

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 which can cause serious injury, property damage, or death. Improper installation and/or operation will void the warranty.

Installation and Operation Manual

LX™ and LT™ Gas-Fired Pool and Spa Heater



**Model
LX250
Shown**

WARNING

If these instructions are not followed exactly, a fire or explosion may result, causing property damage, personal injury, or death.

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

WHAT TO DO IF YOU SMELL GAS

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

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

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SECTION 1. General Information

1A. Introduction

This manual contains information for the proper installation and operation of the LX and LT pool/spa heaters. Certain sections are specific to United States or Canadian installations, and are labeled United States or Canada. Procedures in this manual must be followed exactly. To obtain additional copies of this manual contact Waterpik Technologies. For address information see back cover.

1B. Description

The Laars LX and LT have no standing pilot burner. They exceed the requirements of energy conservation regulations such as those in California, Hawaii, New York, Oregon and other states which require that a pool heater not have a continuous ignition source.

The heaters are designed to operate in conventional swimming pool and spa equipment arrangements. They require 120V or 240V, 60 Hz electrical power.

The Laars LX and LT are certified by International Approval Services, Inc. to comply with latest editions of applicable U.S./Canadian combined standard for gas-fired pool heaters. In the United States, the applicable standard is ANSI Standard Z21.56 for gas-fired pool heaters. In Canada, it is Standard CSA 4.7. As such, the heater carries both the AGA and CGA logos.

The heaters have been designed specifically to heat fresh water swimming pools and spas, and with proper installation and care, they will provide years of reliable service. Do not use the heaters to maintain pool or spa water temperature below 70°F. Do not use them as heating boilers or general service water heaters or to heat salt water. For special applications, consult your Waterpik Technologies dealer.

DANGER

Improper installation or servicing can cause property damage, injury or death due to fire, asphyxiation or carbon monoxide poisoning.

1C. Warranty

The LX and LT are sold with a limited factory warranty. A copy of the warranty is included in a plastic bag inside the heater and on the back cover of this manual. The home owner should fill out the warranty registration card included in the plastic bag and return it to Waterpik Technologies. The warranty does not cover damage caused by improper installation, operation, or field modification; or damage to the heat exchanger caused by corrosive water. See Section 3D for guidelines on pool water chemistry.

SECTION 2. Installation Instructions

2A. General Requirements

All gas-fired products require correct installation to assure safe and satisfactory operation. The requirements for pool heaters include the following:

1. Appropriate site location and clearances.
2. Sufficient supply of clean air for combustion and ventilation.
3. Proper venting of products of combustion.
4. Properly sized gas pipe.
5. Properly sized gas meter.
6. Adequate water flow.

In the United States, installation must be in accordance with local codes and the most recent edition of the National Fuel Gas Code, ANSI Z223.1. The Code can be obtained from:

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02269

In Canada, install the heater in accordance with local codes and the most recent edition of the Installation Codes for Gas Burning Appliances, CAN 1-B149.1 & .2. The Canadian Gas Codes are available from:

Canadian Gas Association
55 Scarsdale Road
Don Mills, Ontario
M3B 2R3

2A-1. Special Precautions

Liquefied petroleum (LP) gas is heavier than air. Therefore, a pool heater using LP gas is subject to special installation rules. Consult local codes and fire protection authorities about specific installation restrictions.

Fuel gas and its combustion products are known to cause cancer or harm the reproductive process. Follow these installation instructions and applicable codes exactly to avoid this hazard.

2B. Heater Assembly and Preparation

The LX or LT can be installed in a variety of ways, some of them requiring preparation or assembly in the field. Water connections are provided on the right side of the heater but can be changed to the left side by reversal of the heat exchanger.

It is best to handle these preparations before the heater is installed in its final location. Instructions are provided in subsequent sections of this document.

Contact Waterpik Technologies regarding installations at elevations above 3,000 feet (980 m). It is necessary to make changes to the burner tray to assure proper operation.

2C. Heater Location

2C-1. Installation Information

The LX and LT can be installed outdoors or indoors as outlined in later sections. In either case location must be selected with consideration of vent gas exhaust and in the case of indoor installation, the location must have suitable provisions for combustion and ventilation air.

Avoid placing the heater in locations where it can cause damage by water leakage. If this is not possible, provide a suitable drain pan to catch and divert any leakage. The pan must not block natural flow of air to or around the heater.

When a heater or any system component is located below the pool surface a leak can result in large scale water loss or flooding. Waterpik Technologies cannot be responsible for such water loss or flooding. Location of a heater below *or above* the pool surface affects operation of the heater pressure switch. See sections on water piping and heater start-up for more information about this.

⚠ CAUTION

When pool equipment is located below the pool surface, a leak from any component can cause large scale water loss or flooding. Waterpik Technologies cannot be responsible for such water loss or flooding or resulting damage.

2C-2. Installation Clearances

Clearances between the heater and combustible material must be per Table 1.

Table 1. Minimum Heater Clearances from Combustible Surfaces

Side of Heater	All Installations	
	U.S. and Canada	
	inch	(cm)
Blank	4	(10.2)
Rear	4	(10.2)
Piping	12	(30.5)
Top	39	(99.0)
Front	18	(45.7)

NOTE: See Outdoor Installation section regarding roof overhang.

These clearances are the **minimum** acceptable. Whenever possible, larger clearances should be provided to assure adequate room for service operations. Note that gas piping may be provided through either side of the unit. See later section on gas piping.

Do not install the heater on carpeting or similar material.

2C-3. Flooring - Typical Installation

The heater must not be installed on combustible flooring without special measures to assure that the floor temperatures will not be excessive.

A special base for combustible floors may be obtained from Waterpik Technologies. The part number appears in the parts list at the back of this manual (see Section 5)

In the United States, the National Fuel Gas Code allows a heater to be placed on a combustible surface when there is a platform under the heater made of hollow masonry no less than 4 inches (102 millimeters [mm]) thick, covered with sheet metal at least 24 gauge thick and extending beyond the full width and depth of the heater by at least 6 inches (76.2 mm) in all directions. The masonry must be laid with ends unsealed, and joints matched to provide free circulation of air from side to side through the masonry (see Figure 1).

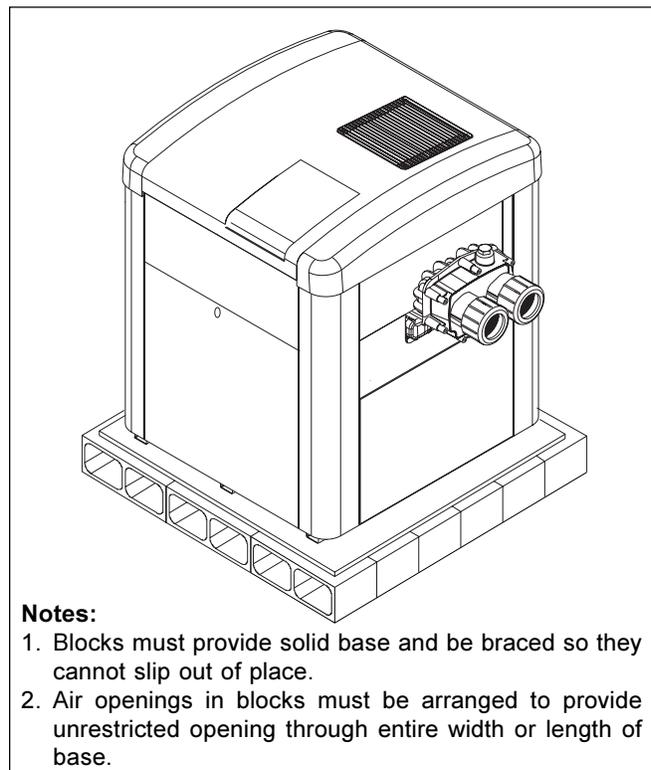


Figure 1. Non-Combustible Platform.

2D. Outdoor Installation

The LX and LT heaters can be installed in the outdoor configuration as received from the factory.

Locate the heater in an **open, unroofed area**. Do not install the heater under a deck. Do not locate the heater below or adjacent to any doors, windows, louvers, grills, etc., which connect in any way with an inhabited area of a building, even though the access might be through another structure (e.g., a garage or utility room. In the United States there must be a minimum of 4 feet (1.22 m) horizontally or vertically between the heater and any door, glass opening, or gravity inlet to a building (see Figure 2).

⚠ DANGER
United States

Do not install the heater with the top of the vent assembly within 4 feet (1.22 m) of any opening into a building.

Canada

Do not install the heater with the top of the vent assembly within 10 feet (3.05 m) of any opening into a building.

If the heater is installed under an overhang, there must be a minimum clearance of 5 feet (1.5 m) above the top of the heater and the structure should not overhang the heater more than 12 inches (0.30 m). The area under the overhang must be open on three sides.

If the heater is installed close to a structure, protect it

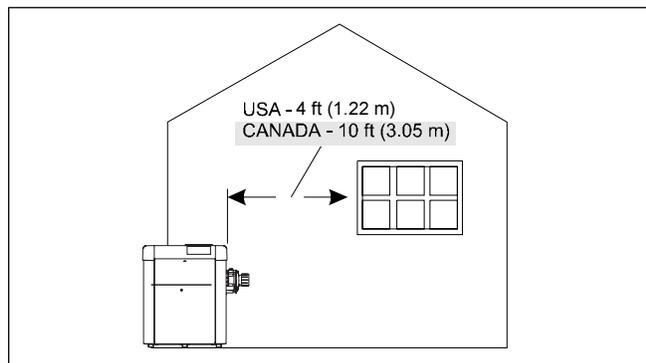


Figure 2. Outdoor Heater Installation.

from rain water runoff by means of gutters, roof water diverters or similar measures. Do not locate the heater close to irrigation sprinklers. Water from sprinklers may damage controls and electronic components.

Avoid locations where wind deflection off nearby structures might cause wind loading and downdraft conditions. Where downdraft conditions exist, locate the heater at least 3 feet (0.91 m) from vertical surfaces (e.g., nearby buildings and walls).

Install the heater at least 5 feet (1.52 meters) from the inside wall of the pool or spa unless the heater is separated from the pool or spa by a five-foot (1.52 meter) high solid fence, wall or other permanent barrier.

2E. Outdoor Shelter Installation (Canada)

An outdoor shelter is an unoccupied enclosure which does not communicate directly with occupied areas. The LX and LT may be installed in such a shelter only when the installation is in accordance with local codes and the most recent edition of Standard CAN/CGA B-149. These codes and standards and Waterpik Technologies require that the heater be properly vented as outlined in this manual. Other requirements also apply, such as provision of ample uncontaminated air for combustion and ventilation.

2F. Indoor Installation

2F-1. Preparation of Heater for Indoor Installation

If the LX or LT is to be installed indoors, its exhaust discharge grill must be converted to a collar for vent pipe connection. The necessary vent collar, gasket and screws can be ordered as parts kit R0331403 or R0331405 (see parts list in Section 5 of this manual). The conversion can be done quite simply as follows:

1. Remove the vent exhaust grill by removing the four screws which retain it. The grill and the screws may be discarded (See Figure 3).
2. Replace the grill with the vent collar (see section 4 for kit number). Place the vent collar and gasket over the hole and fasten it in place with the 4 screws provided. Be sure that all components are properly aligned (See Figure 4).
3. Install the vent pipe on the indoor vent collar. The collar will accommodate vent piping of nominal 7" or 9" diameter, depending upon the model of your heater (See Figure 5). See vent installation section for important information on selecting proper pipe size.

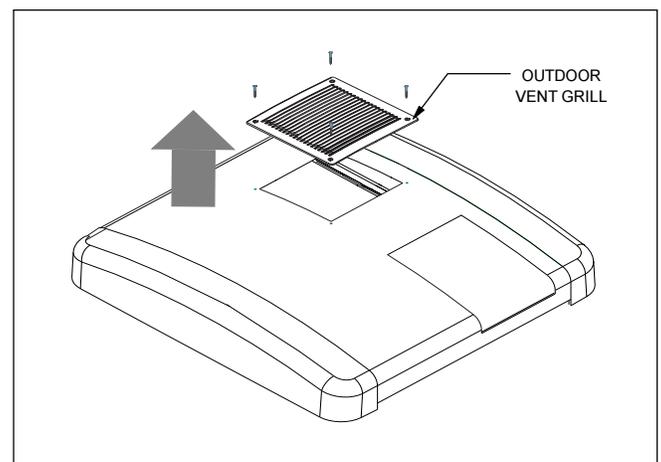


Figure 3. Removal of Outdoor Exhaust Grill.

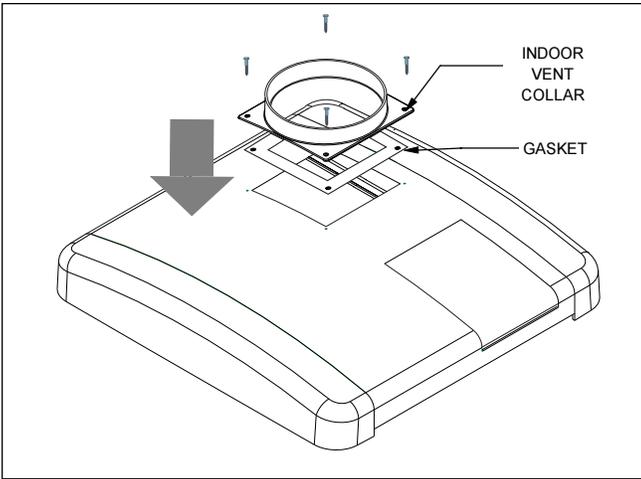


Figure 4. Vent Collar Assembly for Indoor Installation.

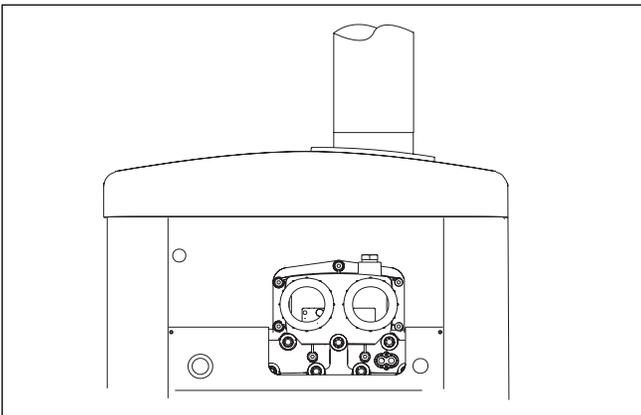


Figure 5. "Vent Pipe" Installation.

2F-2. Special Location Requirement

Virtually all local installation codes require that a heater installed in a garage or similar structure be on a platform at least 18 inches (46 cm) above the floor. This requirement is in consideration of possible existence of combustible fumes at floor level. Consider such installations carefully and do not proceed if there is any possibility of such fumes being ignited by the heater.

2F-3. Air For Combustion and Ventilation

It is very important that the heater be provided with adequate air for combustion and to ventilate the space in which it is located. Provide combustion and ventilation air as specified in local codes, or in their absence per the National Fuel Gas Code ANSI Z223.1 or the Canadian Installation Codes for Gas Burning Appliances, CAN 1-B149.1 & 2.

In general, the codes require that the space in which the heater is located be provided with two combustion air openings, one within 12" of the floor and one within 12" of the ceiling (see Figure 6). If air is supplied directly from the outside, the openings must provide one square

inch of flow area for each 4000 BTU/H of heater input. If air is provided through horizontal ducts, each opening and duct must provide one square inch of flow area for each 2000 BTU/H of heater input. These requirements are summarized in Table 2. Note that the specified areas are net free area, after allowing for the blockage of grill bars, etc. See applicable codes for details.

Even though local codes may allow it, Waterpik Technologies does not recommend installation in which combustion and ventilation air is provided by infiltration. Pool heaters tend to have larger input than many appliances and it is best to specifically provide combustion air means.

Table 2. Air Openings to Outside
Required Net Free Open Area for Combustion Air Openings

Model	Direct from outside		Duct from outside	
	in ²	(cm ²)	in ²	(cm ²)
250	63	(406)	126	(813)
400	100	(645)	200	(1290)

2F-4. Exhaust Venting

2F-4a. Important Information on Vent Pipe Sizing

When converted to indoor venting configuration, the LX and LT heaters have a vent collar fitting. The diameter of the vent collar and, thus, the minimum diameter of the vent pipe to be used is determined by the model of heater installed. *The only correct procedure for vent pipe sizing is to do so in accordance with table 3 and the applicable installation code as stated in the "Danger" warning below.*

Table 3. Vent Pipe Sizing Table

L X Model	Vent Pipe Diameter	
	inch	(cm)
250	7.0	17.8
400	9.0	22.9

⚠ DANGER

Vent pipe diameter must be as required by the National Fuel Gas Code Z223.1 or the Canadian Installation Codes for Gas Appliances CAN 1-B149.1 & 2. Undersize pipe can result in inadequate venting and oversize pipe can result in vent condensation. In either case the result can be release of combustion products to the indoors. This can cause serious injury or death by carbon monoxide poisoning or asphyxiation.

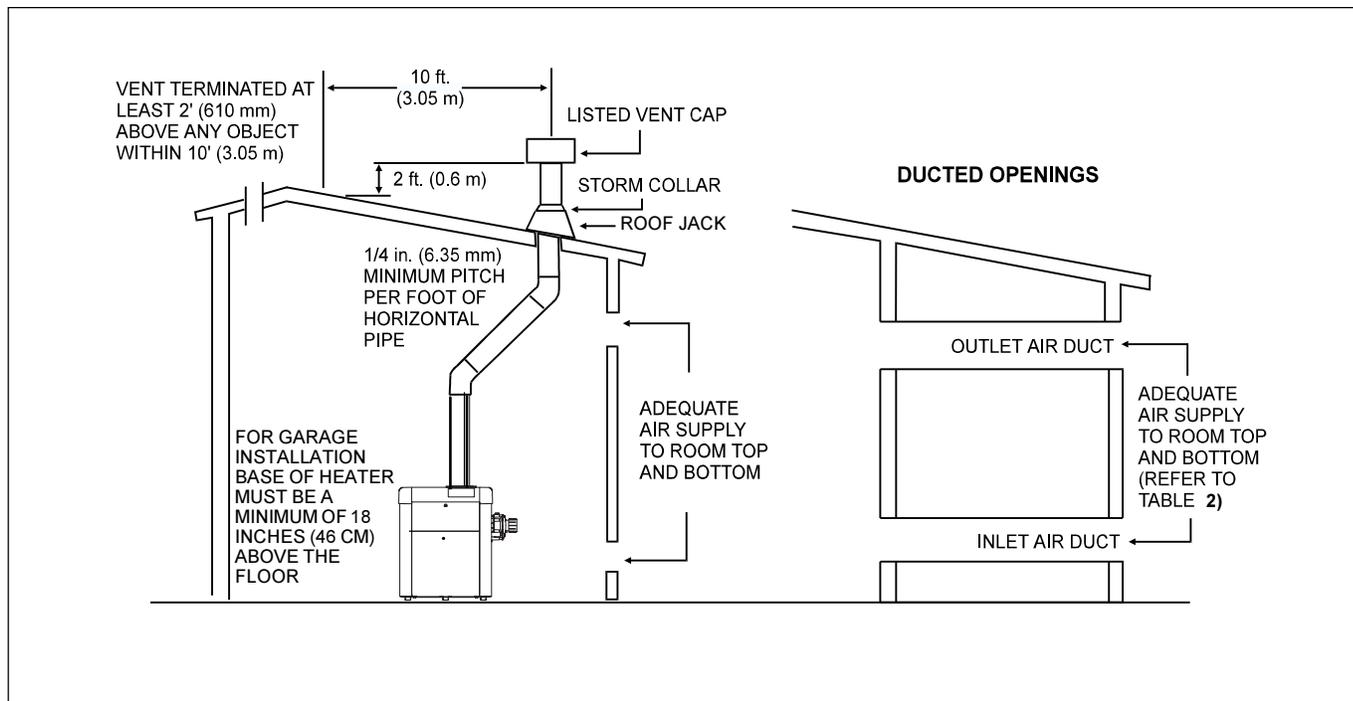


Figure 6. Indoor Installation Venting (USA), or Outdoor Shelter (Canada).

2F-4b. Vent Pipe Sizing and Installation

As part of their certification, the LX and LT have been determined to be a Category I Fan-Assisted appliance. They are intended for standard vertical venting per tables provided in most local codes for Category I Fan-Assisted appliances. If the local code does not include such tables, refer to the National Fuel Gas Code Z223.1 or the Canadian Installation Codes for Gas Appliances CAN 1-B149.1 & 2. Note that the tables for fan-assisted appliances include both maximum and minimum vent loading figures. The primary purpose of the maximum ratings are to assure that the vent operates with negative pressure throughout its length. The minimum ratings are to assure that vent gases don't cool too much and thereby assure that condensation doesn't occur.

It is important that all aspects of venting installation be in accordance with local codes, or in their absence, the cited national codes. Vent diameter, height, allowable length of horizontal runs, vent cap requirements, location and height of vent terminations on a roof, and many other important matters are covered in these codes. Proper installation of the LX and LT heaters requires that all these factors be correctly handled.

2G. Gas Supply and Piping

2G-1. General Instructions

Review the following general instructions before continuing the installation.

1. The gas supply must be able to provide gas at pressures specified in Table 5.
2. Gas piping installation must be in accordance with the latest edition of ANSI Z223.1. In Canada, the installation must be in accordance with CAN- B149.1 or .2 and all local codes that apply.
3. Check the rating plate to make sure the heater is fitted for the type of gas being used. Waterpik Technologies heaters shipped from the factory are certified to operate at an altitude of 0 to 3000 feet (0 to 915 m) for natural gas and 0 to 5000 feet (0 to 1525 m) for propane, or if so ordered, at higher altitudes. In the United States, the heater manifold is marked with a tag or sticker indicating one of the following high altitude operation codes:

FOR NATURAL GAS

- a. High altitude (H) - 3,000 to 6,000 feet (915 to 1830 m)
- b. High altitude (J) - 6,000 to 10,000 feet (1830 to 3050 m)

FOR PROPANE GAS

- a. High altitude (H) - 5,000 to 10,000 feet (1525 to 3050 m)

4. In Canada, the heater rating plate is marked for specific altitude requirements as follows:

FOR NATURAL GAS

- a. Factory Released - 0 to 2,000 feet (0 to 610 m)

- b. High altitude (H) - 2,000 to 4,500 feet (610 to 1370 m)

FOR PROPANE GAS

- a. Factory Released - 0 to 4,500 feet (610 to 1370 m)
- 5. Use only wrought steel piping or when permitted by local codes, other rigid piping material. Do not use flexible gas connectors, which restrict gas flow to the heater.
- 6. Table 4 specifies sizing for gas supply piping based on 1/2" WC (3.45 kPa) pressure drop in the piping. Larger piping may be necessary if the local gas supply is at pressures which will not guarantee adequate pressure at the heater. Table 5 specifies the maximum and minimum supply pressures necessary at the heater *when it is operating*.
- 7. Install a sediment trap (drip leg) ahead of the gas controls (see Figure 7). Fit the trap with a threaded cap which can be removed for cleaning.
- 8. Install a manual gas shut-off valve for service and safety. Do not use a restrictive gas cock.

CAUTION

Permanent damage to the gas valve will occur if the following procedures are not followed.

- 9. Disconnect the heater and its individual shutoff valve from the gas supply system during pressure testing of the system at pressures higher than 1/2 pounds per square inch (psi) (3.45 kilopascals [kPa]). If the test pressure is equal to or less than 1/2 psi (3.45 kPa), close the manual shutoff valve on the heater during the piping pressure test.

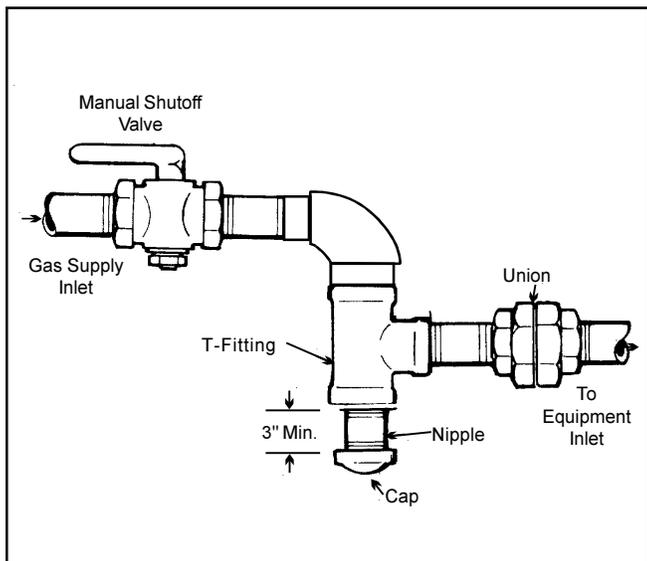


Figure 7. The Proper Design for a Sediment Trap/Drip Leg.

Table 4. Natural Gas Pipe Size Requirements

Heater Size	Distance from Gas Meter		
	0-50 feet (0-15 m)	50-100 feet (15-30 m)	100-200 feet (30-60 m)
	in.	in.	in.
250	1	1-1/4	1-1/4
400	1-1/4	1-1/2	1-1/2

Notes:

- 1. These numbers are for natural gas (0.65 Sp. Gr.) and are based on 1/2 inch (3.45 kPa) water column pressure drop. Check supply pressure with a manometer, and local code requirements for variations. **For liquefied petroleum gas, reduce pipe diameter one size, but maintain a 3/4 inch minimum diameter.**
- 2. Check supply pressure and local code requirements before proceeding with work.

Table 5. Gas Supply Pressure Requirements

Supply Pressure Water Column	Natural Gas	Propane Gas
	in. (kPa)	in. (kPa)
Minimum	6 (1.5)	11 (2.8)
Maximum	10.5 (2.7)	14 (3.5)

- 10. If the gas supply pressure is less than required, check for undersized pipe between the meter and the heater, a restrictive fitting, or an undersized gas meter. Gas supply pressures to the heater, when it is operating, are listed in Table 5.

NOTE: The maximum inlet gas pressure must not exceed the specified value. The minimum value listed is for the purpose of proper heater operation. Refer to Table

- 11. To connect the gas supply line to the heater's gas valve, you must first install a steel elbow (supplied with the heater in the installation and instruction box). Screw the elbow into the inlet side of the gas valve. The heater is designed so that the gas supply line may enter through either side of the heater. Hand tighten the elbow until the desired orientation is achieved.

CAUTION

Do not over tighten the elbow. Over tightening will crack the gas valve. Do not use teflon tape to wrap the elbow threads.

12. Before operating the heater, test the complete gas supply system and all connections for leaks using a soap solution. Do not use an open flame.

⚠ CAUTION

Some leak test solutions (including soap and water) may cause corrosion or stress cracking. Rinse the piping with water after testing.

2G-2. Special Precautions for Propane Gas

Liquefied petroleum (LP) gas is heavier than air. Therefore, do not install pool heaters using LP gas in pits or locations where gas might collect. Locate heaters a safe distance from LP gas storage and filling equipment. Consult local codes and fire protection authorities about specific installation restrictions.

2H. Electrical Power

2H-1. General Information

Wiring connections must be made exactly as shown in the wiring diagram found on the inside of the heater (see Figure 8). Grounding must be provided as required by the prevailing electrical code. A separate bonding wire **MUST** be provided as indicated in the following section

The heater comes factory-wired intended for use with 240 Volt, 60 Hz AC field electrical supply. To convert to 120 Volt, 60 Hz AC requires the changing of the fifteen-pin connector assembly on the component raceway. Remove the fifteen-pin connector from the receptacle located directly below the fan intake on the raceway. All the wires on the connector are red and the connector is marked "240V". The fifteen-pin connector will have two

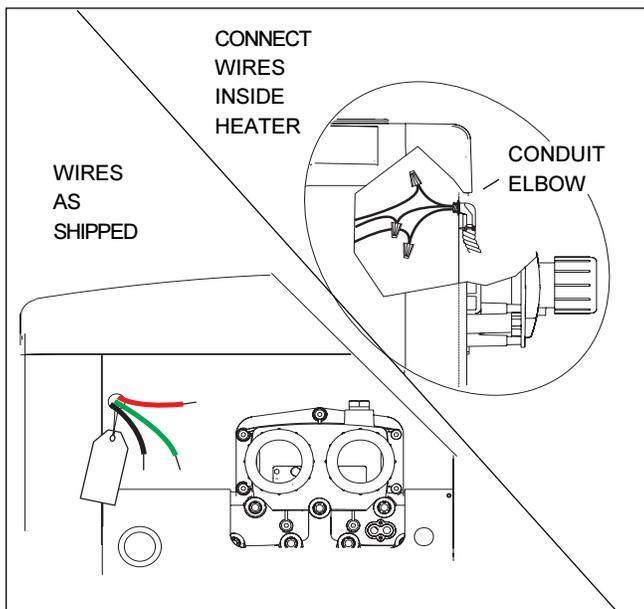


Figure 9. Field Wiring Connections.

wires that lead to a two position terminal block located next to the connector. Remove the two wires from the terminal block. Take the fifteen-pin connector assembly with the black wires from the installation and instructions box. It is marked "120V". Connect the two long wires to the two position terminal block. Either wire may be connected to either tab on the terminal block, the connections are not polarity sensitive. Plug the fifteen-pin connector into the receptacle. The connector is keyed so it will fit in only one orientation.

Electrical wiring must be in accordance with the latest edition of the National Electric Code (NEC), ANSI/National Fire Protection Association (NFPA) 70, unless local code requirements indicate otherwise.

⚠ CAUTION

DO NOT connect power to the LX or LT pool heater from the load side of a filter pump relay or time clock.

To wire the Laars LX or LT heater:

1. Wire the heater to a 120V or 240V /60 Hertz (Hz) electrical source.
2. Connect the wires from the source to the leads on the right side of the heater in the space behind the raceway (see Figure 9).

NOTE: No external junction box is required.

2H-2. Bonding

The National Electrical Code and most other 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 not smaller than a number 8 wire. The heater, along with pumps and other such equipment must be connected to this bonding grid. A special labeled bonding lug is provided on the right side of the heater to accommodate this requirement.

2H-3. Auxiliary Time Clock Wiring

If you install a time clock to control the filter pump operation, it is recommended that the time clock have its own low voltage (Fireman's) switch to turn off the heater before turning off the pump. The switch should shut off the heater about 15 minutes before the filter pump shuts off. This will allow for a more efficient operation by removing any residual heat contained in the heat exchanger back to the pool.

To install a time clock auxiliary switch into the heater circuit, follow these instructions (see Figure 10):

1. Remove heater door.

2. Remove the factory installed jumper wire and tag from the terminal strip (see Figure 10).
3. Connect the low voltage wires from the time clock auxiliary switch to the two terminals. Use American Wire Gage (AWG) No. 14 gauge stranded copper wire with a temperature rating of 221°F (105°C) or greater (see Figure 11).

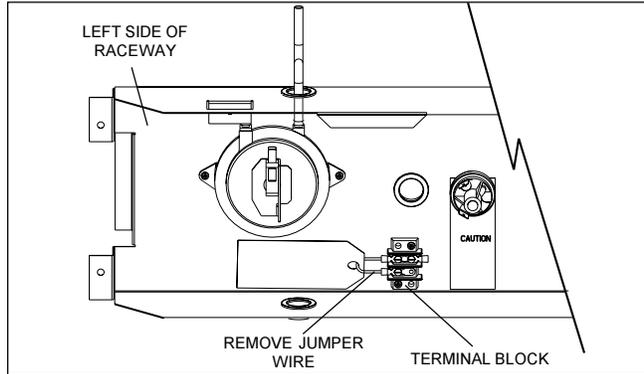


Figure 10. Remove Jumper from Terminal Block

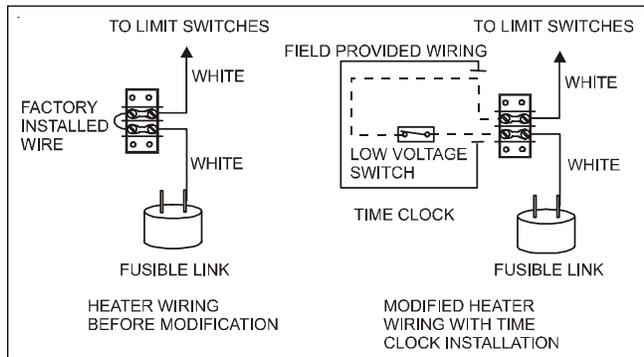


Figure 11. Typical Time Clock Wiring.

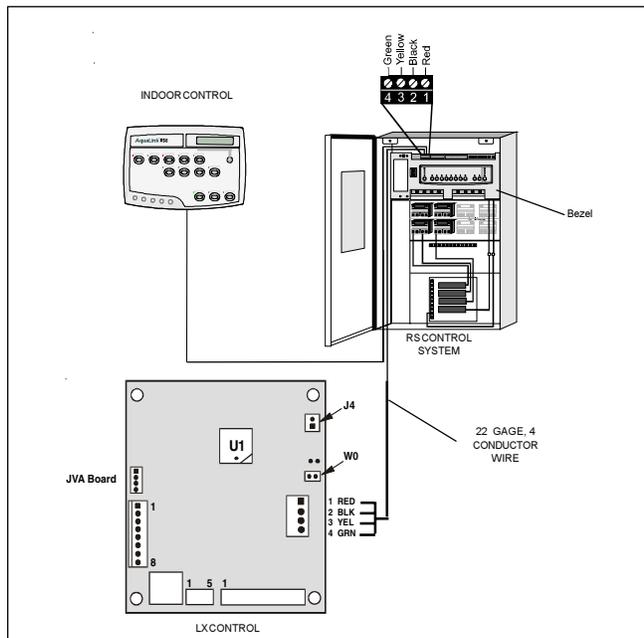


Figure 12. Wiring a Laars LX to a Jandy RS Remote

If your time clock simply interrupts the high voltage power supply or has a high voltage output, **do not connect the power supply of the heater to the output side of the clock.** Doing so will prevent the blower from purging the residual heat from the heater when the heater turns off. This situation will damage the heater. The blower must be allowed to run for 45 seconds after the heater shuts off.

2H-4. Remote Operation (Model LX Only)

The Laars LX pool/spa heater controls can be wired for remote operation. All Waterpik Technologies/Jandy RS Control Systems will permit the heater to be operated by remote control. If you are setting up a new pool or spa system, call your local distributor or the Waterpik Technologies/Jandy Customer Service Department for information on the correct RS Control System to meet your needs.

To connect a Laars LX heater to an existing RS Control System, first determine the revision level the programmed chip in the RS Control System's Power Center Board. To check the revision level of the chip, press and hold the reset button on the side of the indoor control panel for 10 seconds then release it. A number will appear on the display for approximately 5 seconds. This first number can be ignored. After the first number disappears, a second number will appear in the display window. It will consist of 4 digits followed by a revision level ("#### REV _"). If the revision level displayed here is at "H" or higher it will accommodate a Laars LX heater without any modification. If the chip is at a revision "G" or lower the chip will have to be replaced with a newer version. An alternate method for determining the revision level of the programmed chip in your RS control, is described in steps 1-4 below. An updated chip can be obtained through Waterpik Technologies/Jandy by ordering the PPD Kit. Instructions for changing the chip are in the kit.

Do not connect more than two wires to any of the terminals in the RS Control System when connecting peripheral devices. If connecting the LX heater to the RS Control System creates this situation, then a Multiplexing PCB kit must be used. Call your distributor or Waterpik Technologies to order the kit.

To connect the Laars LX to your RS control System, follow the steps listed below (See fig. 12).

1. Turn off the power to the heater and the RS Control.
2. Open the RS Power Center Enclosure and remove the front dead panel.

NOTE: Only a revision "H" or higher program chip in the RS system will support the LX Heater Interface.

3. Remove the two screws holding the bezel in place. Turn the bezel over to view the circuit board on the back.
4. Locate the programmed chip on the Power Center Board (the larger square chip in the lower right corner of the circuit board). In the center of the chip is the revision letter. If the revision letter is "H" or higher go to step 5. If the revision level is "G" or lower, replace the chip. Directions for removal and installation of the chip are provided in the new PPD Kit .

NOTE: If ordering a new programmed chip, be sure to order the part number printed on the chip currently in your RS control .

5. Use 22 gauge 4-conductor wire (WP/J part # 4278) to run between the heater and the RS control, and match the wire color order.
6. The wires coming from the LX heater can be "doubled up" on the red terminal bar with the four wires coming from the indoor controller.

NOTE: If you need to install more than two wires in each terminal, order a Waterpik Technologies/ Jandy Multiplex PCB Kit, which includes the Multiplex Board (WP/J part # 6584). Never put more than two wires into each of the pins of the terminal bar.

7. On the heater's electronic control board, verify that the water temperature sensor is connected (J4), and that jumper is in place on W0.
8. Check all wiring, then apply power to both the heater and the RS control system. Operation can be verified in either Service or Auto mode. See your RS Control System for instructions about operation.

When the LX heater is first powered, the display on the control will show "RS ONLINE". If there is an RS control connected to the heater, it will sense the RS unit and remain online. When the display shows "RS ONLINE" all functionality of the control on the heater is disabled. The heater functions can be controlled only at the RS unit. However, sensor data is displayed at both the heater and the RS unit.

To temporarily use the heater controls, use a thin object to depress the button marked "RS SERVICE". The "RS ONLINE" indicator will disappear from the heater display. All functionality has now been returned to the control on the heater. In this mode the RS unit has been disabled. To return the functionality to the RS unit, push the button again.

An interrupt (on/off) type remote can be connected by removing the jumper wire on the terminal block located in the control compartment (see Figure 8) and connecting the two wires from the remote to the two terminals on the terminal block. This type of remote control will turn the heater on or off, but will not perform any other function.

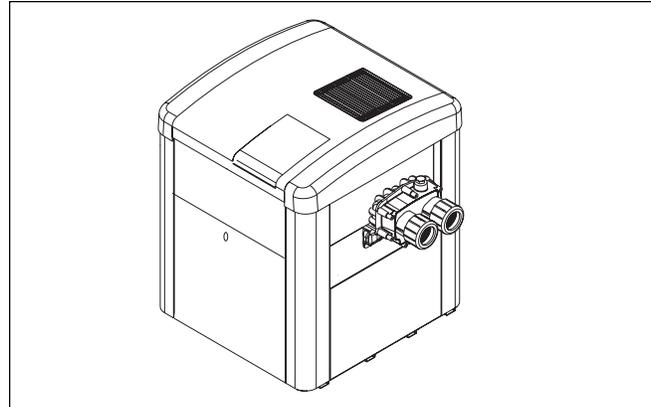


Figure 13. Water Connection as Shipped.

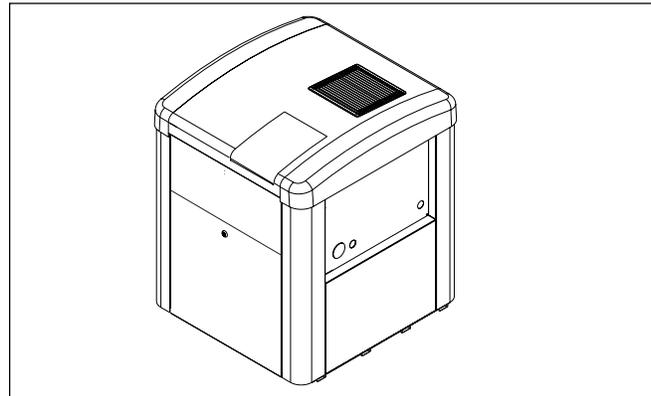


Figure 14. Water Connection Reversed.

Consult with Waterpik Technologies Service Department with questions about installing remote controls manufactured by companies other than Waterpik Technologies.

2I. Water Piping

2I-1. Reversal of Heater Water Connections

The LX and LT are shipped with water connections on the right side, but they can be modified in the field to provide left-side water connections. This procedure involves removing the heat exchanger and reinstalling it opposite to its original position. Some of the heater wiring and control components must be relocated, so this procedure must be done only by a trained service technician.

Heat exchanger reversals are generally done before the installation of power and water to the heater. If you need to reverse the heat exchanger on a previously installed heater be sure that all electrical power and water supply has been turned off before starting the procedure. Water connection reversal is illustrated in Figures 13 and 14. Proceed as follows:

1. Remove the heater front panel (door).

2. Remove the two hex head screws that hold the raceway cover in place. They are located on the bottom flange of the raceway cover. Slide the raceway cover down to expose the raceway.
 3. Remove the control panel assembly from the top panel. Lift the control panel cover. Remove the two philips head screws located at the front edge of the bezel. Lift the front of the bezel up until the entire assembly comes away from the top. Without removing any wires, slip the control assembly through the hole so that when the top is removed, the control assembly will stay with the heater.
 4. Remove the four philips head screws that fasten the vent grill to the top. Remove the vent grill.
 5. Remove the top. There are two hex head screws at the upper corners of the raceway. And there are two philips head screws at the upper corners of the rear panel.
 6. Disconnect the blower pressure switch rubber tubing from the blower assembly housing.
 7. Disconnect the two white wires from the vent switch located just above the inlet/outlet header.
 8. Remove the EMI shield (metal plate) covering the motor on the blower.
 9. Disconnect the five blower wires from the terminal strip on the back of the raceway.
 10. Remove the four hex head screws holding the blower to the flue collector. Lift the blower and the exhaust vent off of the flue collector.
 11. Remove hex head screws holding the flue collector to the top of the combustion chamber. There are 10 screws on a model 400 and 6 screws on a model 250. Remove the flue collector and set it aside.
 12. Remove the water pressure switch's copper siphon loop tube from the header by first loosening the brass nut at the pressure fitting. Then carefully pull the tube out of the fitting. There should be about two inches of tubing inside the header. Be careful not to create any kinks in the tubing when handling it.
 13. Clip the wire tie that bundles the wire harnesses leading from the control panel. Disconnect the two black temperature sensor wires from the back of the control panel. Coil the wires and place them on top of the heat exchanger.
 14. Disconnect the high limit switch black wires from the wire harness leading to the control panel. There are quick disconnects at the end of the wires.
 15. Remove the inlet/outlet header side cover plate located under the inlet/outlet header. There are four philips head screws, one in each corner, holding it in place.
 16. Slide the upper right side panel up and out of the corner posts and place it aside.
 17. Remove the left side cover panel, held to the lower panel with two philips head screws at the corners.
 18. Remove the flat return header side cover plate to expose the return header by removing the four philips head screws, one in each corner.
 19. Slide the upper left side panel up and out of the corner posts and place it aside.
 20. Remove the end baffles from the heat exchanger.
-  **WARNING**

The heat exchanger is heavy. It may be necessary to have help lifting the heat exchanger to remove it and replace it on the combustion chamber.
21. Lift the heat exchanger assembly off of the combustion chamber and rotate it 180° so that the inlet/outlet header is on the left side of the heater.
 22. Carefully place the heat exchanger assembly back on top of the combustion chamber. Be sure that the heat exchanger is level and that the finned tubes fit between the front and rear walls of the combustion chamber. Be sure that the definned section of the tubes, near the headers, fit into the slots cut in the top of the insulation on the side walls of the combustion chamber.
 23. Reinstall the end baffles on the heat exchanger. Align the cut out portion of one of the baffles with the cut out section on the top of the front combustion chamber wall. Set the baffle so that the flange fits completely over the combustion chamber wall. Set the other baffle on the rear combustion chamber wall in the same manner.
- Note: There is no cut out section on the rear combustion chamber wall.
24. Carefully bend the water pressure switch's copper siphon loop tube so that it reaches the inlet/outlet header now on the left side of the heater. **Do not** straighten out the coil behind the raceway and **do not** "kink" the tubing. Straightening the coil or kinking the tubing may result in poor heater operation. Insert the end of the tube into the fitting on the header. Tighten the nut onto the fitting one half turn past hand tight.
 25. Route the wires that attach to the high limit switches along the copper siphon loop, back to the right side of the heater. Reconnect the wires to the wire harness.

26. Route the wires that attach to the temperature sensor along the copper siphon loop, back to the right side of the heater. Reconnect the wires to the tabs on the back of the control panel (marked as J4-1 and J4-2).
27. Use plastic wire ties to refasten the temperature sensor and high limit switch wires to the copper siphon loop. Bundle the wires near the control panel and fasten them with a wire tie.
28. Replace the flue collector so that the blower mount is in the same position as it was before the heat exchanger reversal. Be sure that the bottom of the flue collector lies flat on the top of the combustion chamber and that it covers all of the heat exchanger tubes. Replace the hex head screws to fasten the flue collector to the combustion chamber.
29. Reassemble the blower and exhaust vent to the flue collector. Be sure that the blower is seated properly on the gasket and fasten it to the flue collector with four hex head screws.
30. Reconnect the fan wires to the terminal strip as follows: (Terminal numbers are shown on wires connected to the bottom of the terminal strip)
 - a. Black Blower wire to terminal 11
 - b. Blue Blower wire to terminal 10
 - c. Red Blower wire to terminal 9
 - d. Yellow Blower wire to terminal 8
 - e. White Blower wire to terminal 7
31. Reconnect the two white wires to the vent switch now located just above the return header.
32. Reconnect the blower pressure switch tubing to the blower housing.
33. Replace the EMI shield (metal plate) located over the blower by reinstalling the two hex head screws.
34. Slide the upper right side panel back into the corner posts on the right side of the heater. Push it down until the tabs on the panel lock into the top of the corner posts.
36. Install the flat return header side cover plate (removed from the left side of the heater) on the right side to cover the return header by replacing the four philips head screws, one in each corner.
37. Slide the upper left side panel back into the corner posts on the left side of the heater. Push it down until the tabs on the panel lock into the top of the corner posts.
38. Remove the button plug from the inlet/outlet side cover plate.
39. Reinstall the inlet/outlet header side cover plate located under the inlet/outlet header. It is held with four philips head screws, one in each corner.

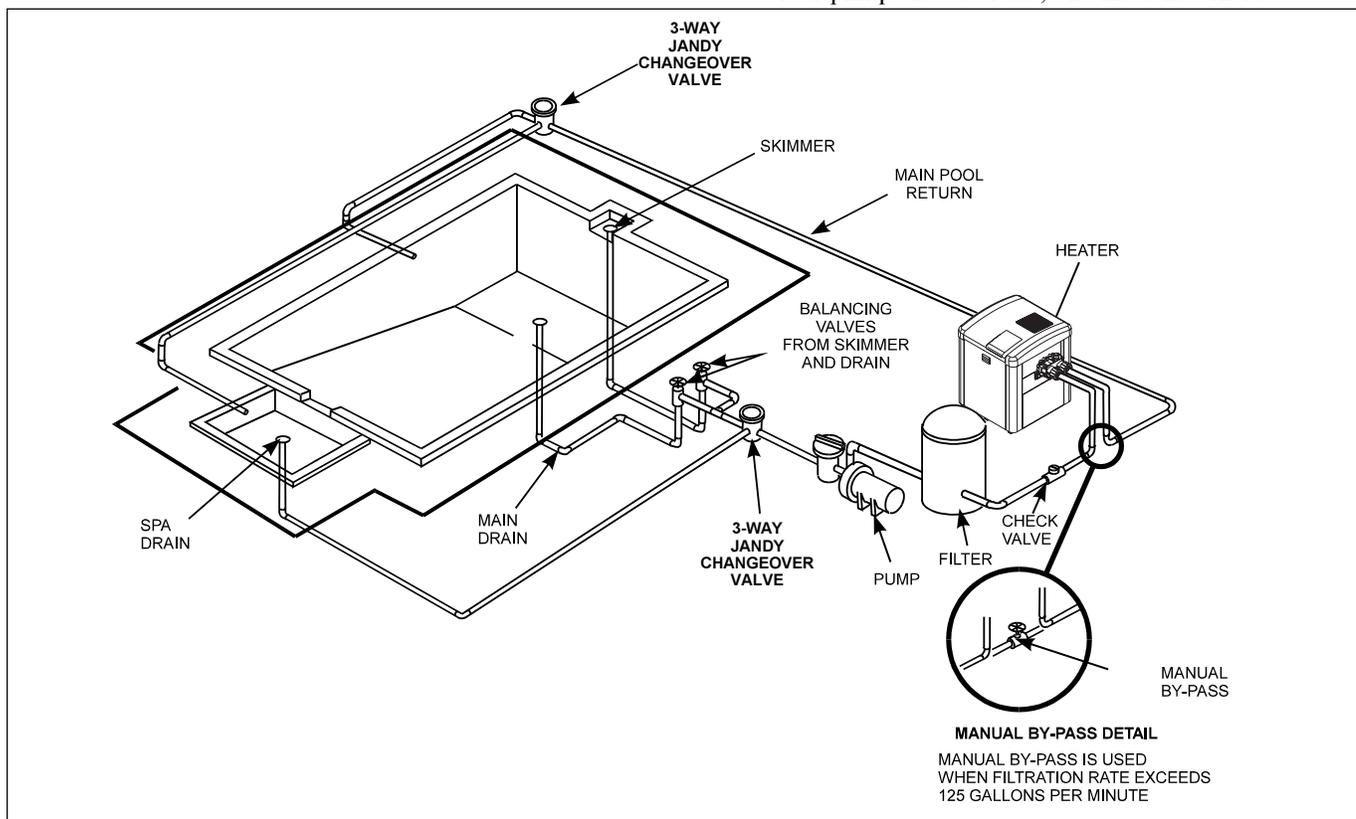


Figure 15. Typical Water Piping.

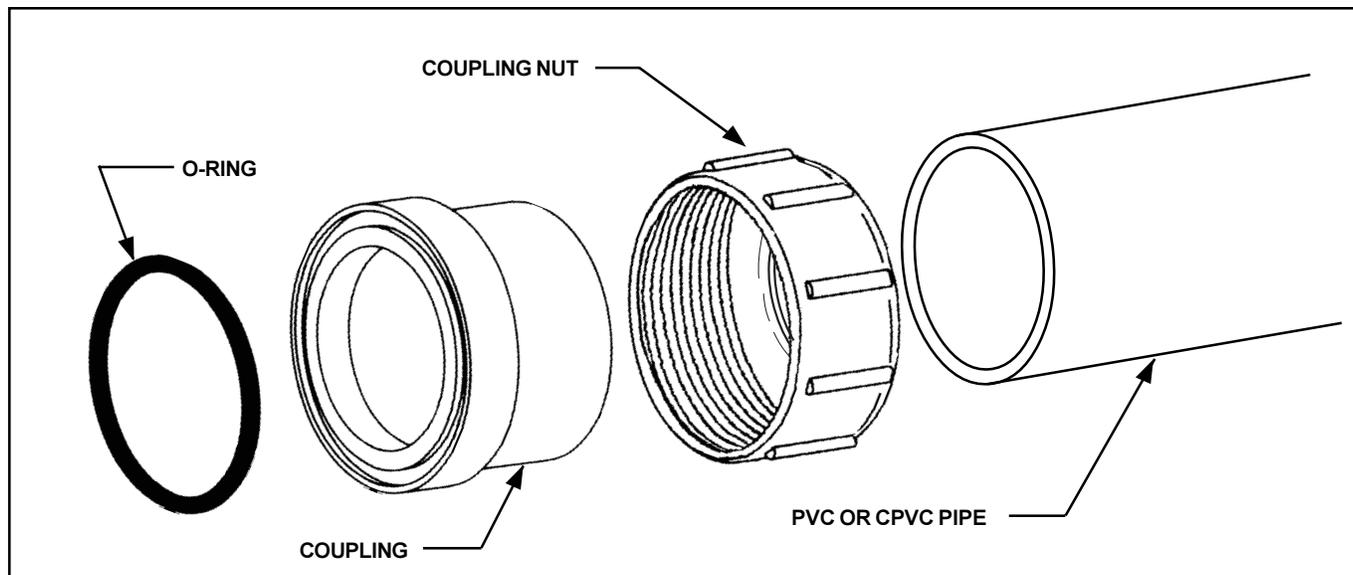


Figure 16. Piping to Heater.

Note: Only the small tab of the top groove will fit behind the upper panel.

40. Remove the button plug type washer from the left side cover panel. This panel will not be used in reassembling the heater after a heat exchanger reversal. However, the button plug washer will be needed. **Do not** replace the cover panel over the vent switch outlet. Doing so may cause the heater to malfunction.
41. The gas line may enter the heater from either the left side or the right side. Replace the button plug washer in the hole through which the gas line will enter the heater.
42. Use the button plug to cover the hole on the opposite side of the heater.

Note: Be sure that the white fiber gasket is positioned on the top flange of the exhaust vent.

43. Replace the top. While positioning the top, pull the control panel through the hole and place it on top of the panel. Fasten the top to the heater by replacing the two hex head screws at the upper corners of the raceway and the two philips head screws at the upper corners of the rear panel.
44. Position the vent grill over the exhaust vent. Replace the four philips head screws that fasten the vent grill to the top.
45. Reinstall the control panel assembly into the top panel. Slide the back of the bezel into place, then lower the front, aligning the holes in the bezel with the holes in clips on the tabs on the top panel. Replace the two philips head screws located at the front edge of the bezel.

46. Slide the raceway cover up to the top of the heater. Be careful not to pinch any wires. Replace the two screws on the bottom flange to hold the cover in place.
47. Replace the front panel (door).

2I-2. Pool/Spa Piping Systems

Figure 15 illustrates typical piping for pool equipment in pool/spa combination pools. With their electronic temperature controls, the LX and LT are particularly suited for this type of pool installation.

The heater must be protected from back-siphoning of water, which can result in dry starts. If there is any chance of back-siphoning, provide a check valve between the pool and the filter pump inlet.

Arrangement of pool system components other than as illustrated in these diagrams can affect the operation of the heater's water pressure switch. Location of the heater above or below the pool water surface can also affect operation of the switch. In general, the pressure switch can be adjusted to accommodate this effect if the heater water connections are no more than six feet below the pool water surface and no more than 15 feet above it. See instructions for pressure switch adjustment in the heater start-up section of this manual for more information about this.

Note that when pool equipment is located below the pool surface a leak can result in large scale water loss or flooding. Waterpik Technologies cannot be responsible for such water loss or flooding or the damage caused by it.

Do not install a shutoff valve or any kind of variable restriction in the water piping between the heater outlet and the pool/spa.

Pool systems with water flow rates higher than 125 GPM require an adjustable external bypass at the heater.

2I-3. Connections at Heater

The LX and LT have a standard two inch water header and coupling design. With this feature, only nominal two inch PVC or CPVC may be connected to the heater. However, by installing the appropriate pipe adapters and two short pieces of two inch plastic pipe (supplied by the installer), any size existing pipe may be fitted to the heater.

To connect a section of 2" PVC or CPVC pipe to the heater, first slip a coupling nut onto the pipe. Then prepare the end of the pipe with the proper PVC/CPVC primer and glue. Follow the manufacturer's instructions provided with the primer and glue for preparation procedures and curing times. Apply the slip-fit side of the coupling to the end of the pipe. Allow the glue to cure completely. Set the o-ring into the groove on the face of the coupling. Slide the coupling nut up to the coupling and tighten it to the threaded connection on the header (see Figure 16).

2I-4. Pressure Relief Valve

A pressure relief valve is mandatory in any installation in which the water flow can be shut off between the heater outlet and the pool/spa.

A pressure relief valve is not supplied with the heater however, it may be required by local codes.

To install a pressure relief valve, do the following:

1. To protect the threads while drilling, screw the brass adapter (included with the Waterpik Technologies PRV kit) into the blind threaded hole on the top of the inlet/outlet header.

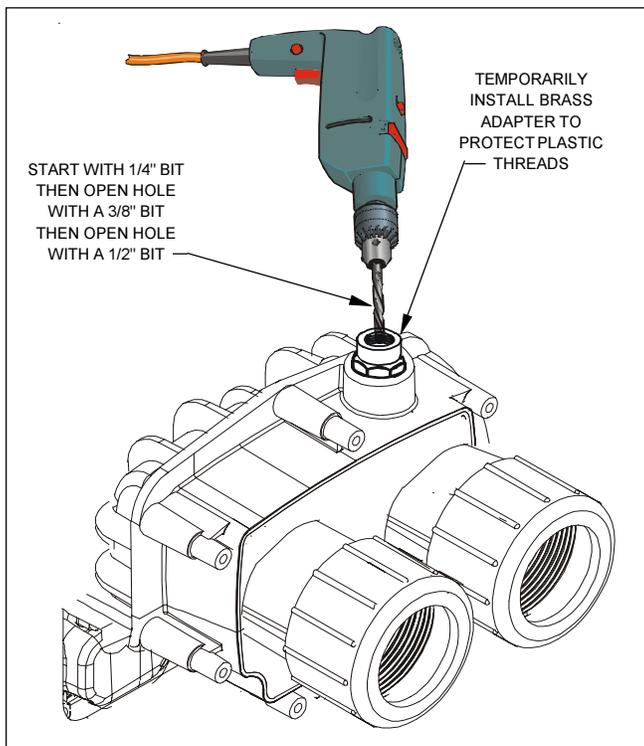


Figure 17. Drill Hole For Pressure Relief Valve

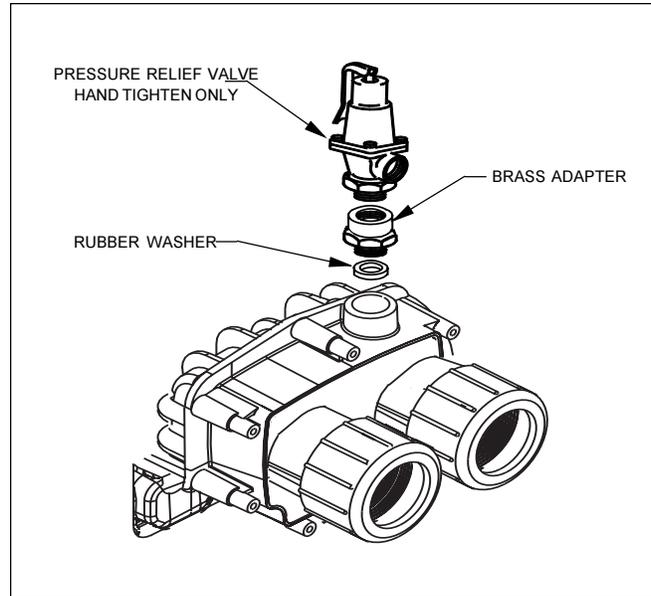


Figure 18. Pressure Relief Valve Installation.

2. Using the countersink in the center of the blind hole as a guide, drill a 1/4 inch hole through the plastic.
3. Open the hole by reaming it with a 3/8 inch drill bit.
4. Open the hole again by reaming it with a 1/2 inch drill bit.

⚠ WARNING

Initially drilling a 1/2 inch hole without reaming may cause the bit to "grab" on the plastic. This may cause personal injury or damage to the plastic header.

5. Remove the brass adapter and clean the cuttings out of the hole.
6. Install the rubber washer at the bottom of the hole.
7. Thread the adapter into the hole and tighten so that it seals against the rubber washer.
8. With a permanent marker, place a mark on the adapter so that the mark faces the same direction as the water connections on the header.
9. Remove the adapter from the hole.
10. Coat the threads of the pressure relief valve (PRV) with an appropriate metal to metal thread sealant.
11. Install the adapter on the PRV and tighten using two wrenches. Use the mark made earlier on the adapter to orient the PRV to the desired direction in relation to the water connections on the header.
12. Wrap the threads of the adapter with a suitable teflon thread tape.

13. Reinstall the adapter, with the PRV, into the plastic threaded hole and tighten it until the mark on the adapter is once again facing the same direction as the water connections on the header.

⚠ CAUTION

Do not use any pipe compound or pipe dope on the threads of the adapter or any part that comes in contact with the plastic headers. These compounds may damage the header over a period of time.

DO NOT TIGHTEN WITH A WRENCH.

Overtightening may crack the header. Route the discharge piping so that steam from the pipe does not endanger anyone near the heater. Refer to your local installation codes for more detailed information. The valve setting should be at or below the maximum working pressure of any component in the filter system. The working pressure of the LX heater is 75 psig.

2I-5. Automatic Chlorinators (Chemical Feeders)

A high concentration of chlorine (and many similar chemicals) in the pool heater can be very destructive. Heater damage caused by chemical concentration is not covered by the Waterpik Technologies Warranty. See Table 6 for guidelines on pool water chemistry.

IMPORTANT: If an automatic chlorinator is being used, equip the chlorinator with an anti-siphoning device so that chlorine will not siphon into the heater after the pump shuts off.

Wire an electric chlorinator so that it cannot operate unless the filter pump is running. If the chlorinator has an independent clock control, synchronize it with the filter clock.

Always install a chlorinator so that it introduces the chlorine downstream from the heater, and, if possible, below the level of the heater outlet fitting.

Table 6. Chemical Concentration Levels

Test	Recommended Level*
Free Chlorine or	1.0 to 3.0 ppm
Total Bromine	2.0 to 4.0 ppm
pH	7.2 to 7.6
Total Alkalinity (TA)	100 to 150 ppm
Calcium Hardness (CH)	200 to 400 ppm
Langelier Saturation Index (SI)	-0.5 to +0.5
Cyanuric Acid	30 to 150 ppm
Total Dissolved Solids (TDS)	Less than 1500 ppm
Copper	0 ppm
*As recommended by IPSEA	

2J. Start-up and Adjustment

2J-1. Normal Operation

The LX and LT heaters are capable of automatic operation based on a call for heat at preset temperatures and an operator selection between pool or spa settings. Additionally, the heater may be controlled by a remote unit to anticipate bather load, changes in temperature settings, or a variety of other demands that might be encountered. The heater has an internal safety system which allows operation in a variety of conditions and prevents operation when certain adverse conditions are encountered. The heater is capable of diagnosing problems within the safety controls scheme, enabling faster service and less down time in the event of a failure.

When the heater is powered, water is flowing through the heater, and the water temperature entering the heater is below the temperature control setting, the heater is ready to ignite. The combustion fan is powered and if airflow is proved adequate the igniter comes on 45 seconds into the call for heat. At 60 seconds into the call for heat, the gas valve opens and gas flows to the burners.

If ignition is unsuccessful, or if the flame fails during normal operation, the ignition control shuts off the gas valve. It imposes a post purge and two more ignition cycles, and it shuts down the system if ignition is not achieved in three cycles.

To reset the model LX for another three cycles, press and release the mode button until the indicator on the LCD screen aligns with "OFF". Now press and release the button again until the indicator on the LCD screen aligns with the desired setting, either "POOL" or "SPA".

To reset the model LT press and release the mode button until the indicator lights for the "SPA" and "POOL" settings are off. Then press and release it again until the indicator light for the desired setting is back on.

⚠ CAUTION

Do not operate this heater outdoors at temperatures below 20 degrees Fahrenheit (°F) (-7 degrees Celsius [°C]).

2J-2. Start-up

Confirm that pool water is flowing normally through the pool system and equipment. Start the heater in accordance with the Operating Instructions section of this manual, with particular attention to the lighting and shutdown instructions and temperature control operation.

The heater may not start on the first try. Air in the gas line or other start-up situations may cause it to recycle. It will lock out if ignition is not achieved in three attempts. On the LX model heater, to provide three additional attempts, press and release the mode button until the indicator on the LCD screen aligns with "OFF". Now press and release the button again until the indicator on the LCD screen aligns with the desired setting, either "POOL" or "SPA".

To reset the cycle on the model LT press and release the mode button until the indicator lights for the "SPA" and "POOL" settings are off. Then press and release it again until the indicator light for the desired setting is back on..

When the heater starts, immediately feel the outlet header of the heater to confirm that there is adequate water flow. The header should not be hot. Normally, water temperature will rise only a few degrees as it passes through the heater, and a "hot" header or pipe indicates low water flow.

⚠ WARNING

When the heater is fired for the first time, the combustion chamber refractory binder material is driven out by the heat of the flame. White smoke and/or sharp odors may be emitted from the vent during this period. Do not inhale combustion product fumes at any time, and especially when these fumes are being emitted. This "burn-in" period will last only a few minutes.

2J-3. Gas Pressure

Confirm that gas supply pressure is correct. If the gas supply pressure is less than required, check for undersized pipe between the meter and the heater, a restrictive fitting, or an undersized gas meter. Gas supply pressures to the heater, when it is operating, are listed in Table 7.

The manifold pressure may be checked by connecting a manometer to the pressure port on the outlet

side of the valve. The pressure will be zero when the heater is not running. When the heater is operating the manifold gas pressure should be 4.0" wc for natural gas and 9.0" wc for LP within .2" wc. To adjust the manifold gas pressure, first remove the slotted cap next to the inlet pressure port on the inlet side of the gas valve. Under the slotted cap is a slotted plastic screw which increases the manifold pressure when turned clockwise and decreases the manifold pressure when turned counterclockwise. After measurements, and adjustments if necessary, have been made, make sure to replace the 1/8" NPT gas valve plugs on the inlet and manifold pressure ports, and the cap on the manifold pressure adjustment screw. It is extremely important to replace these parts before leaving the installation. Failure to do so can result in damage to property or injury or death. *With the heater firing*, the pressure must be within the range shown in Table 7. Also check the pressure with the heater off.

Table 7. Gas Supply Pressure Requirements

Supply Pressure	Minimum	Maximum
Natural Gas	6.0 Inches WC (1.5 kPa)	11.0 Inches WC (2.8 kPa)
LP Gas	10.5 Inches WC (2.7 kPa)	14.0 Inches WC (3.5 kPa)
Manifold Pressure	Nominal	
Natural Gas	4.0 Inches WC (1.0 kPa)	
LP Gas	9.0 Inches WC (2.3 kPa)	

2J-4. Adjustment of Water Pressure Switch

If the heater is installed in line with a two speed pump, the pressure switch **MUST** be adjusted to prevent the heater from firing on low-speed or low-flow pump operation. The pressure switch is preset at the factory for normal pool installations. Do not adjust it unless the heater's water connections are more than three feet above or below the pool surface. If they are not in this range, the pressure switch must be adjusted. This can be done in the field if the water connections are no more than six feet above the pool surface or no more than ten feet below it. For other situations, contact a Waterpik Technologies representative.

⚠ WARNING

The pressure switch should be adjusted to turn the heater off when the pump is off. Setting the switch to close at too low of a flow can damage the appliance.

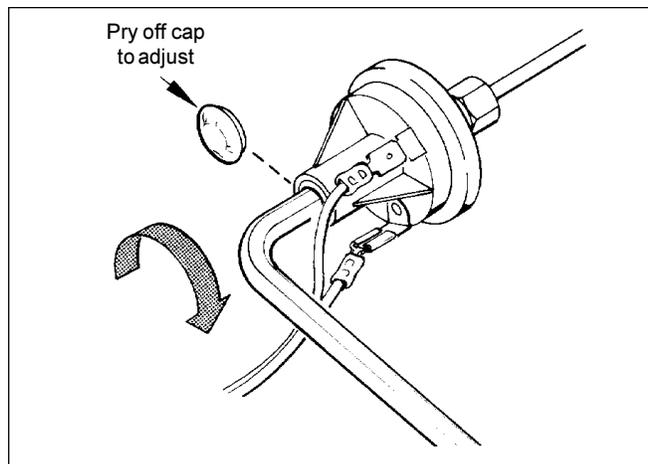


Figure 19. Adjustment of Pressure Switch.

To adjust the pressure switch, proceed as follows (see Figure 19).

The pool filter must be clean before making this adjustment. The heater does not have to be firing.

1. Set the heater control to the "OFF" position.
2. Start the filter pump and confirm by means of an voltmeter that the pressure switch closes (if the switch fails to close, replace it with a switch which has a lower minimum setting).
3. Set the heater control to either 'Pool' or 'Spa'. Heater should start.
4. Pry out the top rubber dirt plug on the pressure switch.
5. Use a 7/32 inch Allen wrench to turn the adjustment screw very slowly clockwise until the heater goes off.
6. Slowly turn the pressure switch adjustment screw **counterclockwise** one-quarter turn. The heater should come back on.
7. Check the adjustment by turning the filter pump OFF. The heater fan will continue to run but the burners should shut off immediately. If they do not, restart the filter pump and repeat Steps 6 and 7. Check the adjustment again.
8. Return the pool temperature control to the desired temperature.

It may be necessary to repeat these steps to get a proper setting. The switch must be set so that the heater will not fire unless the pump is running. If a proper setting cannot be reached, contact the factory service department.

2J-5. Water Temperature Rise

The Laars LX and LT pool heaters have an internal bypass which accommodates a wide range of water flow. The bypass is easily adjustable to change the temperature rise for optimum performance and length of heater life.

The bypass assures constant heat exchanger flow even though flow through the filter system will vary depending on how dirty the filter is.

For most installations, an external bypass valve is not needed in the heater water piping. This is due to the large size of the heater's internal bypass valve. If the pump flow rate is known to significantly exceed 125 gpm (7.9 l/s), an external bypass may be needed to assure proper heater operation.

Water flow should be confirmed upon start-up of the heater and in most servicing situations. If the flow is not normal, corrections must be made to the pool system. Flow is evaluated by determining the water temperature rise through the heat exchanger.

Before checking the temperature rise, make sure that the pool filter is clean. If necessary, clean all components of the filter system. Temperature rise is measured in the outlet of the far-right tubes when facing the inlet/outlet water heater. To measure the temperature rise, turn off the filter pump and remove the plastic plug to the right of, and just below the level of the outlet water pipe. This is mounted flush with the heater jacket (See Figure 20). With the plug removed, install the special thread adapter and "Pete's" plug fitting and insert a pocket thermometer.

The internal bypass can be adjusted by means of a screw on the right hand side of the header. To adjust the temperature rise to within the ranges specified in table 8, proceed as follows.

1. If the piping system has an external bypass valve, close it.
2. Set the heater's control panel to the "Off" position.
3. Start the filter pump.
4. After three minutes, note and record the thermometer reading. This is the pool water temperature.

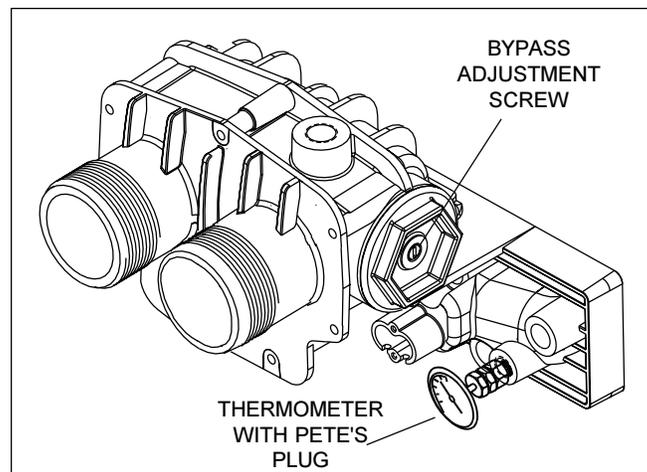


Figure 20. Temperature Rise Measurement

5. Start the heater by setting the control panel to either "Pool" or "Spa". Allow the heater to operate for five minutes or more. Note and record the thermometer reading. Subtract pool water temperature from this reading. This difference is the temperature rise. Refer to Table 8. If your measured temperature rise is within the range designated for your heater, skip steps 6 through 8.
6. Locate the bypass adjustment screw on the right-hand side of the header (see figure 20). Loosen the nut so that the screw can be adjusted. A slight water leak past the nut may be expected. Turn the screw counterclockwise to decrease the temperature rise, and clockwise to increase the temperature rise as needed to achieve the ranges in Table 8. After the adjustment, tighten the nut so that no leaks occur.
7. If the temperature rise is too low and cannot be raised by means of the adjustment screw, the flow is in excess of 125 GPM (7.9 l/s). An external bypass will need to be installed, or if one already exists, open the external bypass valve gradually until the temperature range in Table 8 is achieved.
8. If it was necessary to adjust the external bypass as outlined in step 6, scribe a line on the bypass shaft and case to mark the correct adjustment position. Wire or remove the valve handle to prevent tampering.

Note that temperature rise is somewhat less when a heater is derated for installation at elevations significantly above sea level. For high elevation installations, reduce the numbers in Table 8 by 3% per 1000 feet above sea level.

**Table 8. Water Temperature Rise and Flow Rates
(Measured at Input/Output Header)**

Model	Minimum Temp Rise, °F (C)	Maximum Temp Rise, °F (C)	Minimum System Flow GPM (l/s)
250	24 (13)	28 (16)	30 (1.9)
400	36 (20)	40 (22)	30 (1.9)

In a system without external bypass, it may be necessary to make changes. If temperature rise is too low, a manual bypass must be installed. If temperature rise is too high, there is inadequate flow, possibly requiring a change to the piping system or a larger pump. Before proceeding with either remedy, verify proper heater operation. Low gas input results in low temperature rise and vice-versa. A problem with the heater internal bypass assembly also affects measured temperature rise.

SECTION 3. Operating Instructions

Lighting and shutdown instructions are posted inside the heater.

WARNING

Do not attempt repairs on the gas control or appliance. Tampering is dangerous and voids all warranties.

WARNING

LP GAS: To avoid possible injury, fire and explosion, read and follow these precautions and all instructions on this appliance before starting the heater. LP (propane) gas is heavier than air and will remain at ground level if there is a leak. Before lighting, sniff at ground level. If you smell gas, follow these rules:

1. DO NOT light matches. DO NOT turn electric lights or switches on or off in area. DO NOT use an electric fan to remove the gas from area.
2. Shut off gas at LP tank.
3. Telephone gas company and fire department for instructions. Give your name, address and phone number.

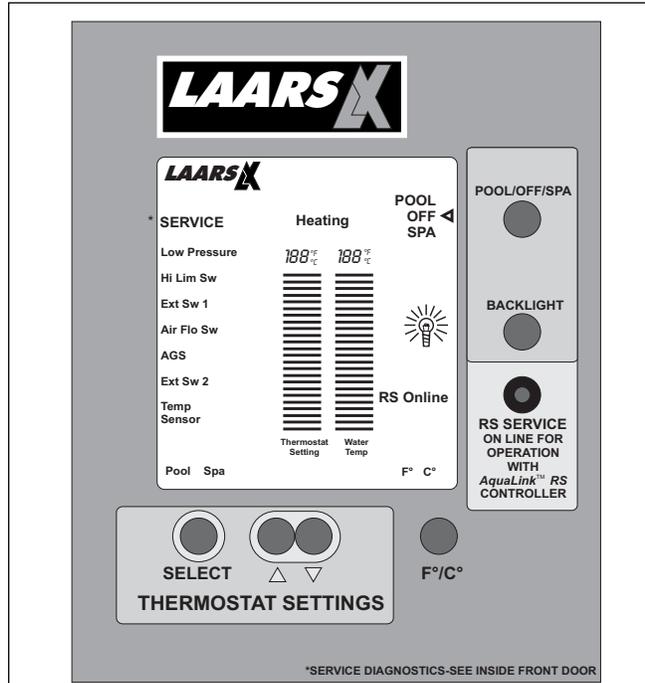
If your LP tank runs out of fuel, turn off gas at the appliance. After the tank is refilled, the appliance must be restarted according to the instructions located on the inside of the door.

3A. Start-Up Procedure

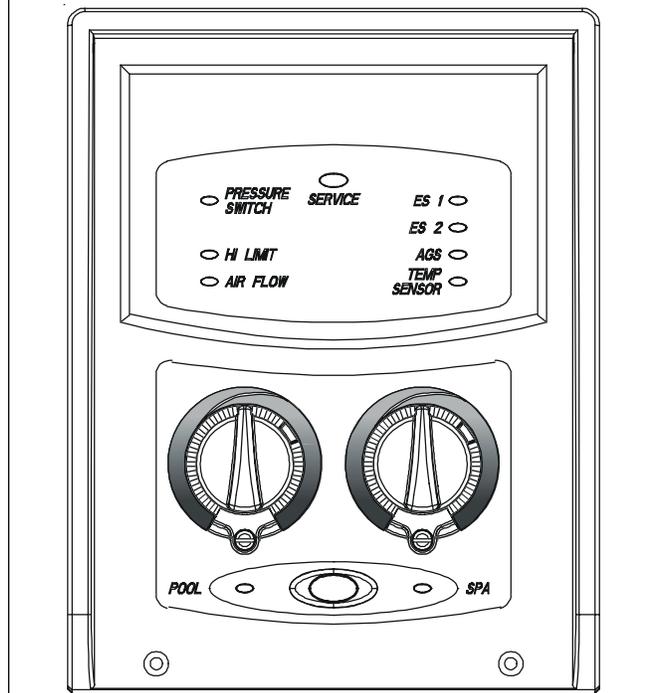
With any new pool or spa installation, run the filter pump with the heater off long enough to completely clean the water. This removes any installation residue from the water. Clean the filter at the end of this operation before starting the heater. Do not operate the heater unless the pool is properly filled with water.

When raising the temperature of water in a cold pool, remove all time clock settings. This lets the filter system and heater operate continuously until the water reaches the temperature setting on the thermostat. When that happens, the heater will shut off automatically, but the filter pump will keep running.

CAUTION
 Keep all objects off the top of the heater, and do not obstruct louvre openings in heater sides. Blocking ventilation air flow may damage the heater and void the warranty.



a) The LX Control Panel Display



b) The LT Control Panel Display

3B. Temperature Controls

The LX and LT heaters have temperature controls that can be set to heat the pool and spa with independent temperature settings. The controls display information to indicate that the heater needs service, and diagnostic information for the service person (see Figure 21). The LX utilizes a liquid crystal display (LCD) screen to display the information while the LT uses indicator lights. The LX Temperature Control also displays pool/spa water temperature and allows for precise temperature settings of the heater.

The controls allow the heater to directly interface with all Waterpik Technologies/Jandy remote control units. The LX offers full remote control capabilities while the LT controls offer limited remote control.

3B-1. Information Displayed

The **Model LX** displays information on a Liquid Crystal Display (LCD) screen. The temperature control displays the water temperature of the pool or spa as well as the desired temperature (thermostat setting) in either Fahrenheit or Celsius. When there is water flowing through the heater (the filter pump is on), the water temperature is displayed in the right-most of two bar graphs in the center of the screen. This bar graph is labeled as 'Water Temperature'. The selected thermostatic setting (either Pool or Spa) is displayed as a bar graph directly to the left of the water temperature bar graph. This bar graph is labeled as 'Thermostat Setting'. Note that when neither thermostat is selected (the heater is in off mode) only the water temperature is displayed.

If there is no water flowing through the heater (the filter pump is off), then only the thermostat setting for the mode selected will be displayed.

The **Model LT** heater does not display water temperatures or thermostatic settings.

When the heater is unable to operate due to a problem, the temperature control will identify which limit is not satisfied. The **Model LX** displays this information on the left side of the LCD under the LAARS LX logo. When the gas heater is firing, the LCD displays 'Heating' under the LAARS LX logo toward the center of the upper portion of the screen.

The **Model LT** displays this information by lighting a set of indicator lights located on the front of the control panel.

On the upper right-hand portion of the LCD screen on the **Model LX** is a selector arrow. Directly to the left of the selector arrow are three positions. They are 'POOL', 'OFF', and 'SPA'. This part of the display indicates the mode of operation in which the heater is set.

The mode of operation of the **Model LT** is shown by two indicator lights labeled "SPA" and "POOL"

Underneath the mode selector on the **Model LX** display screen is a Backlight indicator. To turn the backlight on, press the middle button to the right of the screen, labeled "Backlight".

Figure 21. Temperature Control Panel

Below the Backlight indicator is an RS service indicator, which displays 'RS Online' when the heater is connected to an RS unit.

Directly below the RS Service indicator on the bottom right hand portion of the LCD screen is the Fahrenheit/Celsius temperature unit indicator.

The **Model LT** does not offer these features.

3B-2. Turning the Heater On or Off

When power is supplied to the **Model LX** heater, the control goes into a diagnostic mode for approximately 15 seconds before the heater can be turned to the Pool or Spa mode. During this time the display will show "RS Online". If there is an RS control connected to the heater, it will sense the RS unit and remain online. If the control is not connected to an RS unit the "RS Online" indication on the display will disappear after the initial 15 seconds. When the display shows "RS ONLINE" all functionality of the control at the heater is disabled. The heater functions can be controlled only at the RS unit. However, sensor data is displayed at both the heater and the RS unit.

To temporarily use the heater controls when online with an RS control unit, use a thin object to depress the button marked "RS SERVICE". The "RS ONLINE" indicator will disappear from the heater display. All functionality has now been returned to the control at the heater. In this mode the RS unit has been disabled. To return the functionality to the RS unit, push the button again.

When power is first supplied to the **Model LT** heater it also runs through a circuit board diagnosis to make sure that the control is working correctly. Indicator lights will flash during the 10 second diagnostic sequence.

After the initial diagnostic sequence on the **Model LX**, the heater can be turned to Pool or Spa mode by pressing and releasing the top (mode) button to the right of the LCD screen so that the selector arrow is aligned with either the Pool or Spa setting as seen on the LCD screen.

The **Model LT** heater does not offer the remote control indicator function. To turn the heater on, press and release the button located between the "POOL" and "SPA" indicator lights. Repeat pressing the button to achieve the desired mode of operation, shown by the indicator lights. When neither light is on, the heater is "OFF"

It is now necessary to set the thermostat to the desired pool or spa setting.

3B-3. Setting Pool and Spa Temps, Changing from Fahrenheit to Celsius

The **Model LX** heater displays temperature in Fahrenheit units when powered-up. To switch to Celsius, press the 'F°/C°' button. Once the desired temperature units are selected, the thermostat can be set. The left-most button below the LCD screen, labelled "Select", will select either the Pool or the Spa thermostat when depressed.

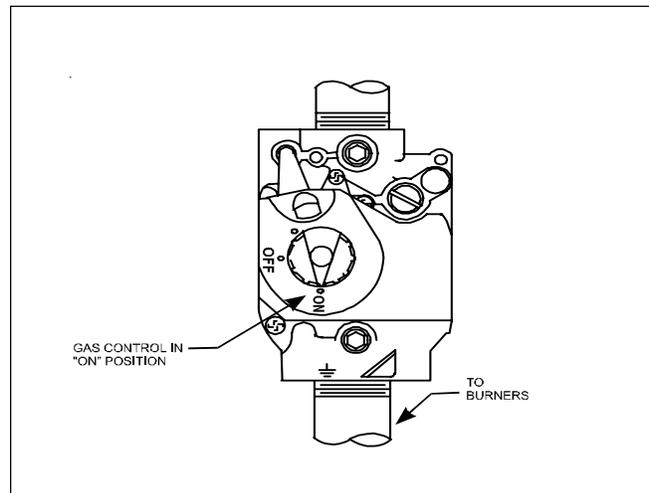


FIGURE 22. GAS VALVE

Either "Pool" or "Spa" will be displayed in the bottom left corner of the LCD screen. The 'up' and 'down' buttons will increase or decrease the thermostat setting.

The **Model LT** heater control is less quantitative and not automatic. The pool or spa water temperature will need to be monitored manually as the control is adjusted. Temperature adjustments are made by turning the knob associated with the mode labeled below it. Turning the knob clockwise will increase the temperature setting. Turning it counterclockwise will decrease the setting. Once the desired setting is achieved, set the temperature lock by loosening the screw located at the bottom of the knob and rotating the dial stop counterclockwise until it contacts the knob. Tighten the screw to lock the stop in place.

When the thermostat setting exceeds the temperature of the pool or spa, the heater will fire. The heater will fire continuously until the pool or spa water is heated to the selected thermostat temperature. The control will not allow the heater to fire again for five minutes even if there is a call for heat, unless the thermostat setting is increased. In this case, the heater will fire within two minutes. This is to prevent short-cycling, and thereby increase the life of the heater.

When the **Model LX** heater is firing, "Heating" will be displayed underneath the LAARS LX logo. Note that in both the "POOL" and "SPA" thermostat settings, the temperature cannot be raised above 104°F (40°C).

Note that if power is momentarily lost, the thermostat settings will remain the same.

Also note that the heater should not be used to maintain water temperatures at or below 70°F (21°C). This will damage the heater.

3B-4. Error Status

If the heater is powered, in either pool or spa mode, and there is a call for heat (i.e. the thermostat setting is higher than the water temperature) the heater will fire. The blower will come on for approximately 30 seconds,

LX/LT HEATER SERVICE DIAGNOSTIC GUIDE

DISPLAY CODE	CAUSE	REMEDY
PRESS SW * <i>(pressure switch)</i>	<ol style="list-style-type: none"> 1. Pump is not running. 2. Low pump pressure. 3. Device connected at “Fireman Switch” terminal block is open. 4. Pressure switch fault. 	<ol style="list-style-type: none"> 1. This is a normal display when the pump is OFF. No Service Required. 2. Clean filter or clear blockage/check position of valves in plumbing system. 3. This is a normal display when a device connected to the “Fireman Switch” operates to open the safety circuit on the heater. 4. Adjust or replace pressure switch. Refer to qualified service personnel.
HI LIM SW <i>(hi-limit switch)</i>	<ol style="list-style-type: none"> 1. Water temperature in heater exceeds the internal limit. 2. Limit switch fault. 	<ol style="list-style-type: none"> 1. Identify and correct cause of overheating. Refer to qualified service personnel. 2. Identify and correct loose connections or replace switches. Refer to qualified service personnel.
EXT SW 1 <i>(extra switch 1)</i>	<ol style="list-style-type: none"> 1. Flue gas vent switch tripped. (manual reset) 2. Vent switch fault. 3. Fusible link fault 	<ol style="list-style-type: none"> 1. Verify proper fan operation. Check for restriction or blockage of flue. Reset switch after problem is corrected. 2. Identify and correct loose connections or replace switch. Refer to qualified service personnel. 3. Identify and correct loose connections or replace fusible link. Refer to qualified service personnel.
AIR FLO SW <i>(air flow switch)</i>	<ol style="list-style-type: none"> 1. Broken, split, pinched or disconnected fan/switch tubing. 2. Fan not operating. 3. Fan running slow or premature fan failure. 4. Air flow restricted at intake or discharge. 	<ol style="list-style-type: none"> 1. Check tubing and replace if necessary. 2. Correct fault or replace fan. Refer to qualified service personnel. 3. Verify proper wiring for 120VAC or 240VAC. Refer to qualified service personnel. 4. Check for proper clearances around heater and for adequate room ventilation if enclosed. Inspect for blockage or restriction at discharge or flue. Refer to qualified service personnel.
AGS <i>(automatic gas shut-down)</i>	<ol style="list-style-type: none"> 1. Oscillating pump pressure. 2. Low gas supply pressure. 3. No flame at burners. 	<ol style="list-style-type: none"> 1. Clean filter or identify and repair cause of pump oscillation. 2. Identify and repair incorrect supply pipe size or pipe line blockage. Refer to qualified service personnel. 3. Identify and correct loose wiring connections, or problems with igniter, flame sensor , gas valve, or ignition control. Refer to qualified service personnel.
EXT SW 2 <i>(extra switch 2)</i>	Not used in this model.	
TEMP SENSOR* <i>(temperature sensor)</i>	<ol style="list-style-type: none"> 1. Faulty wiring or connection 2. Failed Sensor 	<ol style="list-style-type: none"> 1. Inspect Sensor wiring. Ensure sensor is plugged into back of control panel. 2. Replace Temperature Sensor. Refer to qualified service personnel

* **NOTE:** When these messages are displayed, the Controls are still operable and the heater will operate normally when the displayed condition is remedied. Faults (shown above without an asterisk (*)) will shut down the Heater and Control Panel and a flashing “SERVICE” is displayed.

then the ignitor will glow and the gas valve will energize. The water temperature and flue temperature will increase as gas combustion takes place.

The heater will attempt to ignite three times in succession. If, after three attempts for ignition, the heater does not sense the presence of flame, the heater goes into a 'lockout' mode and must be reset to fire. This can be done on both model heaters by pressing and releasing the mode button so that the heater is turned off and then returned to the desired mode.

If the heater cannot fire, a diagnostic message is displayed on the left side of the **Model LX** LCD screen on the control panel, or by a lighted indicator on the **Model LT** control panel. Review the potential causes listed on the opposite page for the code on the display. The unit may require service from a qualified professional serviceman. Contact Waterpik Technologies for your nearest qualified service organization. Be sure to note the serial number and model number before calling. The address of Waterpik Technologies is displayed on the rear cover of this manual.

IMPORTANT: The temperature controls cannot be calibrated in the field. If the temperature control does not work, shut down the heater and replace the temperature control. DO NOT rely on temperature control to shut the heater off. Remove the heater door and turn the main gas valve to OFF.

3C. Lighting and Shutdown

3C-1. Lighting the Heater

WARNING

Do not attempt to light the heater with the door off. Doing so may cause severe bodily injury.

Lighting and shutdown instructions are listed on the label attached to the inside of the heater door and on the following page. Lighting instructions are as follows:

1. Turn off all electrical power to the heater at the main junction box.
2. Remove the heater door and turn the heater gas valve to off.
3. Wait 5 minutes before trying to start the heater.
4. Turn the gas valve control knob counterclockwise to ON (see Figure 22.)
5. Replace the heater door.
6. Turn on electrical power to the heater.
7. Turn on the filter pump.

8. Set the heater controls to the "SPA" position (mode). If the temperature of the water exceeds the thermostat setting it is necessary to increase the thermostat setting to exceed the water temperature. Adjust the thermostat setting to be greater than the water temperature (desired temperature). The ignitor lights the burner when the thermostat calls for heat.
9. Set the time clock, if one is installed.

3C-2. Shutdown

Complete shutdown instructions are as follows:

1. Set both temperature controls to their lowest setting.
2. Press and release the mode button until the indicators show that the heater is off.
3. Turn off all electrical power to the heater at the junction box.
4. Open the heater door and turn the gas valve knob clockwise to off.
5. Shut off the external gas supply valve to the heater.

3D. Water Chemistry

Caution

All auto-chemical feeders must be installed 'downstream' of the heater. A check valve must be installed between the heater and the chemical feeder to prevent chemical corrosion of the heater's heat exchanger.

Do not put any chemicals into the filter skimmer or intake. Concentrated chemicals can damage the heat exchanger and will void the manufacturer's warranty.

3D-1. Pools

The mineral content of swimming pool water increases daily, due to natural evaporation and the addition of sanitizing chemicals. If the mineral concentration in the pool gets too high, the excess minerals will deposit on the walls of the pool, in the filter system, and in the heater tubes. It is important to keep the pH factor of the pool water between 7.2 and 7.6. See Table 6 for guidelines on other chemical measurements.

3D-2. Spas

The proper chemical balance in spa water is more critical than in a swimming pool heater operation. Due to the spa's size, high water temperature, and heavy usage, chemical values in a spa can vary greatly. This chemical imbalance can result in unsanitary water conditions, and affect the life of the heater.

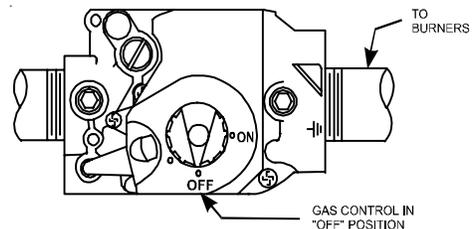
FOR YOUR SAFETY READ BEFORE OPERATING

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

- A. This appliance does not have a pilot light. It is equipped with an ignition device which automatically lights the heater. Do NOT try to light the burners by hand.
- B. BEFORE OPERATING, smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
- WHAT TO DO IF YOU SMELL GAS**
- Do not try to light any appliance
 - Do not touch any electric switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, 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.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to lowest setting and turn appliance switch to "OFF".
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the heater. Do not try to light the burners by hand.
5. Remove the heater door.
6. Turn gas control knob clockwise ↻ to "OFF".
7. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to next step.
8. Turn gas control knob counterclockwise ↻ to "ON".
9. Replace control access panel
10. Turn on all electric power to appliance.
- 11.* Set thermostat to desired setting and switch appliance from "OFF" to either "POOL" or "SPA".
12. If the appliance will not operate, check that the filter pump is on, the filter is clean and water is flowing to the pool. Otherwise, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.



TO TURN OFF GAS TO APPLIANCE

- 1.* Set the thermostat to lowest setting and switch appliance to "OFF".
2. Turn off all electric power to the appliance if service is to be performed.
3. Turn gas control knob clockwise ↻ to "OFF".
4. Replace control access panel.

3D-2a. Spa Water Chemistry

Maintaining safe water conditions in a spa can only be done by regular water changes and the proper addition of sanitizing chemicals. Kits are available from your local pool supply dealer for making the various tests for mineral content. One of these kits will detect copper in the system. This is usually a warning that corrosion is taking place, possibly due to a low pH value combined with other chemistry problems. The condition can be corrected by changing the spa water and closely monitoring the pH factor and chemical properties of the water (see Table 6).

3D-2b. Water Changing

Waterpik Technologies recommends changing of spa water every 60 days if usage is light and every 30 days during heavy usage. Be sure to stabilize the water chemistry after every water change.

3D-2c. Corrosion

The corrosive action of pool/spa water is increased by the following:

1. Low pH - acidity
2. Low Total Alkalinity - bicarbonates
3. Low Calcium hardness - soft water

NOTE: Waterpik Technologies does not warrant heat exchangers damaged by corrosive water.

3D-2d. Testing

Waterpik Technologies recommends that spa owners purchase a test kit and use it regularly. A minimum kit is one which will measure chlorine and pH levels.

The pool/spa owner will find it helpful to have a qualified professional technician perform more extensive chemical testing and water changing on a regular basis.

3E. Spa/Hot Tub Safety Rules

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 temperature 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.
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 102°F (39°C) can cause fetal damage during the first three months of pregnancy (resulting in the birth of a brain-damaged or deformed child). Pregnant women should stick 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°C).
5. Persons with medical history of heart disease, circulatory problems, diabetes or blood pressure problems should obtain their physician's advice before using a spa or hot tub.
6. Persons taking medications which induce drowsiness, such as tranquilizers, antihistamines, or anticoagulants should not use spas or hot tubs.

Prolonged immersion in hot water can induce hyperthermia. Hyperthermia occurs when the internal body temperature reaches a level several degrees above the normal body temperature of 98.6°F (37°C). Symptoms include dizziness, fainting, drowsiness, lethargy, and an increase in the internal body temperature.

The effects of hyperthermia include:

- Unawareness of impending hazard
- Failure to perceive heat
- Failure to recognize need to leave spa
- Physical inability to leave spa
- Fetal damage in pregnant women
- Unconsciousness resulting in a danger of drowning

3F. Swimming Pool Energy Savings Tips

Waterpik Technologies suggests the following to help conserve fuel and minimize the cost of operating your pool heater without sacrificing comfort.

1. Set the heater temperature control no higher than 78°F (26°C). The American Red Cross maintains that the healthiest water temperature for swimming is 78°F (26°C) is. Be certain you are using an accurate pool thermometer, because a variance of 4 degrees, from 78 to 82°F (26 to 28°C) will use as much as 40% more gas.
2. Carefully monitor the water temperature of your pool in the summer time, because heater usage can be reduced due to warmer air temperatures.
3. Find the proper setting on the pool heater temperature control and use the locking ring to discourage further adjustments.
4. Set the filter time clock to start the pump no earlier than 6:00 AM during the pool heating season. This is the time when nightly heat loss stabilizes.
5. If the pool is only going to be used on weekends, reduce the heater temperature control setting by 8 or 10 degrees during the week. It should be reset to the 78°F (26°C) level before expected usage, keeping in mind to allow enough lead time for the water to reach the desired temperature.

6. During the winter shut down the heater by following the lighting and shutdown instructions in Section 3A. When on vacation for longer than a week, make sure the heater is shut off at the temperature control panel.
7. Where possible, shelter the pool from prevailing winds with well-trimmed hedges or other landscaping, cabanas, or fencing.
8. Always use a pool cover when practical. Besides providing a valuable safety feature, a pool cover will reduce heat loss, conserve chemicals, and reduce the load on filter systems.

3G. Seasonal Care

3G-1. Spring and Fall Operation

During periods when the pool is only going to be used once in a while, set the thermostat control to the lowest temperature for both modes. This prevents the pool from becoming "chilled," yet still requires the least amount of time to raise the water back up to swimming temperature.

If the heater is not going to be used for a long period of time, shut it down completely, following the instructions in Section 3C-2 'Shutdown', or the lighting and shutdown instructions posted inside the heater.

3G-2. Winterizing

If you don't plan to use the pool or spa over the winter and your area is subject to freezing temperatures, have a qualified professional technician perform the following steps to protect the heater:

1. Shut off the heater's gas valve according to the lighting and shutdown instructions.
2. Shut off the main supply gas cock outside the heater jacket.
3. Completely drain the heater before the first frost. To drain the heater, remove the drain plug from the right side of the inlet/outlet header (see Figure 23).
4. Return the drain plug to the manifold, but do not tighten.

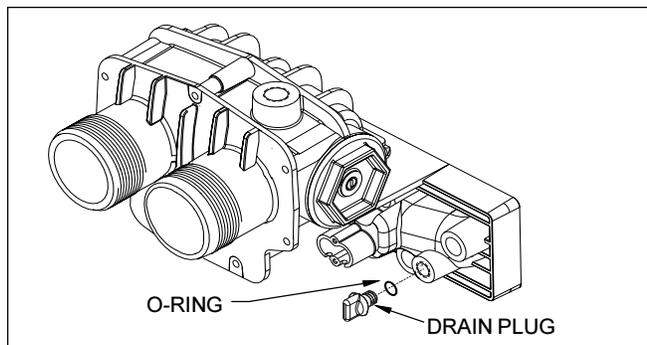


FIGURE 23. Draining the Heater

5. Disconnect the copper tubing from the pressure switch fitting (see Figure 24).
6. Cover the vent grille so that snow will not accumulate in the combustion blower, where it may freeze.

To reactivate the heater in the spring, have a qualified professional technician reassemble the heater as follows:

1. Attach the pressure switch fitting to the copper tubing (see Figure 24).
2. Tighten the drain plugs in the headers.
3. Uncover the vent grille.
4. Turn on the main supply gas cock outside the heater jacket.
5. Turn on the heater according to the lighting and shutdown instructions on the back of the heater door.

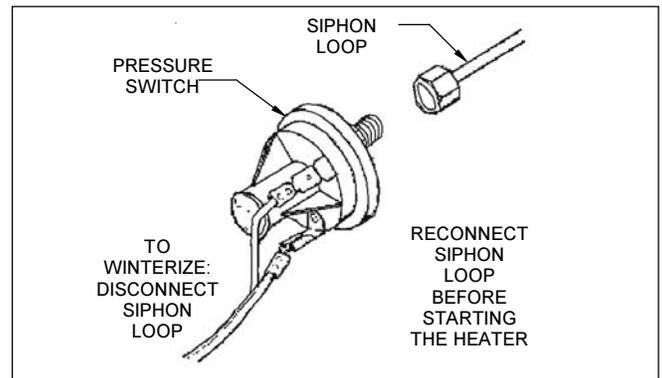


FIGURE 24. WINTERIZING THE PRESSURE SWITCH

3H. Periodic Inspection

⚠ WARNING
 Improper installation or maintenance can cause nausea or asphyxiation from carbon monoxide or flue gases which could result in severe injury, property damage, or death.

3H-1. Owner Inspection

Waterpik Technologies has designed and constructed the LX heater to provide long performance life when installed and operated properly under normal conditions. The following basic guidelines should be maintained:

1. Keep the top of the heater clear of all debris, and make sure there is no collecting of flammable materials, leaves, paper, etc., around or beneath the heater.
2. Keep the pool heater area clean and free of all combustible materials, gasoline and other liquids, and vapors.

3. Do not use the heater if any part has been under water. Immediately call a qualified professional technician to inspect the heater and replace any part of the control system and any gas control which has been under water.
4. Check for spider webs and other debris in the heater and vent outlet — especially at spring start up.

3H-2. Professional Inspection

Inspections performed at least once a year by a qualified professional technician, are required to keep the heater operating safely and efficiently through the years. The following basic safety checks must be performed.

1. Inspect the burners and verify that they are clean.
2. Inspect the fan for damage.
3. Make sure that the pressure switch operates properly by shutting the filter pump off and on a few times. The burner should go off immediately after the pump stops. An ignition sequence should start shortly after the pump is turned back on.
4. Make a visual check of the main burner flame. The flame can be seen in a mirror arrangement held beneath the burners. The flame should be light blue with little or no yellow tips in the flame
5. Inspect the gas and electronic controls, including the following:
 - a. High temperature limit switch
 - b. Water pressure switch
 - c. Exhaust temperature limit switch
 - d. Automatic gas valve
 - e. Fusible Link
 - f. Temperature control
 - g. Control circuit fuse
6. Perform a temperature rise test in accordance with Section 2J-5.

7. If the heater is equipped with a pressure relief valve, clean any accumulated corrosion and make sure that water runs freely through it.
8. Inspect combustion chamber and burner for corrosion and indication of improper operation.
9. Regularly inspect electrical controls for deterioration. Repair and replace as necessary.

NOTE: Keep this manual in a safe place for future reference by you and your professional technician when inspecting and servicing the heater.

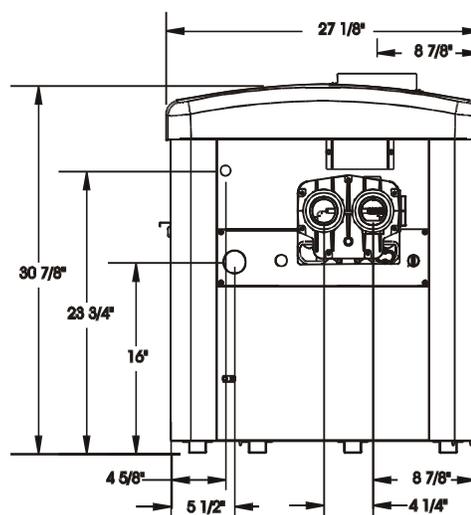
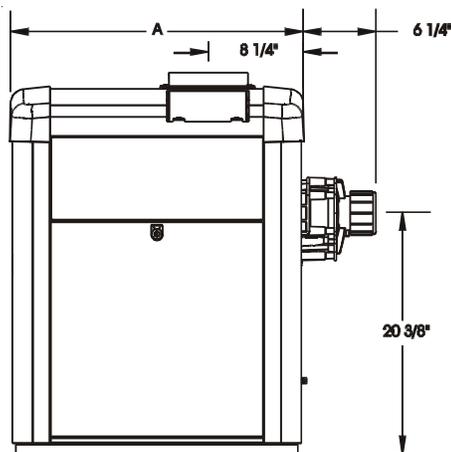
SECTION 4. Specifications and Dimensions

4A. General Information

4A-1 Specifications

1. The Laars LX and LT heaters are design certified by International Approval Services as a swimming pool heater under ANSI Standard Z21.56 for use in the United States and Standard CSA-4.7 for use in Canada
2. The Laars LX and LT are certified for use indoors and outdoors in the United States.
3. The Laars LX pool heater is for use with natural gas or liquefied petroleum gas. Ratings apply to either fuel.
4. The Laars LX and LT high altitude heaters are derated at the factory to compensate for atmospheric conditions at elevations higher than 3000 feet above sea level.
5. The Laars LX and LT require a 120VAC/60Hz or 240VAC/60Hz electrical supply for operation.
6. The maximum working pressure of the Laars LX and LT heaters is 75 psig.

4A-2 Dimensions



Model No.	250	400
Width 'A'	28 1/4"	34 1/4"
Input BTU	250,000	400,000
Shipping Weight	206 lbs	318lbs

SECTION 5. Parts List

5A. General Information

To order or purchase parts for the Waterpik Technologies LX or LT pool/spa heater, contact your nearest Waterpik Technologies dealer or distributor. If they cannot supply you with what you need, contact the Customer Service Manager at Waterpik Technologies.

5B. Part Numbers

Key No.	Description	Model No.	ORDER PART NO:
Water Components			
1	Complete Heat Exchanger (Copper)	250,400	R0326303,05
2	Tube Assy.(Cu), w/ Hdwr & Gaskets	250,400	R0326603,05
3	Heat Exchanger Baffles (Set of ten including end baffles)	250,400	R0334403,05
4	Front Header, w/ Hardware & Gaskets	All	R0326900
5	Rear Header, w/ Hardware & Gaskets	All	R0327000
6	By-Pass Assy, w/ Hardware & Gaskets	All	R0327100
7	Gasket, Bypass Assy	All	R0336700
8	Spring, Bypass	All	R0327200
9	Coupling Nut Kit, w/Compression Ring and Gasket, (Set of two)	All	R0327300
10	Compression Ring w/ Gasket, I/O Header, (Set of two)	All	R0327400
11	Gasket, Header (front or rear)	All	R0327500
12	Header Drain Plug w/gasket (Set of 3)	All	R0335900
13*	Heat Exch. Hardware Kit & Gaskets	All	R0327600
Gas Components			
14	Burner Tray Weldment	250,400	R0327703,05
15	Burners (Ea.)	All	L0052300
16	Manifold, Gas	250,400	R0327803,05
17	Nat. Orifice (0-3K ft) (Set of 20)	All	R0327900
17	Nat. Orifice (3K-6K ft) (Set of 20)	All	R0328000
17	Nat. Orifice (6K-9K ft) (Set of 20)	All	R0328100
17	LP Orifice (0-5K ft) (Set of 20)	All	R0328200
17	LP Orifice (5K-10K ft) (Set of 20)	All	R0328300
18	Anti-Rotation Bracket	All	R0331800
19	Gas Valve Nat w/ Street Ell	All	R0336800
19	Gas Valve LP w/ Street Ell	All	R0336900
Exhaust System			
20	Flue Collector	250,400	R0331703,05
21	Blower Assy.	All	R0329800
22	Gasket w/ Blower Mounting Hardware	All	R0329900
23	Flue Vent	All	R0331500
24	Indoor Vent Collar	250,400	R0331403,05
25	Outdoor Grill	All	R0328500
26*	Vent Hardware Kit	All	R0331600
Electrical			
27	Transformer	All	R0328700
28*	Fuse Assy, In-line	All	R0337100
29	Blower Pressure Switch	All	R0302000
30	Temperature Sensor	All	R0011800

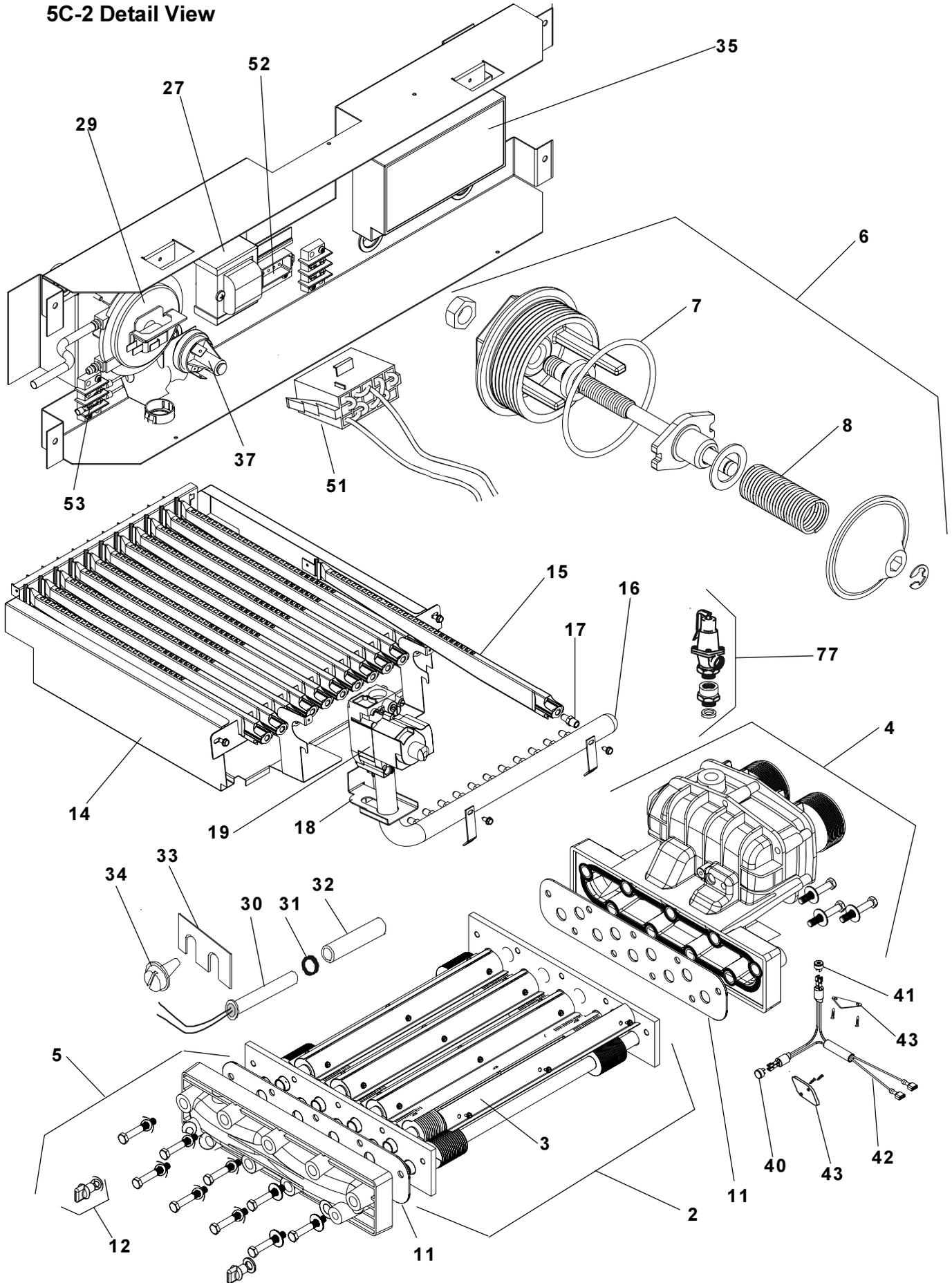
Key ORDER No.	Description	No.	Model PART NO:
Electrical (continued)			
31	Gasket, Temperature Sensor	All	E0116400
32	Plastic Sleeve, Temperature Sensor	All	10444900
33	Retainer Bracket, Temp. Sensor	All	10447300
34	Screw, Retainer Bracket	All	F0009100
35	Ignition Control	All	R0328800
36	Pressure Switch Assy	All	R0334500
37	Pressure Switch, 2 psi	All	R0013200
38	Siphon Loop	All	R0334600
39	High Limits Set	All	R0023200
40	High Limit 135°F	All	R0022700
41	High Limits 150°F	All	R0023000
42	Harness, High Limit Switch	All	R0334700
43	Retainer Plates, High Limit (Set of 2)	All	R0336500
44	Hot Surface Ignitor	All	R0337000
45	Exhaust Temp. Limit Switch	All	R0329400
46*	Wire Harnesses Complete	All	R0329500
47*	Wire Harness, Power Transformer	All	R0330900
48*	Wire Harness, Ignition Control	All	R0331000
49*	Wire Harness, Gas Valve	All	R0331100
50*	Wire Harness, Safety Loop	All	R0331200
51	Wire Harness, 120 Volt Power Plug	All	R0336200
51	Wire Harness, 240 Volt Power Plug	All	R0336300
52	Wire Harness, 15 Pin Connector	All	R0336400
53	Terminal Block for Fireman's Switch	All	R0097800
54	Temperature Control W/ Bezel -LX	All	R0329600
54	Temperature Control W/ Bezel -LT	All	R0350500
55	Flame Sense Rod	All	R0334800
56	Fusible Link	All	R0012200
Jacket Assy.			
57	Door w/ Latch	250,400	R0330003,05
58	Door Latch Assembly w/ Handle	All	R0334900
59	Cover Panel, Raceway	250,400	R0335103,05
60	Panel, Side, Lower (fits left or right)	All	R0330100
61	Panel, Right Side, Upper	All	R0330200
62	Cover Panel, Exhaust Switch	All	R0336600
63	Panel, Left Side, Upper	All	R0335200
64	Cover Plate, I/O Header Side	All	R0335300
65	Cover Plate, Return Header Side	All	R0335400
66	Cover Panel, Left Side	All	R0335500
67	Rear Panel	250,400	R0330303,05
68	Corner Posts	All	R0330400
69	Top Assy.	250,400	R0330503,05
70	Cover, Temperature Control	All	R0330600
71	Combustion Chamber Assy.	250,400	R0330703,05
72	Base Panel	250,400	R0335603,05
73	Igniter Box Assembly	All	R0335700
74	Bracket, Fusible Link	All	R0337200
Optional			
74*	Non Comb. Base	250,400	R0330803,05
75*	Touch-up Paint	All	R0335800
76*	Temperature Rise Measurement Kit	All	R0336000
77	Pressure Relief Valve	All	R0336100

* PARTS NOT SHOWN ON KEY VIEW

NOTES:

- When ordering a kit for a model 250 specify as R#####-03,
When ordering a kit for a model 400 specify as R#####-05,
- All hardware sets contain all pieces necessary for assembly, including gaskets. Not shown.
- Gaskets and hardware are included in all kits that involve the removal of a gasket as part of the procedure to replace a part.

5C-2 Detail View



LIMITED WARRANTY

Thank you for purchasing Jandy® pool and spa products. Water Pik Technologies (manufacturer of Jandy products, including Laars® pool and spa heaters) warrants all parts to be free from manufacturing defects in materials and workmanship for a period of one year from the date of retail purchase, with the following exceptions:

- AquaLink® RS units installed with Jandy Surge Protection Kits will be covered for two years.
- NeverLube® valves are warranted for the life of pool and/or spa on which they were originally installed.

This warranty is limited to the first retail purchaser, is not transferable, and does not apply to products that have been moved from their original installation sites. The liability of Water Pik Technologies shall not exceed the repair or replacement of defective parts and does not include any costs for labor to remove and reinstall the defective part, transportation to or from the factory, and any other materials required to make the repair. This warranty does not cover failures or malfunctions resulting from the following:

1. Failure to properly install, operate or maintain the product(s) in accordance with our published Installation, Operation and Maintenance Manuals provided with the product(s).
2. The workmanship of any installer of the product(s).
3. Not maintaining a proper chemical balance in your pool and/or spa [pH level between 7.2 and 7.8, Total Alkalinity (TA) between 80 to 120 ppm, Total Dissolved Solids (TDS) less than 2000].
4. Abuse, alteration, accident, fire, flood, lightning, rodents, insects, negligence or acts of God.
5. Scaling, freezing, or other conditions causing inadequate water circulation.
6. Operating the product(s) at water flow rates outside the published minimum and maximum specifications.
7. Use of non-factory authorized parts or accessories in conjunction with the product(s).
8. Chemical contamination of combustion air or improper use of sanitizing chemicals, such as introducing sanitizing chemicals upstream of the heater and cleaner hose or through the skimmer.
9. Overheating, incorrect wire runs; improper electrical supply; collateral damage caused by failure of O-Rings, DE grids, or cartridge elements; or damage caused by running the pump with insufficient quantities of water.

LIMITATION OF LIABILITY:

This is the only warranty given by Water Pik Technologies. No one is authorized to make any other warranties on Water Pik Technologies' behalf. **THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY. WATER PIK TECHNOLOGIES EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL, INCIDENTAL, INDIRECT OR PUNITIVE DAMAGES FOR BREACH OF ANY EXPRESSED OR IMPLIED WARRANTY.** This warranty gives you specific legal rights. You may also have other rights which vary by state or province.

WARRANTY CLAIMS:

For prompt warranty consideration, contact your dealer and provide the following information: proof of purchase, model number, serial number and date of installation. The installer will contact the factory for instructions regarding the claim and to determine the location of the nearest designated service center. If the dealer is not available, you can locate a service center in your area by visiting www.jandy.com or by calling our technical support department at (707) 776-8200 extension 260. All returned parts must have a Returned Material Authorization number to be evaluated under the terms of this warranty.

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Jandy®



A Water Pik Technologies Company
6000 Condor Drive • Moorpark, CA USA 93021 • 707.776.8200 • Fax 707.763.7785
480 S. Service Road West • Oakville, Ontario, Canada L6K 2H4 • 905.844.8233 • Fax 905.844.2635

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