 22 & 28.

ATTENTION: Do not attempt to repair the gas valve. If found defective, replace the entire valve.

Attempts to repair it will void the warranty.

1. Turn pump, gas supply, and heater power “OFF”.
2. Disconnect the union joint in the gas supply piping outside the heater cabinet.
3. Remove the front access panel. It is secured with (1) screw.
4. Disconnect the wiring terminals from the gas valve.
5. Remove the gas manifold assembly. It is attached to the air box using (4) screws.
6. Unscrew the gas valve from the gas manifold pipe.
7. Remove the BSP to NPT adapter, if used, for use on replacement valve.
8. Reassemble the gas manifold assembly using the new gas valve. See Figure 41 for the correct orientation of the manifold pipe, pipe elbows, and gas valve. Only use liquid pipe dope on the male threads of the elbows and the gas manifold pipe. Do not place pipe dope on the first two threads of any joint.
9. Complete assembly by reversing step 1-5.

Figure 28: Correct orientation of components of gas manifold assembly



IGNITER:

Refer to Figures 21 and 26. To remove the igniter:

1. Turn pump, gas supply, and heater power “OFF”.
2. Remove the front access panel. It is secured with (1) screw.
3. Disconnect the high voltage wire from the DSICM.
4. Remove the (1) screw from the igniter access panel. Withdraw the access panel by sliding along the high voltage wire.
5. Disconnect high voltage wire from igniter.
6. Remove the (2) screws that secure the igniter.
7. Pull the igniter straight back until it is free of the combustion chamber, then out of the air box.
8. Installation is the reverse of steps 1-7.

FLAME SENSOR:

Refer to Figures 21 and 26. To remove the flame sensor:

1. Turn pump, gas supply, and heater power “OFF”.
2. Remove the front access panel (1 screw).
3. Disconnect the wire from the flame sensor.
4. Remove the screw that secures the flame sensor to remove the sensor.
5. Reverse the flame sensor by reversing steps 1-4.

BURNER ORIFICES:

Refer to Figures 21 and 28 as needed. To remove the igniter:

1. Turn pump, gas supply, and heater power “OFF”.
2. Disconnect the union joint in the gas supply piping outside the heater cabinet.
3. Remove the front access panel. It is secured with (1) screw.
4. Disconnect the wiring terminals from the gas valve.
5. Remove the gas manifold assembly. It is attached to the air box using (4) screws.
6. Remove the orifices using a 7/16” wrench.
7. After cleaning or replacing orifices, re-install into the gas manifold pipe being careful not to cross-thread or over tighten as a leak may result.

ATTENTION: Do not enlarge orifice holes.

GAS CONVERSION:

The factory-installed gas train, where appropriate, may be changed from natural gas to propane or from propane to natural gas, using the appropriate conversion kits available from the factory. Gas conversions are to be performed only by a qualified service agency. Detailed instructions are included with each kit.

SECTION V. CONTROL LOCATIONS

The following sections give a brief overview of the various heater controls and service/replacement procedures. The text describes the function of the controls. See Figure 21.

ELECTRICAL WIRING:

ATTENTION: If it is necessary to replace any of the original wiring, it must be replaced with Hayward supplied replacement parts.

IGNITION CONTROL SYSTEM:

The ignition control system consists of two controls (the thermostat control is a printed circuit board and the ignition control has its own casing). The locations of these components are shown in Figure 31. The ignition control system functions as the heater's thermostat, safety control, and controller for the gas combustion system. To remove the ignition control board or thermostat control:

1. Turn pump, gas supply, and heater power "OFF".
2. Remove the front access panel. It is secured with (1) screw.
3. Disconnect all wires from the ignition control board.
4. Detach the board from the sheet metal panel.
5. Replace the ignition control board. Reassembly is the reversal of steps 1-5.

DISPLAY BOARD AND KEYPAD:

The display board and keypad provide the user interface with the heater. See Figure 29. The replacement part is only available as an assembly. To remove the display board and keypad assembly:

1. Turn pump, gas supply, and heater power "OFF".
2. Remove the front access panel. It is secured with (1) screw.
3. Unplug the display connector from the thermostat control board.
4. Remove the (4) screws along the edges of the bezel that retains the assembly.
5. Pull the assembly forward and then lift it out.
6. Replace the assembly. Reverse steps 1-6 to complete the procedure.

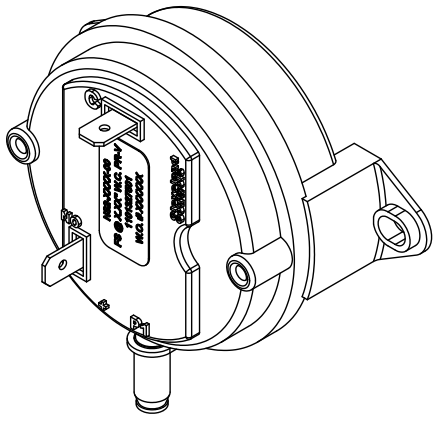
Figure 29: Keypad

FAN PROVING SWITCH:

The blower vacuum switch is a safety device that prevents the ignition sequence from continuing unless the blower is developing sufficient airflow for combustion. See Figure 30. When the blower achieves sufficient airflow, the negative pressure created in the blower housing closes the contacts on the blower vacuum switch. This indicates to the ignition control board that it is safe to continue the ignition sequence.

The tubing on the blower vacuum switch should be attached to the blower housing pressure tap that faces the right side of the heater.

Figure 30: Blower Proving Switch



To remove the blower vacuum switch:

1. Turn pump, gas supply, and heater power “OFF”.
2. Remove the front access panel. It is secured with (1) screw.
3. Remove the wires from the pressure switch.
4. Pull the tubing from the hose barb on the switch.
5. Remove the (2) screws that secure the pressure switch to the control panel.
6. Replace the switch. Reverse steps 1-6 to complete the procedure.

HIGH LIMIT SWITCHES:

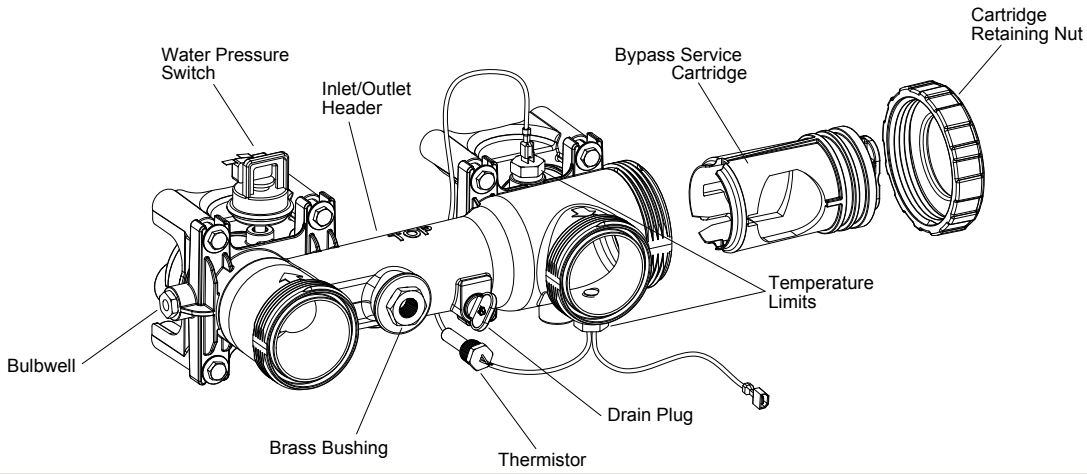
The high limit is an automatically resetting safety device wired in series with the thermostat and gas valve. See Figure 31. The heater is equipped with two automatic high limits, located on the water header.

If the water temperature exceeds the limit set point, the gas valve will be closed, shutting off gas supply to the burners.

Erratic high limit operation 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 if one is used.
3. Lime scale accumulation in the heat exchanger.

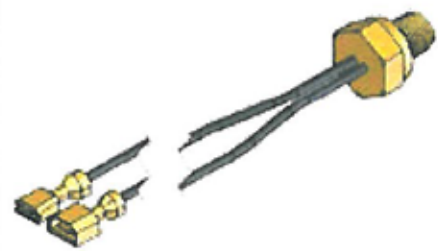
Figure 31: Component locations on header



TO REPLACE A HIGH LIMIT SWITCH:

1. Turn pump, gas supply, and heater power “OFF”.
2. Drain the heat exchanger of all water.
3. Unplug the high limit wires from the wiring harness.
4. Unscrew the high limit switch from the header.
5. Replace the high limit switch. Use new sealant on the high limit switch threads before reinstalling. Reassembly is a reverse of steps 1-4.

Figure 32: Automatic Reset High Limit Switch



THERMISTOR:

Figure 33: Thermistor

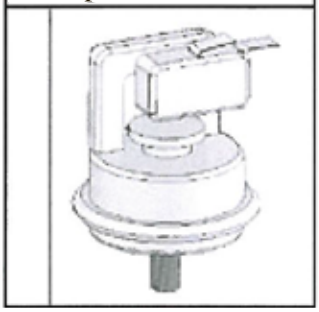
The thermistor monitors the return water temperature. See Figure 31 for its location.
To replace the thermistor:

1. Turn pump, gas supply, and heater power “OFF”.
2. Drain the heat exchanger of all water.
3. Remove the front access panel. It is secured with (1) screw.
4. Unplug the thermistor connector from the thermostat control board.
5. From outside the heater, pull the thermistor leads out of the control box and through the hole in the heater chassis.
6. Unscrew the thermistor from the bushing in the header.
7. Replace the thermistor. Use new sealant on the thermistor threads before re-installing. Reverse steps 1-6 to complete the procedure.

WATER PRESSURE SWITCH:

The water pressure switch (Figure 34, see Figure 31 for its location) is factory pre-set for deck-level installations. When the heater is located below the level of the spa or pool, the water pressure switch may require an adjustment to compensate for the no-flow static head. If adjustment is needed, the procedure is detailed in Section III, under Water Pressure Switch Test/Adjustment Procedure.

Figure 34:
Water pressure switch



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

To replace the pressure switch:

1. Turn pump, gas supply, and heater power “OFF”.
2. Unplug the high limit terminals from the main wire harness.
3. Remove the (4) screws securing metal trim panel around the header.
4. Remove the wires from the pressure switch.
5. Using two ½” open-end wrenches disconnect the pressure switch from the pressure switch tubing.
6. Replace the pressure switch. Use new sealant on the pressure switch threads before re-installing.
7. Reverse steps 1-5 to complete the procedure.

TRANSFORMER:

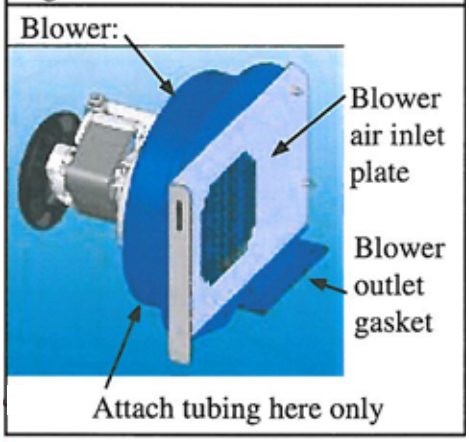
The transformer converts the 240 VAC, 50 Hz field supply voltage to 24 VAC for powering the control circuits. See Figure 21 for its location. To replace the transformer:

1. Turn pump, gas supply, and heater power "OFF".
2. Remove the front access panel. It is secured with (1) screw.
3. Disconnect all wires from the transformer leads.
4. Remove the (2) screws that secure the transformer to the control box.
5. Replace the transformer. Reassembly is the reversal of steps 1-4.

BLOWER:

The blower provides the air that mixes with the gas at the main burners for the combustion process. The blower operates during the prepurge time (approximately 15 seconds) at the beginning of each ignition cycle, during the entire time the gas valve is open and the burners are firing, and for 15 seconds after the gas valve closes. See Figure 21 for the location of the blower.

Figure 35: Combustion Blower



To replace the blower:

1. Turn pump, gas supply, and heater power "OFF".
2. Remove the front access panel (1 screw).
3. Disconnect the blower wires from the wire harness.
4. Pull the tubing from the hose barb on the blower housing.
5. Remove the air inlet screen from the blower (5 screws).
6. Remove the blower from the air box cover (4 screws).
7. Reverse steps 1-6 to install the new blower.
   Be sure the blower outlet gasket is in place before proceeding.

BYPASS SERVICE CARTRIDGE:

1. Turn pump, main gas valve, and heater power off.
2. Remove drain plug and drain water out of heat exchanger.
3. Remove 6 screws and remove the upper plastic heater side panel, to allow access to the header.
4. Remove cartridge retaining nut from end of header (see Figure 31).
5. Slide out the bypass cartridge from the end of the header (see Figure 31).
6. Check the function of the bypass valve to ensure the valve flaps rotate smoothly on the shaft, and the spring fully closes the valve.
7. Apply silicone o-ring grease (Hayward Jack's 327 Multilube P/N SP032712, or equivalent) on o-ring seals on the bypass cartridge before inserting into the header.
8. Insert bypass cartridge into header with the arrow on the end of the cartridge pointing up.
9. Re-install cartridge retaining nut. Nut should be tightened hand-tight only. DO NOT OVER-TIGHTEN.
10. Re-install the upper plastic heater side panel.

SECTION VI. TROUBLESHOOTING

GENERAL:

ATTENTION: 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. These instructions and procedures are not for the use of "do-it-yourself" consumers.

WARNING: BURN HAZARD The operation of the heater with the pump shut off could cause heater overheating and fire. Never operate heater with the pump shut off.

ATTENTION: As a preliminary check, make sure that all wire connections are clean and tight and that all wiring conforms to the wiring diagram.

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 ("POOL" or "SPA").

ERROR CODES:

See Figure 52 for an error code chart.

TROUBLESHOOTING:

See Figure 53 for troubleshooting guide.

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 restarts, 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.

FUSE SPECIFICATIONS:

The fuse designations are printed on the control board. See Figure 18 for board locations. Fuses are available as common hardware items or may be purchased from Hayward in a service parts kit. The fuse specifications are:

- F101 fuse (low voltage): 3.15 A, 250V slow-blo, 5x20 mm

Figure 36: **ERROR CODES**

TCM ERROR CODES:
Note: If two or more faults are present at the same time, the error code highest on the following table will be displayed.

Code	Description	Information
LO	Limit string open while call-for-heat	If the string of limit switches opens while there is a call-for-heat, the heater will shutdown and go into lock-out. Automatic restart 2 minutes after the limit string error condition is corrected.
SF	Thermistor fault	An excessive temperature difference between the two thermistors (3°C or more) or an "out of bounds" condition on either sensor (temperature less than 2°C or greater than 82°C). The heater will shut down and go into lock-out. Automatic restart 2 minutes after the thermistor error condition is corrected.
HE	Rapid water temperature rise	If water temperature rises too rapidly in two consecutive 10-second periods, the heater will shut down and go into lock-out. Automatic restart after 2 minutes. After the third occurrence in the same call-for-heat, the heater will go into lock-out with automatic restarts disabled. Manual restart is required.
HS	Excessive Water Temperature	Inlet water temperature sensor is reporting a temperature in excess of 40°C. Normal operation resumes 2 minutes after inlet water temperature sensor reports temperatures of 40°C or less. This error functions in both normal and remote thermostat modes.
lo	Limit string open while no call-for-heat	If the string of limit switches opens while there is no call-for-heat, the error code will be displayed, but the control will continue to function. The error code will be cleared when the condition is corrected.
Sb	Keypad button stuck closed	If one of the keypad buttons is closed (pressed) for more than 30 seconds, the error code will be displayed but the control will continue to function. The error code will be cleared when the condition is corrected.
bo	Bypass Operation mode	This is NOT an error code. If the user sees "bo" in the display, the TCM is in Bypass Operation mode. To exit "Bypass Operation" mode, select "STANDBY" mode, then press and hold both the "DOWN" and "MODE" buttons for 3 seconds (until the "bo" code is no longer displayed).
. (dot)	Auto restarts disabled	When a dot (decimal point) is displayed after the error code, this is an indication that auto restarts are disabled. The TCM must be manually restarted.

Figure 37: **TROUBLESHOOTING**

Code	Fault	Diagnosis Step	Remedy
None	Heater will not power up.	1. Ensure field power supply to heater is turned on.	Measure for field supply voltage across terminals of terminal block. If OK, proceed to step 2.
		2. Check for defective transformer.	Measure for 24 VAC between low voltage pins of transformer. If 24 VAC is not present, replace transformer. Otherwise, proceed to step 3.
		3. Check for faulty IOPS board wiring.	Inspect IOPS board wiring. Ensure all plugs are securely fastened to IOPS board. If OK, proceed to step 4.
		4. Verify low voltage input to IOPS board.	Verify 24 VAC across R (E112) and C (E113) terminals on IOPS board. If not OK, replace harness. If OK, proceed to step 5.
		5. Verify that F101 fuse on IOPS is not open	Remove F101 fuse from fuse holder. Measure continuity across fuse. If OK, replace IOPS board. If fuse is open, proceed to section titled “Open F101 Fuse”.
None	Open F101 Fuse	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 IOPS board or DSICM wiring.	Inspect IOPS board & DSICM wiring. Ensure insulation on wiring is not worn. If OK, proceed to step 4.
		4. Either IOPS board or DSICM is defective.	Disconnect wire at R terminal on DSICM, replace fuse F101 and try again. If fuse remains OK, replace DSICM. Otherwise, replace IOPS board and fuse F101. If fuse blows again, replace DSICM also.
None	Burner is not operating when the “Heating” LED is illuminated	1. Ensure gas supply shutoff valves are open.	Ensure that the main gas shutoff installed adjacent to the 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 is between the minimum and maximum values indicated on rating plate. If OK, proceed to step 3.
		3. Check status of DSICM.	Remove front panel and inspect the DSICM fault indicator LED. If the LED is illuminated (steady) or flashing, there is a DSICM fault condition and the module is in lock-out. Refer to the “DSICM FAULT CONDITIONS” section of this manual. A DSICM lock-out can be reset by pressing the “MODE” button to cycle through “STANDBY” and back to the original mode (“SPA” or “POOL”).

TROUBLESHOOTING continued

Code	Fault	Diagnosis Step	Remedy
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.
bO	Bypass Operation	1. Check to see if heater is in Bypass Operation	This is 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 in 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 the pump is running.	This is a normal display when the pump is off. Turn pump on. LO code should clear. If LO code 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 (76 LPM for H150FD and H200FD, 95 LPM for H250FD and H300FD, 114 LPM for H350FD and H400FD). 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. If open, proceed to step 5. If closed, LO code is not caused by water 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.
		6. Check for correct water pressure switch setting.	Adjust water pressure switch as shown in Section III. If LO does not clear, proceed to step 7.
		7. Water pressure switch is defective.	Replace water pressure switch.
LO	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 the temperature switches. If OK, proceed to step 2.
		2. Verify state of temperature limit switch contacts.	For each temperature limit switch in turn, remove wires from the limit switch and jumper leads. Operate heater. Measure continuity across limit switch. If closed, LO code is not caused by this limit switch. Test the next limit switch. If a limit switch is open, proceed to step 3. Remove jumper from leads and reconnect leads to all temperature limit switches.
		3. Verify that water flow is adequate.	Verify that water flow rate to heater is above minimum required (76 LPM for H150FD, 95 LPM for H250FD, and 114 LPM for H400FD. If OK, proceed to step 4.
		4. Temperature limit switch is defective.	Replace temperature limit switch.

TROUBLESHOOTING continued

	Ignition failure	1. Ensure gas supply shutoff valves are open.	Ensure that the main gas shutoff installed adjacent to the 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 is between the minimum and maximum values 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 the DSICM. 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 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 in DSICM is defective. Replace DSICM.
		6. Check for blockages in gas orifices and burners.	Inspect gas orifices for blockages which could prevent gas flow. Remove and inspect burners for blockages.
	Blower vacuum switch closed	1. Vacuum switch is defective	Replace blower vacuum switch.
	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 lower wiring. If OK, proceed to step 4.
		4. Check for defective blower motor.	Disconnect blower motor from DSICM. Measure resistance across blower motor windings. Winding resistance across leads should be in the range 13 to 14 ohms. If measured value varies substantially from this, blower motor is defective. Replace. If OK, proceed to step 5.
		5. Check for defective blower relay.	Disconnect blower motor from DSICM. Place heater in Pool or Spa Mode. Raise set point temperature to generate a call-for-heat. During pre-purge period, measure for 240 VAC between the DSICM IND terminal and neutral. If 240 VAC is not present, the blower relay in the DSICM is defective. Replace DSICM. If OK, proceed to step 6.
		6. Vacuum switch is defective.	Replace blower vacuum switch.

HAYWARD POOL HEATER CERTIFICATE OF LIMITED WARRANTY

Hayward Pool Products (Australia) Pty Ltd (ACN 083 413 414) ("Hayward Pool Products") distributes Hayward Pool Products in Australia and provides the following warranty:-

LIMITED HEATER WARRANTY

Hayward Pool Products warrants that its products are free from defects in materials and manufacture for 12 months from the date of purchase (unless otherwise specified). Hayward Pool Products will at its discretion, except in the circumstances described below, either replace or repair any product proven to be defective during the warranty period for either materials or manufacture or alternatively pay the cost or repair or replacement within 90 days of the receipt of the defective product, barring unforeseen delays. This warranty is personal to the original purchaser and does not pass to any subsequent purchaser(s). 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, 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, odours, or discoloured (rusty, ect.) 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 malfunctions or 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.

To the extent permitted by law, except as set out in this Warranty, Hayward Pool Products excludes all statutory or implied conditions and warranties and any other liability it may have to the Customer (including liability for indirect or consequential loss) that may arise under statute or at law including without limitation for breach of contract, in tort (including negligence) or under any other cause of action.

To the extent permitted by law, except as set out in this Warranty, Hayward Pool Products limits its liability under any condition or warranty which cannot be legally excluded in relation to the supply of Goods and Services to:

1. Replacing the Goods or supplying equivalent Goods or Services again;
2. Repairing the Goods;
3. Paying the cost of replacing the Goods or of supplying equivalent Goods or Services again; or
4. Paying the costs of repairing the Goods.

THIS PRODUCT REQUIRES QUALIFIED INSTALLATION

All Hayward heaters due to their technical nature are only intended for sale by retail shops where local sales and technical support can be provided or as a part of a new Pool Installation. Warranty claims for such products will only be recognised when the products have been sold and installed by technicians approved by Hayward Pool Products where installation has not been carried out in accordance with this requirement, warranty, labour and support will be the sole responsibility of the reseller supplying the product. Claims will only be accepted where evidence is provided that installation has been completed by an organization, business or individual who has been authorised or approved by Hayward Pool Products (Australia) Pty Ltd, to undertake such installation.

HEATING PRODUCTS

Please note that warranty claims for gas Heaters are handled directly by Hayward Pool Products and are not authorised for over the counter exchanges. These items are site specific and involve local conditions such as placement, installation, water chemistry, fuel supply and electricity. Each unit needs to be evaluated on the site utilising Hayward Pool Products authorised service network. Hayward Pool Products will not be responsible for additional costs incurred where a heater has been installed at a location situated further than 20km from an authorised service outlet. Advice must be sought in writing from Hayward Pool Products to determine appropriate service procedure on a case by case basis. Under no circumstances should a complete Heater or Heat Pump be returned without prior written approval from either Hayward Pool Product warranty department or your local Branch Customer Service Centre.

WHAT TO DO IF YOU HAVE A WARRANTY CLAIM

The faulty product is to be returned to the place of purchase or to an authorised warranty agent. Unless prior authorisation is provided, no returns will be received directly from end consumers by Hayward Pool Products. You are responsible for arranging removal of the defective product and arranging installation of the repaired or replacement product, all transportation (and any applicable insurance costs) of transporting the product to the supplier and transporting the replaced or repaired product from the supplier.

All returns are subject to Hayward Pool Products written approval and must be accompanied by either:-

1. A Field Inspection Report authorised by the Local Customer Service Manager; or
2. A "Return Goods Authorisation" form obtained from Hayward Pool Products prior to shipment.

Unauthorised returns will not be accepted.

All Hayward Pool Products warranty parts taken as an across the counter warranty exchange must be held for inspection until authorisation has been given by the Local Branch Customer Service Manager to dispose of them. Hayward Pool Products reserves the right to provide replacement or credit for any items authorised under this warranty program.

All serial numbers must place the product within the warranty period or a proof of purchase is required. No claims in respect of the product can be made after the expiration of the warranty period.

STATUTORY RIGHTS

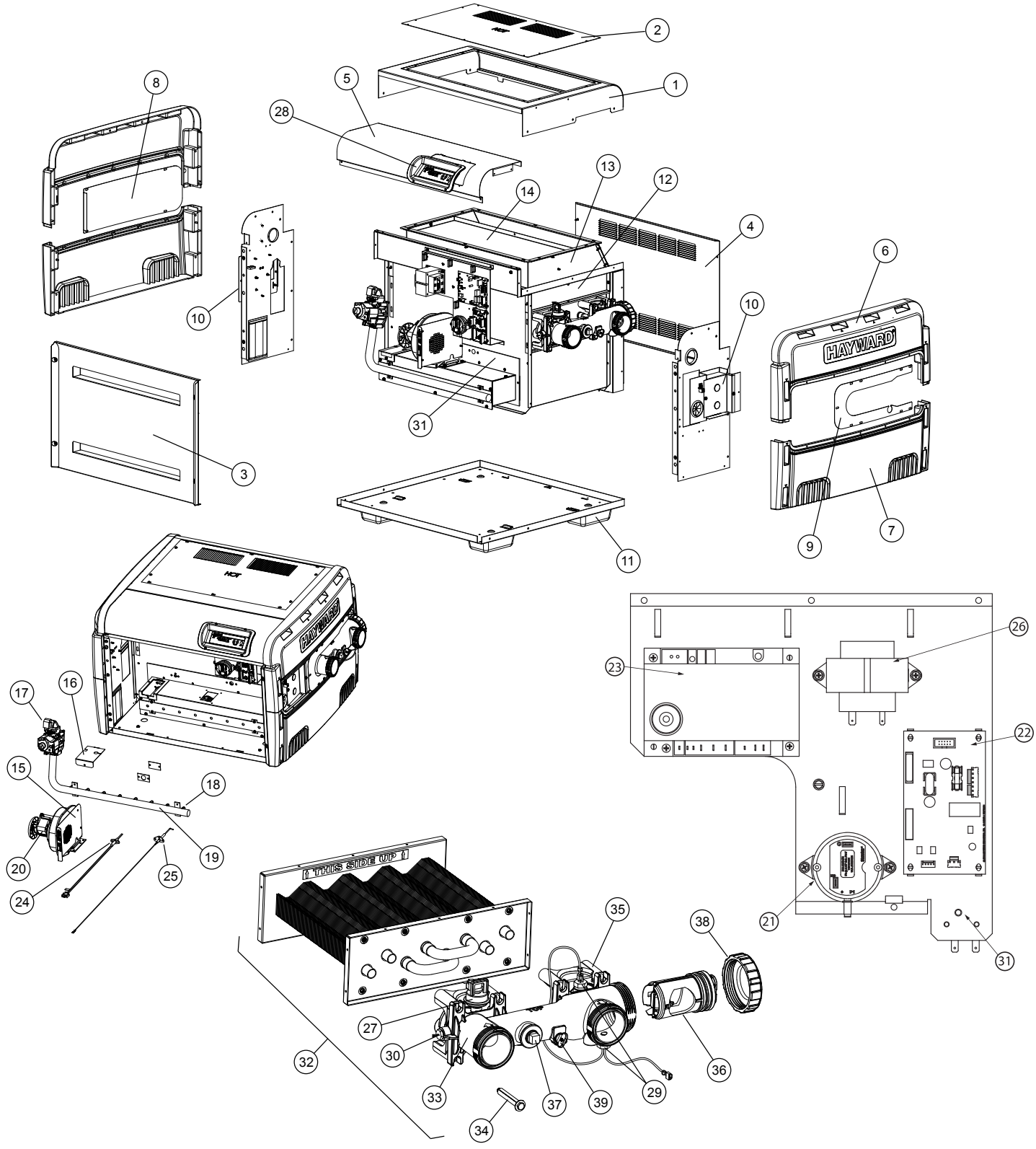
1. The benefits to the consumer under this warranty are in addition to other rights and remedies of the consumer under the laws in relation to the goods and services to which the warranty relates; and
2. Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You may be entitled to a replacement or refund for a major failure and for compensation for any other loss or damage. You are also entitled to have the goods repaired if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

To register your product for warranty, please go to **www.hayward-pool.com.au/warrantyregistration**

Warranty service requests can be faxed to: **Hayward Pool Products (Australia) Pty Ltd (ACN 083 413 414) Fax 1300 POOLS2 (1300 766572) or call 1300 POOLS1**

A standard form is available to request warranty service. We will require:

- Installation contact information including address, daytime telephone numbers, home phone number, email etc.
- Complete model and serial number
- Proof of purchase (if the serial number was manufactured > 1 year ago).
- Evidence that purchase and Installation was completed in one transaction, by the one business or organization. Nature of problem including specific faults and error codes



Plastic Header Models (Non-ASME)

ITEM	PART NO.	DESCRIPTION
1	FDXLJKT1150	JACKET TOP & FLUE COVER H150FD
	FDXLJKT1250	JACKET TOP & FLUE COVER H250FD
	FDXLJKT1400	JACKET TOP & FLUE COVER H400FD
2	FDXLTFC1150	TOP/FLUE COVER - H150FD
	FDXLTFC1250	TOP/FLUE COVER - H250FD
	FDXLTFC1400	TOP/FLUE COVER - H400FD
3	FDXLFAD1151	ASSY, ONE SCREW FRONT ACCESS DOOR H150FD
	FDXLFAD1251	ASSY, ONE SCREW FRONT ACCESS DOOR H250FD
	FDXLFAD1401	ASSY, ONE SCREW FRONT ACCESS DOOR H400FD
4	FDXLRAD1150	REAR ACCESS DOOR ASM - H150FD
	FDXLRAD1250	REAR ACCESS DOOR ASM - H250FD
	FDXLRAD1400	REAR ACCESS DOOR ASM - H400FD
5	FDXLTFP1150	TOP & FRONT PANEL - H150FD
	FDXLTFP1250	TOP & FRONT PANEL - H250FD
	FDXLTFP1400	TOP & FRONT PANEL - H400FD
6	FDXLUEC1930	UPPER END CAP - FD
7	FDXLLEC1930	LOWER END CAP - FD
8	FDXLLTP1930	LEFT TRIM PANEL - FD
9	FDXLRTP1930	RIGHT TRIM PANEL - FD
10	FDXLLJB1930	LEFT JUNCTION BOX - FD
	FDXLRJB1930	RIGHT JUNCTION BOX - FD
11	FDXLPBL1930	BASE LEG - FD
12	FDXLFCS1930	FLUE COLLECTOR SIDE PANEL
13	FDXLRGK1150	RAIN GUARD ASM - H150FD
	FDXLRGK1250	RAIN GUARD ASM - H250FD
	FDXLRGK1400	RAIN GUARD ASM - H400FD
14	FDXLHBP1150	HEAT BARRIER PANEL - H150FD
	FDXLHBP1250	HEAT BARRIER PANEL - H250FD
	FDXLHBP1400	HEAT BARRIER PANEL - H400FD
15	FDXLBBN1150AU	BLOWER INLET BAFFLE - H150FDAU
	FDXLBBN1250AU	BLOWER INLET BAFFLE - H250FDAU
	FDXLBBN1400AU	BLOWER INLET BAFFLE - H400FDAU
16	FDXLIAC1930AU	IGNITER ACCESS COVER - AUS
17	FDXLGSV0001	GAS VALVE NATURAL - FD
	FDXLGSV0002	GAS VALVE PROPANE - FD
	FDXLBRN1930	BURNER (NOT SHOWN)
18	FDXLBON1930	BURNER ORIFICE NATURAL FD
	FDXLBOP1930	BURNER ORIFICE PROPANE FD
19	FDXLMAN1150	GAS MANIFOLD - H150FD
	FDXLMAN1250	GAS MANIFOLD - H250FD

ITEM	PART NO.	DESCRIPTION
	FDXLMAN1400	GAS MANIFOLD - H400FD
20	FDXLBWR1930AU	COMBUSTION BLOWER - H150/250FDAU
	FDXLBWR1400AU	COMBUSTION BLOWER - H400FDAU
21	FDXLBVS1150AU	BLOWER VACUUM SWITCH - H150FDAU
	FDXLBVS1250AU	BLOWER VACUUM SWITCH - H250FDAU
	FDXLBVS1400AU	BLOWER VACUUM SWITCH - H400FDAU
22	FDXLTCB1930AU	THERMOSTAT CONTROL BOARD - 50 HZ FD
23	FDXLDSCB1930AU	DIRECT SPARK IGNITION CONTROLLER
24	FDXLDSI1930AU	DIRECT SPARK IGNITER - 50 HZ FD
25	IDXLFLS1930	FLAME SENSOR
26	FDXLXFR1930AU	50 HZ FD TRANSFORMER
27	FDXLWPS1930	WATER PRESSURE SWITCH
	FDXLDSB1930AU	DISPLAY BOARD ONLY - 50 HZ FD (NOT SHOWN)
28	FDXLBKP1930	BEZEL & KEYPAD ASSEMBLY
29	FDXLHLI1930	HIGH LIMIT 135 F
30	FDXLTER1930	THERMISTOR
31	FDXLMRL1930AU	MANUAL RESET LIMIT - H150/400FDAU
	FDXLMRL1931AU	MANUAL RESET LIMIT - H250FDAU
32	FDXLHXA1150AU	HEAT EXCHANGER ASM - H150FDAU
	FDXLHXA1250AU	HEAT EXCHANGER ASM - H250FDAU
	FDXLHXA1400AU	HEAT EXCHANGER ASM - H400FDAU
33	FDXLFHD1930	HEADER ONLY
34	FDXLHDW1930	HEADER HARDWARE KIT
35	FDXLHMB1930	HEADER MOUNTING BASE KIT
36	FDXLBPK1930	BYPASS CARTRIDGE KIT
37	FDXLFOR1930	HEADER O-RING KIT
38	FDXLCRN1930	HEADER CARTRIDGE RETAINING NUT
	FDXLFHA1930AU	HEADER ASSEMBLY FDAU (INCLUDES ITEMS 27, 29, 30, 33 - 38)
39	SPX4000FG	DRAIN PLUG WITH GASKET
ITEMS NOT SHOW ON PAGE 49:		
	FDXLGCK1150NP	CONVERSION KIT, NA TO LP, QUICK-CHANGE - H150FD (NOT SHOWN)
	FDXLGCK1250NP	CONVERSION KIT, NA TO LP, QUICK-CHANGE - H250FD (NOT SHOWN)
	FDXLGCK1400NP	CONVERSION KIT, NA TO LP, QUICK-CHANGE - H400FD (NOT SHOWN)
	FDXLWHA1150AU	WIRING HARNESS 50HZ H150FDAU (NOT SHOWN)
	FDXLWHA1400AU	WIRING HARNESS 50HZ H250/400FDAU (NOT SHOWN)
	FDXLESC1930AU	240V ELECTRICAL SUPPLY CORD WITH STRAIN RELIEF (NOT SHOWN)
	IDXLTMB1931	TERMINAL BLOCK - 5 POLE (NOT SHOWN)
	FDXLFSK1930AU	FUSE SERVICE KIT - FDAU (NOT SHOWN)
	FDXLGSK1930AU	GASKET KIT - AIR SIDE FDAU (NOT SHOWN)

ITEM	PART NO.	DESCRIPTION
	FDXLFSK1930 INCLUDES:	
		GASKET KIT - AIR SIDE FD ALL (NOT SHOWN)
		GASKET, BLOWER MOUNTING
		GASKET, COVER/AIR BOX FRNT - H400FD
		GASKET, COVER/AIR BOX FRNT - H250FD
		GASKET, COVER/AIR BOX FRNT - H150FD
		GASKET, MANIFOLD/AIR BOX FRNT - H400FD
		GASKET, MANIFOLD/AIR BOX FRNT - H250FD
		GASKET, MANIFOLD/AIR BOX FRNT - H150FD
	FDXLGSK1931 INCLUDES:	
		GASKET, EXHAUST SIDE FD ALL (NOT SHOWN)
		GASKET, FLUE COLLECTOR SIDE
		GASKET, RAIN GUARD SIDE
		GASKET, RAIN GUARD BOTTOM SIDE
		GASKET, FLUE COLLECTOR TOP - H400FD
		GASKET, FLUE COLLECTOR TOP - H250FD
		GASKET, FLUE COLLECTOR TOP - H150FD
		GASKET, RAIN GUARD FRNT & REAR - H400FD
		GASKET, RAIN GUARD FRNT & REAR - H250FD
		GASKET, RAIN GUARD FRNT & REAR - H150FD
		GASKET, RAIN GUARD BOTTOM FRNT & REAR - H400FD
		GASKET, RAIN GUARD BOTTOM FRNT & REAR - H250FD
		GASKET, RAIN GUARD BOTTOM FRNT & REAR - H150FD

SPECIFICATIONS

Total Nominal Gas Consumption

Model	Natural Gas	Propane Gas
H150FDAU	158 MJ/h	158 MJ/h
H250FDAU	264 MJ/h	264 MJ/h
H400FDAU	422 MJ/h	422 MJ/h

Gas Pressure

Fuel	Natural	Propane
Manifold	0.45-0.50	1.70-1.75
Inlet, Minimum	1.12	2.24
Inlet, Maximum	2.61	3.24

Burner Configuration

Natural Gas	Main Injector
Main Burner	#25

Propane Gas	Main Injector (mm)
Main Burner	2.26mm

NOTES

HAYWARD® Pool Products

A Hayward Industries, Inc. Company

Hayward Pool Products, Inc.
620 Division St.
Elizabeth, NJ 07207

Hayward Pool Products, Inc.
2875 Pomona Boulevard
Pomona, CA 91768

Hayward Pool Products, Inc.
2880 Plymouth Drive
Oakville, Ontario L6H 5R4

Hayward S.A.
Zoming de Jumet
B6040 Jumet, Belgium