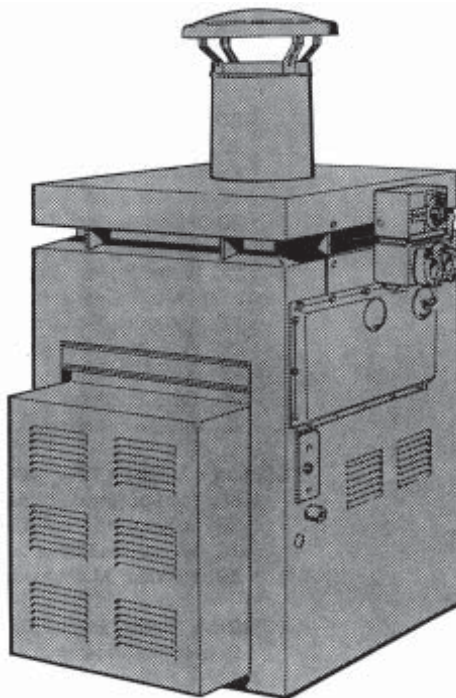


FOR YOUR SAFETY - This product must be installed and serviced by authorized personnel, qualified in pool/spa heater installation. Improper installation and/or operation can create carbon monoxide gas and flue gases which can cause serious injury, property damage, or death. Improper installation and/or operation will void the warranty.

Installation and Operation Manual

XL-3™ Oil-Fired Pool and Spa Heater

Model DP3000
No.2 Fuel Oil Only



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 FUEL

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

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

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SECTION 1. General Information

1.1 Introduction

This manual provides installation and operation instructions for the Laars XL-3 oil-fired pool and spa heater. Read these installation and operation instructions completely before proceeding with the installation. Consult the Jandy factory, or local factory representative, with any questions regarding this equipment.

The Laars XL-3 heater get it's electrical power from an external 115VAC source and provides a thermostat control system for maintaining your pool or spa at a comfortable temperature.

The Laars XL-3 heater is specifically designed for heating fresh water swimming pools and spas, and with proper installation and care, it will provide years of reliable service. Do not use the heater to maintain pool or spa water temperature below 70°F. Do not use it as a heating boiler or general service water heater or to heat salt water. Consult your dealer for the appropriate Jandy products for these applications.

NOTICE TO INSTALLER: Deliver all documents that come with the heater to the pool owner. These include the Owner's Information and Operating Manual and this Installation Manual.

NOTE: Read the Owner's Information Manual before starting this installation, and before starting up the heater the first time.

1.2 Shipping Damage

After unpacking the heater, check for visible damage from shipment mishandling. Remove the inspection plug on the inner panel and use a mechanics mirror to inspect the firebox for cracks or other damage. Water Pik Technologies carefully manufactures, inspects and packages the heater before delivering it to the freight carrier. Immediately, file any claim for damage against the freight carrier.

1.3 Consumer Information and Safety

The Laars XL-3 heater is designed and manufactured to provide many years of safe and reliable service when installed, operated and maintained according to the information in this manual and the installation codes referred to in later sections. Throughout the manual safety warnings and cautions are identified by the "▲" symbol. Be sure to read and comply with all of the warnings and cautions.

▲ WARNING
For your safety, do not store gasoline or other flammable liquids or vapors in the vicinity of this or any other appliance.

Use only #2 fuel oil or #2 diesel fuel. Heavier fuels will not operate satisfactorily, and their use will void the warranty.

1.3.1 Spa/Hot Tub Safety Rules

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

▲ WARNING
The U.S. Consumer Product Safety Commission warns that elevated water temperature can be hazardous. Consult heater operation and installation instructions for water temperature guidelines before setting temperature.

1. Spa or hot tub water temperature should never exceed 104°F (40°C). One hundred degrees Fahrenheit (100°F [38°C]) is considered safe for a healthy adult. Special caution is recommended for young children.
2. The 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 take note!** Soaking in water above 102°F (38.5°C) can cause fetal damage during the first three months of pregnancy (which could result in the birth of a brain-damaged or deformed child). If pregnant women are going to use a spa or hot tub, they should make sure the water temperature is below 100°F (38°C) maximum.
4. The water temperature should always be checked with an accurate thermometer before entering a spa or hot tub. Temperature controls may vary by as much as 4F° (2C°).
5. Persons with a medical history of heart disease, diabetes, circulatory or blood pressure problems should consult their physician before using a hot tub or spa.
6. Persons taking any medication which induces drowsiness (e.g., tranquilizers, antihistamines, or anticoagulants) should not use spas or hot tubs.
7. 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:

- Lack of awareness 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

1.3.2 Swimming Pool Energy Saving Tips

Water Pik Technologies offers the following recommendations to help conserve fuel and minimize the cost of operating your pool heater without sacrificing comfort.

1. The American Red Cross recommends a maximum water temperature of 78°F (25°C). Use an accurate pool thermometer. A difference of 4F° (2°C), between 78°F and 82°F (26°C and 28°C), will use as much as 40% more fuel.
2. Carefully monitor the water temperature of your pool in the summertime. You can reduce heater usage due to warmer air temperatures.
3. Set the pump 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 balances.
4. 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. Reset it to the 78°F (25°C) level a day or so before you plan to use the pool.
5. During the winter or when on vacation for longer than a week, shut down the heater by following the shutdown instructions found on the inside of the heater.
6. Where possible, shelter the pool from prevailing winds with well-trimmed hedges or other landscaping, cabanas, or fencing.
7. 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.

1.4 Warranty

The Laars XL-3 heater is sold with a limited factory warranty. Details are specified on the back cover of this manual and the home owner's guidelines.

Make all warranty claims to an authorized Jandy representative or directly to the factory. Claims must include the heater serial number and model (this information can be found on the rating plate),

installation date, and name of the installer. Shipping costs are not included in the warranty coverage.

The warranty does NOT cover damage caused by improper assembly, installation, operation or field modification. Also, damage to the heat exchanger by corrosive water is NOT covered by the warranty. See Section 8.1 for maintaining proper pool water chemistry.

NOTE: Keep this manual in a safe place for future reference when inspecting or servicing the heater.

1.5 Codes and Standards

The Laars XL-3 pool and spa heater is certified by UL (Underwriters Laboratory) as complying with the latest standard of UL726 "Oil-Fired Boiler Assemblies, Oil-Fired Service Water Heaters and Swimming Pool Heaters", CAN/CSA-B140.12

All Jandy heaters must be installed in accordance with the local building and installation codes as per the utility or authorities having jurisdiction. All local codes take precedence over national codes.

In the absence of local codes, refer to the latest edition of the following national codes for installation:

1. In the United States, "The National Fuel and Gas Code", ANSI Z223.1. Specifically, refer to Part 7, "Venting of Equipment".
2. In Canada, "The Installation Codes for Gas Burning appliances and Equipment", CAN/CGA B149.

Any changes to the heater, gas controls, gas orifices, wiring, draft diverter, or improper installation may void the warranty. If change is required to any of the above, consult the factory.

1.6 Technical Assistance

Consult Water Pik Technologies or your local Jandy distributor with any questions or problems involving the specifications, installation, and operation of your Jandy equipment. An experienced technical support staff is ready to assist you in assuring the proper performance and application of Jandy products. For technical support call the Water Pik Technologies, Technical Service Department at (707) 776-8200 extension 260.

1.7 Materials Installer Must Provide

1.7.1 Materials for All Applications

The following items are needed and are to be supplied by the installer for all XL-3 heater installations:

1. The correct size and length of fuel line to supply fuel from the storage tank to the heater (see Section 4.1 for correct fuel pipe size).

2. A manually operated fuel valve to be installed in the fuel line near the storage tank.
3. A 115V AC power supply and all wire and conduit needed to supply electricity to the heater. A junction box is not needed at the heater, connections are made inside of the heater jacket.

1.7.2 Materials for Special Applications

In addition to the items listed above, the following items are needed for special applications.

1. A factory authorized barometric draft control and any vent pipe needed for indoor installations in the USA and outdoor shelter installations in Canada (see Section 3.2.2). Barometric draft controls are available from any Laars distributor.
2. The appropriate size metal pipe to connect to the inlet/outlet header of the heater. Do not connect any type of plastic pipe directly to the heater.
3. A non combustibile platform for installation on combustibile surfaces (see Section 2.3.3). Non combustibile bases are available from your Jandy distributor.

1.8 Specifications

1.8.1 General Specifications

1. Installation Location:
 Certified for use:
 In the USA: Indoor and Outdoor
 In Canada: Outdoor and Outdoor Shelter
2. Minimum Clearance From Combustible Material:
 See Table 1 in Section 2.3.2
3. Supply Fuel Type:
 Certified for use with:
 #2 Fuel Oil or # 2 Diesel Fuel.
4. Burner Rating:
 315 BTU/Hr
5. Fuel Consumption:
 2.25 GPH (US Gallons per Hour)
4. Water Pipe/Heater Connection:
 1 1/2" Threaded Iron Pipe or
 1 1/4" Unthreaded Iron Pipe or
 1 1/2" Copper Tubing
7. Water Flow Rate:
 Maximum: 60 gpm (228 lpm)
 Minimum: 30 gpm (110 lpm)
8. Working Water Pressure:
 Maximum: 75 psi
9. Exhaust Vent Connection Size:
 Model DP3000 9" Diameter
10. Electrical Supply:
 115 Volts AC, 60 Hertz, 1 Phase.

11. Modification of Heater for High Altitude:
 Adjustment of air shutter to obtain most efficient combustion.
12. Shipping Weight:
 315 lbs.

1.8.2 Dimensions

See Figure 1 for a diagram showing the heater's exterior dimensions and dimensions to critical connections on the heater.

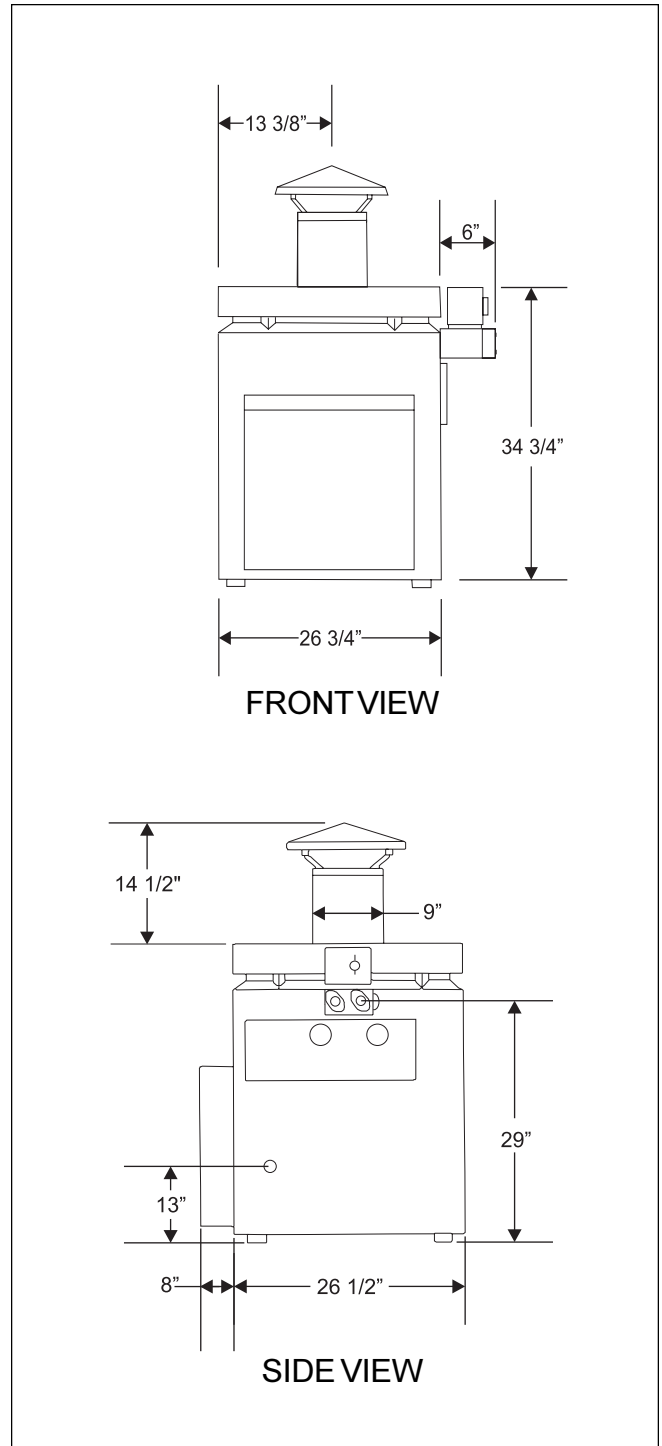


Figure 1. XL-3 Model DP3000 Oil-Fired Heater.

SECTION 2. Installation Instructions

2.1 Introduction

⚠ WARNING

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

⚠ CAUTION

The Laars XL-3 heaters are designed to operate at all altitudes. Adjustments to the air band and end shutter of the burner can be made to compensate for changes in altitude. Contact your Jandy representative or Water Pik Technologies' Customer Service Department for more information.

Install the Laars XL-3 heater and vent systems in accordance with the procedures in this manual, local codes and ordinances, and in accordance with the latest edition of the appropriate national code (see Section 1.5 "Codes and Standards").

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

1. Field assembly (if required)
2. Appropriate site location (clearances) and flooring
3. Sufficient combustion and ventilation air
4. Properly sized fuel line.
5. Proper electrical wiring
6. Adequate water flow

This manual provides the information needed to meet these requirements. Review all application and installation procedures completely before continuing the installation.

2.2. Field Assembly

The Laars XL-3 heater can be installed in a variety of ways, some of them requiring preparation or assembly in the field. The XL-3 is shipped with the inner stack packaged on top of the control panel door in the box with the heater. The inner stack must be assembled and installed before mounting the vent cap or vent pipe. To assemble the inner stack, remove the tape and small envelope from the sheet metal coil. Expand the coil until the holes on each end are aligned. Use the two screws supplied in the small envelope to secure the ends together. Install the inner stack, 7" (18cm) diameter, on the collar of the flue collector before attaching the vent cap (outdoor installation) as shown in Figure 2. The Laars XL-3 heater is also designed for "Indoor" installations in the United States and "Outdoor Shelter" installations in Canada when

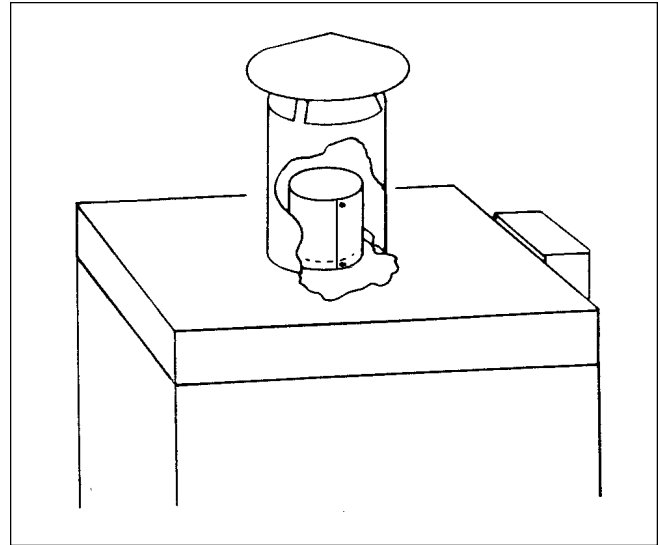


Figure 2. Inner Stack.

equipped with a barometric draft control and the appropriately sized exhaust vent.

Check the Parts List (Section 10.2) of this manual for the correct Jandy vent cap part number. For specific installation information see Section 2.3.5 "Indoor and Outdoor Shelter Installations".

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. See Section 5.4 "Reversible Water Connections" of this manual for instructions.

2.3 Location Requirements

2.3.1 Introduction

⚠ CAUTION

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

The Laars XL-3 heater may be installed indoors or outdoors as outlined in later sections. Location of the heater below *or above* the pool deck affects operation of its water pressure switch. See Section 5.1 water piping for more information about this.

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

All criteria given in the following sections reflect minimum clearances as stated in the national standards. However, each installation must also be evaluated, taking into account the prevailing local

Table 1. Minimum Heater Clearances From Combustible Surfaces

SIDE OF HEATER	INDOOR (OUTDOOR SHELTER) INSTALLATION		OUTDOOR INSTALLATION	
	INCHES	CENTIMETERS	INCHES	CENTIMETERS
BLANK	6	15	6	15
REAR	6	15	6	15
PIPING	24	61	24	61
TOP (CHIMNEY CONNECTOR)	13	33.0	OPEN UNROOFED AREA	
FRONT	24	61	24	61

Note: Clearances listed in Table 1 are manufacturer's tested values. These are given as minimum values. Where local and national codes apply, and values are different than those listed in Table 1, use the greater value to ensure safe operation.

conditions such as wind speed and direction, proximity and height of walls that may block ventilation, and proximity to public access areas.

2.3.2 Clearances

The heater must be placed to provide clearances on all sides for maintenance and inspection. There must also be minimum distances maintained from combustible surfaces (see Table 1).

At least 24" (457mm) access must be available in front of the heater for burner removal.

If the heater is to be installed in a garage, or similar structure, all burners and burner ignition devices must have a minimum 18" (457mm) clearance above the floor.

This heater must be installed at least 5 feet (1.52m) from the inside wall of a pool unless the heater is separated from the pool by a solid fence, wall or other permanent solid barrier.

2.3.3 Flooring

The heater must be installed on a floor of noncombustible construction or on fire-resistant slabs or arches. Noncombustible flooring is defined as flooring material and surface finish not capable of being ignited and burning and with no combustible materials against the underside. Acceptable materials are those consisting entirely of a combination of steel, iron, brick, tile, concrete, slate, glass or plaster. **Do not** install the heater directly on a combustible wood or carpet floor without placing a noncombustible platform between the floor and the heater.

The heater can be installed on a combustible floor if a noncombustible base assembly, available from Jandy, is used. See the Parts List (Section 10) of this manual for the appropriate base part number. **Heaters must never be installed directly on carpeting.**

As an alternative to the Jandy noncombustible base plate, 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 3). If the heater is installed in a carpeted alcove, the entire floor of the alcove must be covered by a noncombustible panel.

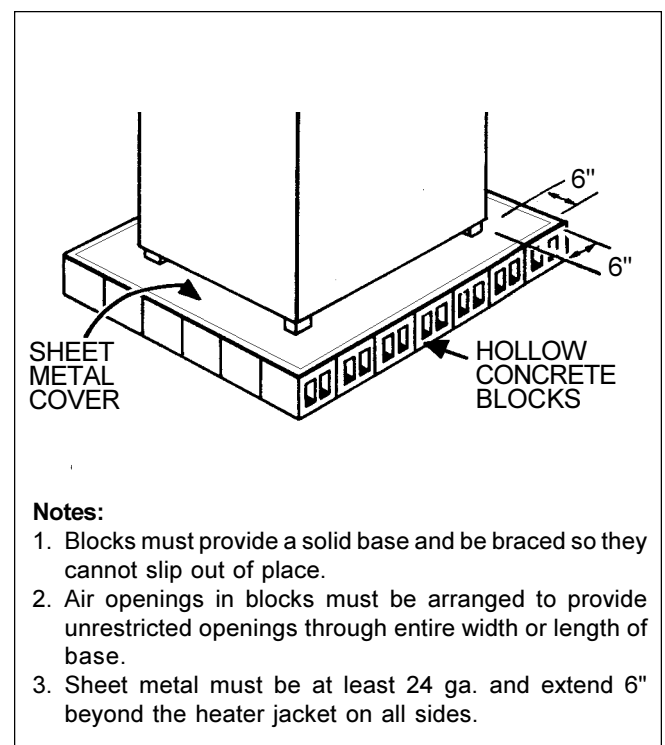


Figure 3. Non-Combustible Platform.

2.3.4 Outdoor Installation

For outdoor configuration, the XL-3 heater must be installed with a factory authorized vent cap installed over the inner stack. See Section 2.2, "Field Assembly" for installation of the inner stack. See Section 10, "Parts List" for instructions on ordering a factory authorized vent cap.

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, glass openings, 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 four (4) feet (1.22 m) horizontally and four (4) feet (1.22 m) vertically between the heater exhaust point and any door, glass opening, or gravity inlet to a building. In Canada, the heater must be installed so that the exhaust point of the heater is at least ten (10) feet (3.0 m) from any building opening (see Figure 4).

WARNING

United States

Do not install the heater with the top of the vent assembly within 4 feet (1.22 m) horizontally and 4 feet (1.22 m) vertically 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.

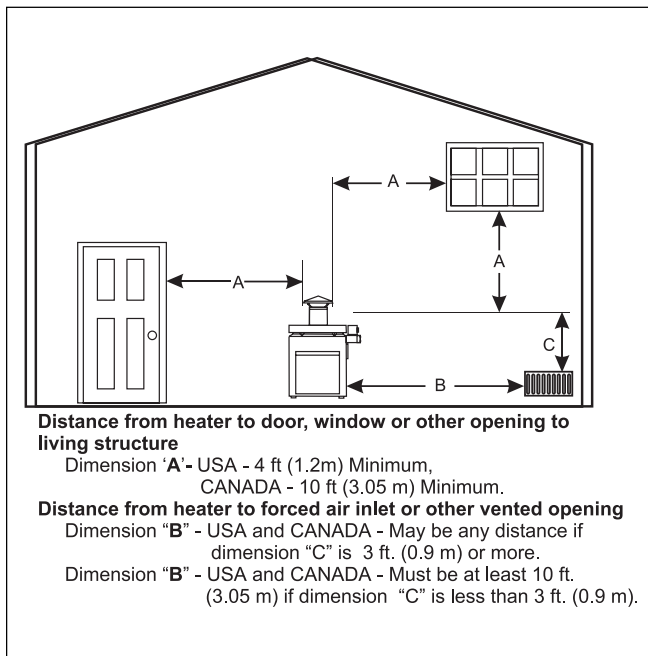


Figure 4. Outdoor Heater Installation.

The top surface of the heater must be at least three (3) feet above any forced air inlet, or intake ducts located within ten (10) feet horizontally.

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. This prevents combustion gases from being diverted into living areas through doors, windows, or gravity inlets.

If the heater is installed close to a structure, protect it from rain water runoff with rain gutters on the roof or other measures. Do not locate the heater near irrigation sprinkler systems that could spray water on it. Water from sprinklers may cause damage to controls and electronic components.

Avoid locations where wind deflection off nearby structures might cause 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).

2.3.5 Indoor and Outdoor Shelter Installations

An outdoor shelter (Canada only) is an unoccupied enclosure which does not communicate directly with occupied areas. All indoor installations and outdoor shelter installations require the addition of a factory approved barometric draft control. The barometric draft control must be installed without modification and in accordance with the instructions provided by the manufacturer.

These codes, standards and Water Pik Technologies require that the heater be properly vented as outlined in this manual. Proper ventilation of exhaust and combustion air are essential for the safe and efficient operation of the heater (See Section 3 "Venting").

2.3.5.1 Installing a Barometric Draft Control

A barometric draft control must be installed between the heater and the vent pipe with a minimum 13 inch clearance between the chimney connector and any combustible material. Observe NFPA Standard No. 31 and all national and local ordinances. See Section 3 "Venting" for the proper location of the barometric draft control when constructing the stack. For more information on the correct barometric draft control for your heater, contact your local Jandy Pool Products dealer.

SECTION 3. Venting

3.1 Combustion Air Supply

The heater location must provide sufficient air supply for proper combustion and ventilation of the surrounding area as outlined in the latest edition of ANSI standard Z223.1 or in Canada, CAN/CGA-B149.1 or .2, and any local codes that may be applicable.

In general, these requirements specify that the room in which a heater is installed should be provided with two permanent air supply openings; one within 12 inches (305mm) of the ceiling, the other within 12 inches (305mm) of the floor. All indoor installations must have openings to outside air for combustion, ventilation, and dilution of flue gases from inside the building (see Figure 5 and Table 2). Water Pik Technologies does not recommend indoor installations that do not provide combustion air from outside the building.

All outdoor shelter installations (Canada only) must have uninterrupted openings to outside air for combustion and ventilation. The installation must be in accordance with the latest edition of CAN/CGA B149. Water Pik Technologies does not recommend outdoor shelter installations that depend on internal air for combustion. Combustion air should be ducted to the heater from outside the structure.

Outside Air Supply: When combustion air is supplied directly through an outside wall, each opening should have a minimum free area of one square inch per 4,000 BTU/Hr (1.2kW) input of the total input rating of all appliances in the enclosed area. If air is provided through horizontal ducts, each opening and

duct must provide one square inch of flow area for each 2000 BTU/Hr (0.6 kW).

The XL-3 model DP3000 has an input rating of 315,000 BTU/Hr. The vent opening requirements for the XL-3 heater are summarized in Table 2. Note that the areas specified are net free areas and should be increased when the openings are covered by screens, louvers, grills or other protective covers (see Figure 5 and Table 2 notes).

Note: In Canada, follow Canadian Standard, CAN/CGA-B149.1, .2 or local codes.

Table 2. Air Openings to Outside.

Required Net Free Open Area* for Combustion Air Openings				
	Direct from outside		Duct from outside	
Model	in ²	(cm ²)	in ²	(cm ²)
DP3000	79	(510)	158	(1020)

*Area indicated is for one of two openings; one at floor level and one at the ceiling, so the total net free area would be double the figures indicated. For special conditions, refer to NFPA54 ANSI Z223.1. In Canada refer to the National Standard CAN1-B149.1 or .2 which differs from this table.

Note: If using screens and/or metal louvers, compensate by adding 50% additional area to each opening

If using wood louvers each opening must be at least four times the area indicated in the table above.

Exhaust Fans or Vents: Any equipment which exhausts air from the room where the heater is installed can deplete the combustion air supply or reverse the natural draft action of the venting system. This could cause flue products to accumulate in the room. Additional air must be supplied to compensate for such exhaust.

The information in Table 2 is not applicable in installations where exhaust fans or blowers of any type are used. Such installations must be designed by qualified engineers.

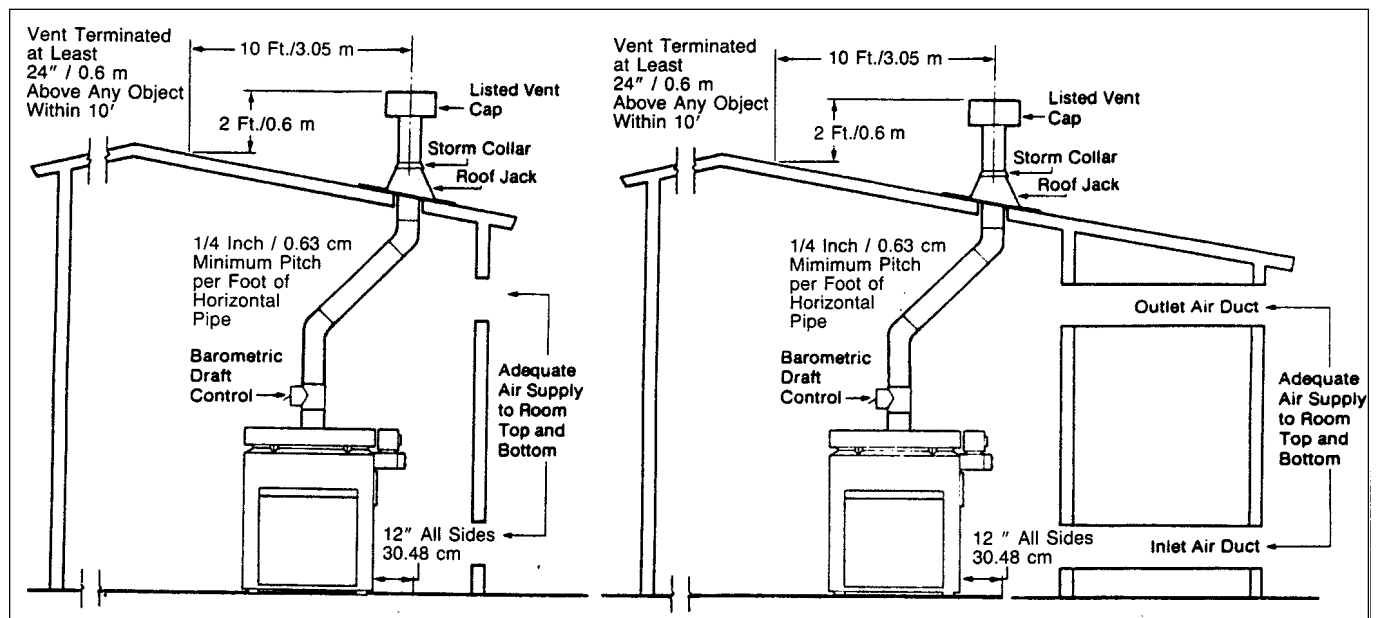


Figure 5. Combustion Air, Indoor Installation.

The heater must be completely isolated and protected from any source of corrosive chemical fumes such as those emitted by trichlorethylene, perchloroethylene, chlorine, etc.

⚠ WARNING

Do not store any chemicals, cleaners, or other corrosive material near combustion air openings or in the room. Avoid locating dryer vents in the vicinity of combustion air openings. Failure to prevent corrosive materials from mixing with combustion air can result in reduced heater life and unsafe heater operation.

3.2 Exhaust Venting

The XL-3 heater has a vent collar fitting as part of the heater's top panel. The diameter of the vent collar and, thus, the minimum diameter of the vent pipe to be used is 9 inches. **The only correct procedure for vent pipe sizing is to do so in accordance with these instructions and the applicable installation code as stated in the following "Danger" warning.**

⚠ 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.

3.2.1 Outdoor Installations

For outdoor installations, a factory authorized vent cap with a 9 inch diameter must be installed and secured to the vent collar fitting on the top panel of the heater. Exhaust venting considerations will determine the placement of the heater (See Section 2.3.4). If the heater cannot be placed so as to meet the requirements stated in Section 2.3.4, a vent pipe may be added to the heater to move the exhaust vent opening to a position that complies with the requirements. In all cases, vent pipes must be of the same diameter as the exhaust outlet of the heater. Approved vent pipes may be obtained through your Jandy distributor.

3.2.2 Indoor and Outdoor Shelter Installations

All indoor installations and outdoor shelter installations require the addition of a factory approved barometric draft control. The barometric draft control must be installed without modification.

All vent installations must be made in accordance with all local, state or provincial codes and with:

1. Chapter 7, "Venting of Equipment" of the national Fuel Gas Code, ANSI 223.1 latest edition, or the applicable provisions of the local building codes.
2. In Canada, CAN/CGA B149.1 or .2.

Avoid terminating heater vents near air conditioning or air supply fans. The fans can pick up exhaust flue products from the heater and return them inside the building, creating a possible health hazard.

Do not locate the vent terminal where flue products could strike against building materials and cause degradation.

Vent opening should be well away from trees or other obstructions that would prevent free air flow to and from vent terminal. Do not terminate the vent under decks, stairways, or carports.

Be sure to support all venting so that connections will not separate and so that the weight of the vent pipe does not rest on the heater vent collar. All connections should be made with rustproof sheet metal screws. Do not weld or fasten the vent pipe to the heater vent collar. The heater top must be easily removable for normal heater service and inspection.

The vent collar outlet is to be connected to an unobstructed barometric draft control and vent pipe of the same diameter, terminating in a chimney or directly outside the building. The vent must terminate at least two (2) feet (0.6 m) above the highest point of the roof or other object that is within ten (10) feet (3.0 m) of the vent termination. The vent pipe must have a listed vent cap which allows a full equivalent opening for flue products (see Figure 5).

Install all venting as specified in the latest edition of the National Fuel Gas Code ANSI Z 223.1 or in Canada CAN/CGA-B149.1 and B149.2

Run the vent pipe as directly as possible with minimum turns. Never use a vent smaller than 9" (23cm). On lateral runs, maintain a minimum pitch of 1/4" (.6cm) per linear foot. If a chimney is used, the total equivalent straight length of flue piping between the heater and the chimney should not exceed 75% of the vertical height of the chimney above the flue pipe connection. The chimney should be at least 9" (23cm) diameter. Maintain adequate clearances between the vent pipe and combustible materials. Check local codes and the vent manufacturer's instructions for proper clearances. The 7" (18cm) dia. inner stack must be in place.

Any change in the amount of draft in the combustion chamber can affect the flame characteristics. An approved barometric draft control must be used on all indoor installations to maintain a clean and consistent flame (see Figure 6). When the system is properly adjusted, the pressure in the stack below the draft control will be approximately minus .03" W.C. If this draft pressure cannot be achieved, the chimney is too short or too small. Take corrective action.

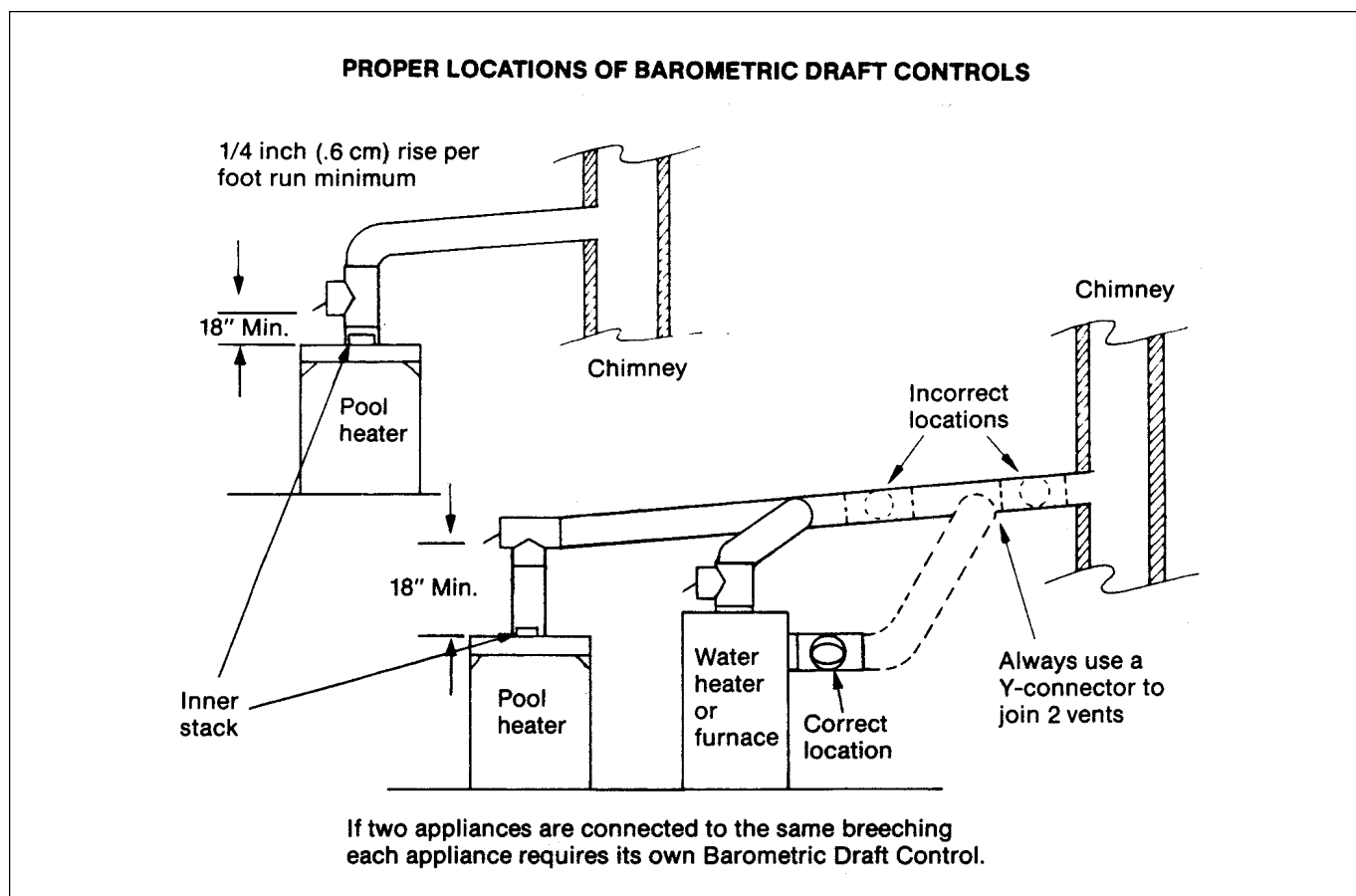


Figure 6. Venting, Indoor Installation.

Avoid locating the chimney termination in a location susceptible to downdraft conditions, or near ventilation inlets to the building.

When venting multiple appliances through one common duct, each appliance must have its own barometric draft control (see Figure 6). Refer to ANSI Z223.1 or, in Canada, to CAN/CGA B149.1 or 2 for more information on multiple venting.

SECTION 4. Fuel Connections

4.1 Fuel Supply and Piping

Review the following general instructions before continuing the installation.

⚠ WARNING

The Laars XL-3 pool and spa heater was designed for use only with #2 fuel oil or #2 diesel. **DO NOT ATTEMPT TO CONVERT THIS HEATER FOR USE WITH ANY OTHER TYPE OF FUEL.**

1. Fuel piping installation must be in accordance with all local or national codes that apply. Local ordinances take priority over national codes.

2. Check the fuel supply to be sure that only #2 fuel oil or #2 diesel fuel will be used to supply the heater. Laars XL-3 heaters, as shipped from the factory, are certified to operate at sea level but the burner air shutter can be adjusted to operate the heater efficiently at high altitudes
3. Use the figures in Table 3 to size the fuel inlet piping from the fuel storage tank to the heater. Check all local codes for compliance before installing the heater.
4. Always install the fuel filter provided with the heater in the fuel inlet pipe just outside the heater jacket.
5. Install an approved shutoff valve at the fuel storage tank for service and safety.
6. Before operating the heater, test the complete gas supply system and all connections for leaks.

All XL-3 heaters are equipped with two-stage fuel units. This enables the heater to be connected with either a single pipe or a two pipe fuel supply system. In locations where the fuel storage tank is above the level of the heater inlet, a single pipe system may be used. Water Pik Technologies recommends a two-pipe system, with a supply line and a return line between the heater and the tank (see Figure 7), for all

other installations. When using a two-pipe system, install the bypass plug in the fuel unit. The plug is shipped in the small plastic bag attached to the oil burner. The location for the plug is shown on the decal on the end of the fuel unit. Remove the large hex-head fitting and insert the plug using an Allen wrench. Check the instructions attached to the fuel pump for proper fuel connections. Compression fittings are not recommended.

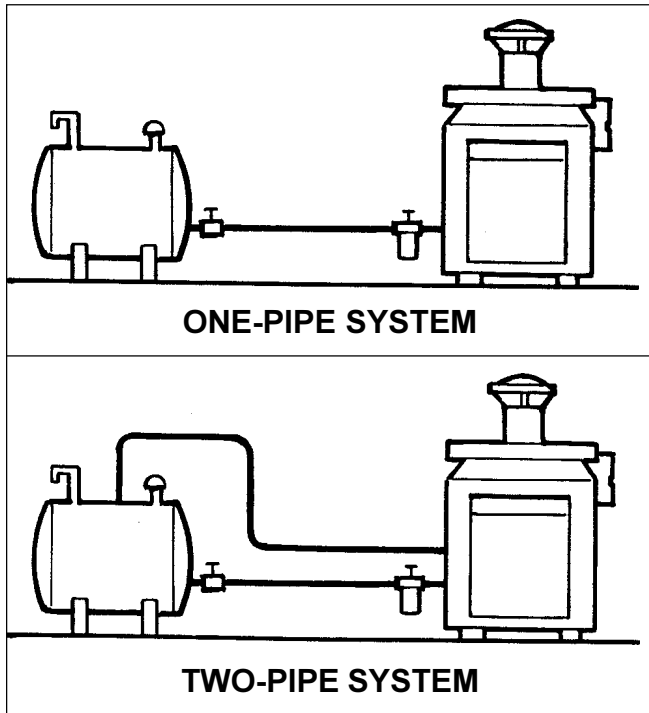


Figure 7. One-Pipe and Two-Pipe Systems.

See Table 3 for correct fuel line sizes. NEVER USE TUBING SMALLER THAN 3/8" (1cm).

Water Pik Technologies provides an oil filter with the XL-3 heater. Install this filter using the fittings provided for convenient servicing of the oil burner and filter (see Figure 8). Post a notice near the heater stating filter service frequency.

Provide a code approved, high quality shutoff valve at the oil supply tank.

Table 3. Fuel Line Sizes.

Lift From Bottom of Storage Tank to Fuel Pump on Heater	Total Tubing Length Allowed Using 3/8" dia. Pipe	Total Tubing Length Allowed Using 1/2" dia. Pipe
0 ft. (0.0m)	68 ft. (20.7m)	100 ft. (30.5m)
2 ft. (0.6m)	63 ft. (19.2m)	100 ft. (30.5m)
4 ft. (1.2m)	58 ft. (17.7m)	100 ft. (30.5m)
6 ft. (1.8m)	53 ft. (16.2m)	100 ft. (30.5m)
8 ft. (2.4m)	48 ft. (14.6m)	100 ft. (30.5m)
10 ft. (3.0m)	42 ft. (12.8m)	100 ft. (30.5m)
12 ft. (3.7m)	37 ft. (11.3m)	100 ft. (30.5m)
14 ft. (4.3m)	32 ft. (9.8m)	100 ft. (30.5m)
16 ft. (4.9m)	27 ft. (8.3m)	100 ft. (30.5m)
18 ft. (5.5m)	22 ft. (6.7m)	88 ft. (26.8m)

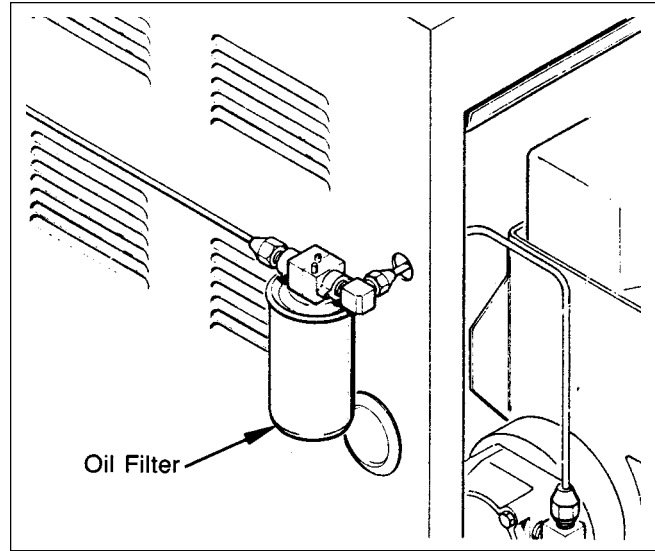


Figure 8. Oil Filter Installation.

SECTION 5. Water Connections

5.1 Water Piping

Figure 9 illustrates typical piping for pool equipment.

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 (Section 7.6) 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. Water Pik Technologies cannot be responsible for such water loss or flooding or the damage caused by either occurrence.

5.2 Check Valve Installation

For normal installations, do not install a shutoff valve or any kind of variable restriction in the water piping between the heater outlet and the pool/spa.

Install a check valve if there is any chance of back-siphoning when the pump stops. Do not install any other valve in the piping between the heater outlet and the pool, unless it is being used as a diverter valve. For special installations such as water connections below the water level of the pool, or for other questions contact the Water Pik Technologies Technical Service department at (707) 776-8200 ext. 260.

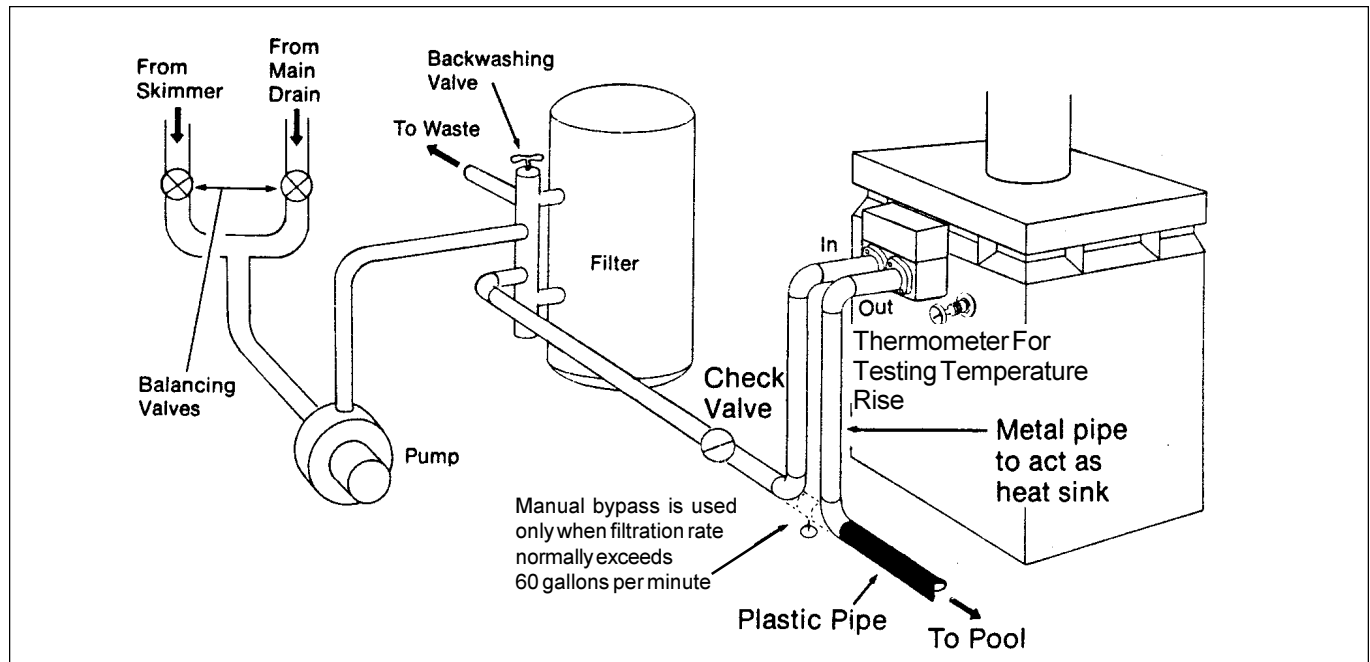


Figure 9. Water Piping.

5.3 Automatic Flow Control Valve

The inlet/outlet header of the XL-3 heater comes equipped with an automatic flow control valve. The automatic flow control valve maintains the proper flow through the heater at rates up to approximately 60 Gallons Per Minute (GPM) (227 liters per minute [LPM]). If the filter system flow rate is higher than approximately 60 GPM (227 LPM), install a manual bypass valve (see Figure 9), then perform a temperature rise test (see Section 7.7) and adjust the flow using the bypass valve until the proper temperature rise is obtained.

5.4 Reversible Water Connections

The XL-3 heater is shipped with water connections on the right side, but changing the connections to the left side could simplify the installation or improve access for service and maintenance. Make the change before locating and connecting the heater. This procedure for reversing the connections involves removing the heat exchanger and reinstalling it turned 180° from its original position. Some of the heater wiring and control components must be relocated, so this procedure must be done only by a qualified 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, the gas supply and water supply have been turned off before starting the procedure.

Follow these step-by-step instructions and Figures 10 and 11 to reverse the heat exchanger:

1. Remove the control compartment door.
2. Remove the chimney cap assembly, or barometric draft control if one is installed, and the inner stack (1).
3. Remove the eight screws (2) securing the top assembly and lift off.
4. Lift out the flue collector assembly (3).
5. Lift off both heat exchanger end baffles (4).
6. Remove the siphon loop cover (5) located on the right side of the heater under the In-Out header.
7. Remove both gap spacers (6).
8. Disconnect the siphon loop from the header (7).
9. Remove both drain extensions (8) (one at each side of the heat exchanger) and the 1/4" plug (9).
10. Carefully remove the insulation at each corner of the heat exchanger; it will be reused. Remove the four hold-down screws (10).
11. Unplug the electrical connector at the switch box inside the control compartment (11). At the other end of the conduit, loosen the brass compression fitting one or two turns. Rotate the conduit assembly and lay it on top of the heat exchanger.

WARNING

The heat exchange is heavy. FOR YOUR SAFETY it may be necessary to have help lifting the heat exchange out of the heater and replacing it.

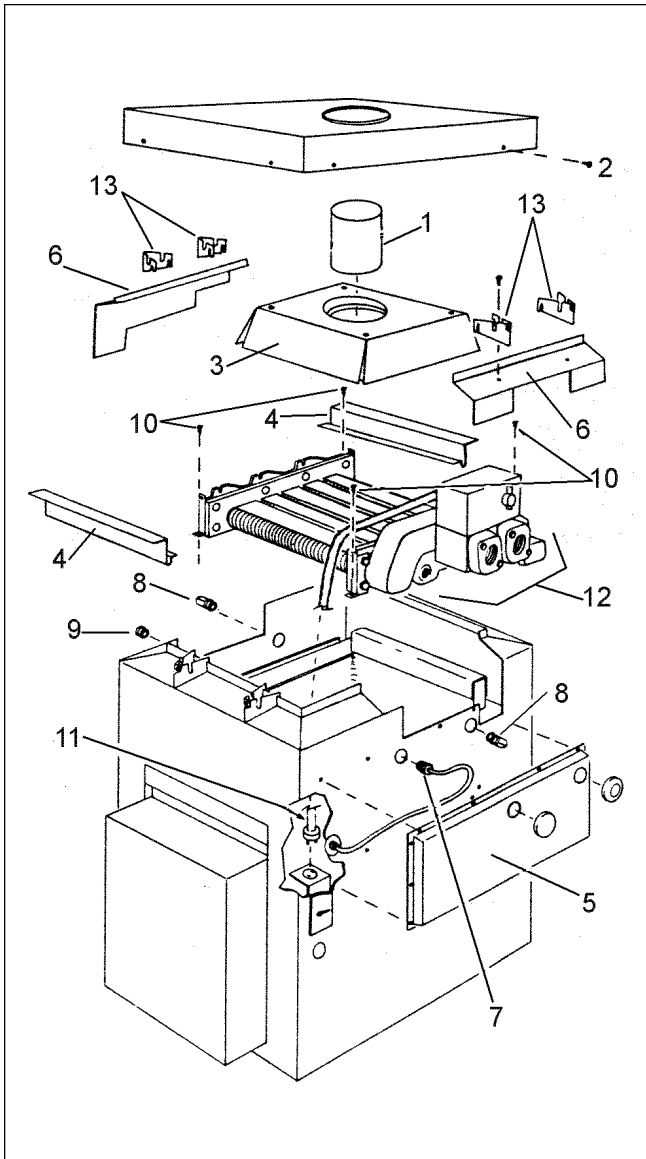


Figure 10. Heat Exchanger Reversal.

12. Lift out and rotate the heat exchanger (12). Make sure the insulation strips that were under the header bars stay in position.
13. Rotate the conduit assembly and attach it to the switch box (11). Tighten the compression nut on the other end.
14. Reinstall the screws (10) through the hold-down clips at each corner of the heat exchanger. Put the insulation back in the corners.
15. Reinstall the drain extensions (8) and 1/4" plug (9) in the positions shown in Figure 5.
16. Straighten the siphon loop tubing (7) and install it in the header at the original position of the 1/4" drain plug (see Figure 5).
17. Remove the vent blades (13) from both gap spacers. Reinstall the vent blades using the previously unoccupied holes in each of the gap spacers.

18. Replace the gap spacers (6) on the opposite side of the heater from their original position.
19. Reinstall any previously removed rubber grommets and replace siphon loop cover (5).
20. Replace the heat exchanger end baffles (4).
21. Reinstall the flue collector assembly (3).
22. Replace the top assembly and fasten it in place with the eight screws (2) previously removed. Install the inner stack
23. Reinstall the inner stack (1). Install the chimney cap assembly, or barometric draft control if one was removed.

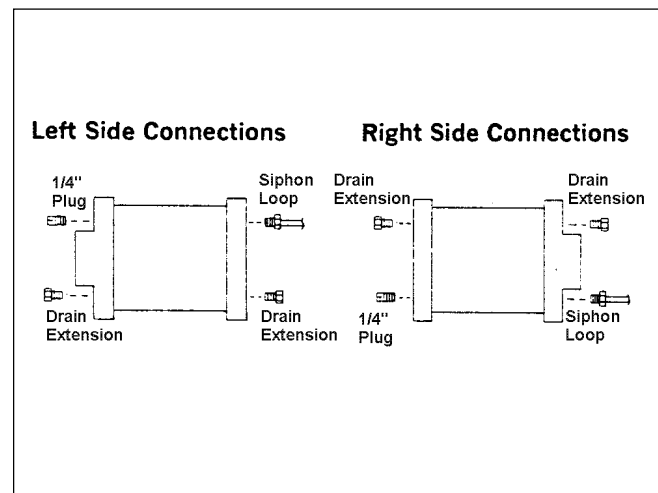


Figure 11. Connection Locations.

5.5 Connections at Heater

Connect the inlet and outlet piping to the universal flange couplings on the heater as shown in Figure 12. The inlet and outlet ports on the heater are clearly marked with arrows on top of the control cover.

The flanged couplings accept either threaded iron pipe, 1-1/2" NPT, unthreaded 1-1/4" iron pipe, or 1-1/2" copper tubing (see Fig. 12).

Connect the pool heater between the pump and filter and the pool or spa. If the system flow rate exceeds 60 gpm (227 lpm), install a manual bypass valve between the heater inlet and outlet (see Figure 9). If the flow rate is below 60 gpm (227 lpm), the automatic, built-in bypass valve will maintain the proper flow through the heater.

If a manual bypass is required, see section 7.6 of this manual for the proper procedure for adjustment.

Install a check valve and heat sink pipe in the heater inlet if any part of the piping or filter system uses plastic materials (see Figure 9).

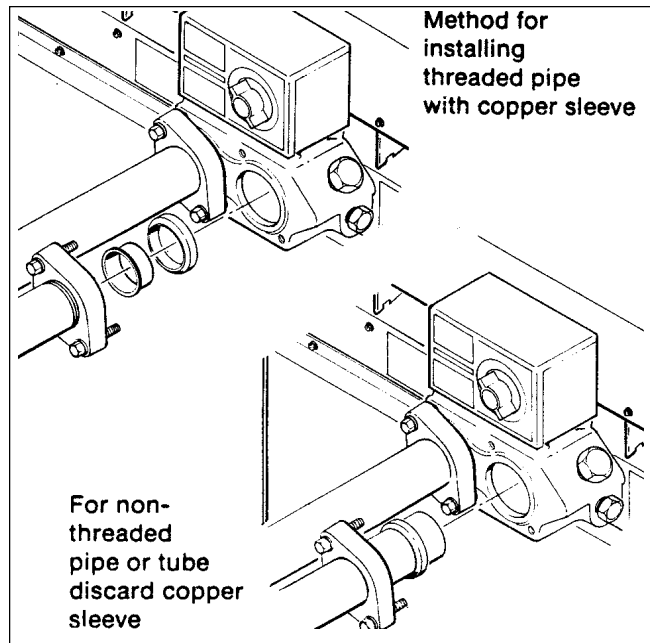


Figure 12. Water Connections.

5.6 Pressure Relief Valve

A pressure relief valve (PRV) is recommended in all installations, and 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 furnished with the heater. Check local building and plumbing codes to determine if a pressure relief valve is required. An appropriately rated relief valve is required for protection of the filter system if there is a shut-off valve installed between the heater and the pool.

The working pressure of the XL-3 heater is 75 psig. However, the pressure rating of the valve should be at or below the lowest working pressure of any component in the system. The threads on the PRV mount must be 3/4" NPT or a 3/4" NPT adapter may be used as long as the inside diameter of the adapter is not less than the inside diameter of the PRV mount. Any pressure relief valve installed must comply with provisions of the standard described in ANSI Z21.22 for the United States or CAN1-4.6 in Canada. If a pressure relief valve is not required, leave the standard 3/4" brass plug in place.

To install a pressure relief valve, do the following:

1. Remove the 3/4 inch plug from the side of the inlet/outlet header (see Fig. 13).
2. Mount the PRV directly to the inlet/outlet header by threading it into the hole.
3. 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 working pressure of the XL-3 heater is 75 psig.

5.7 Auxiliary Components, Chlorinators, Ozone Generators, and Sanitizing Chemicals

The XL-3 heater is manufactured with materials that are not compatible with high concentrations of ozone, chlorine, bromine, or other sanitizing chemicals. Heater damage caused by excessive chemicals or improper ozonization is not covered by the Jandy warranty. Be sure to adhere to the following:

- When ozone is injected upstream of the heater, install an offgas mixing chamber, or an ozone bypass system between the heater and the ozone injector to prevent ozone and air from entering the heater.
- When chemical feeders are used, plumb the feeder downstream of the heater and at a lower position than the heater outlet. Install an in-line check valve between the heater and the feeder to prevent chemicals from siphoning into the heater after the pump shuts off. A minimum of 18" is required between the heater and the check valve.
- Wire the electric chlorinator so it cannot operate unless the filter pump is running. If the chlorinator has an independent clock control, synchronize the filter pump and chlorinator clocks, so the chlorinator only operates during the filter cycle.
- Never deposit chemicals directly in the pool skimmer.

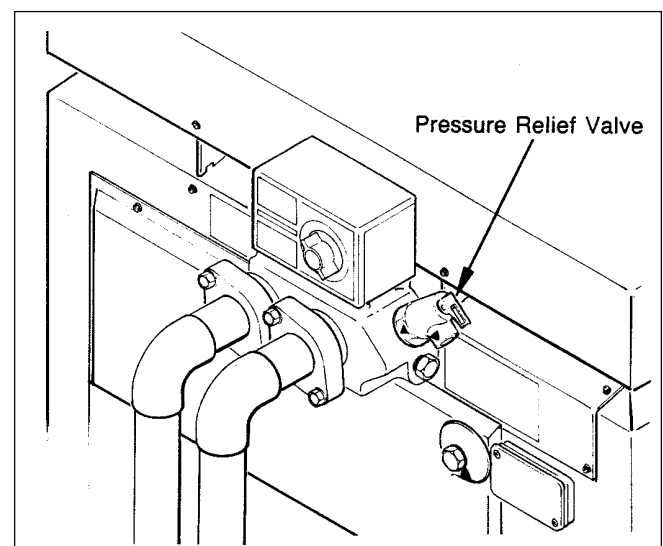


Figure 13. Pressure Relief Valve.

SECTION 6. Electrical

CAUTION

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

6.1 General Information

Wiring connections must be made exactly as shown in the wiring diagram found on the inside of the heater (see Figure 14). The heater must include a definite means of grounding. There is a bonding lug on the right side of the heater, where a bond wire must be attached.

6.2 Main Power

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.

The heater comes factory-wired intended for use with 115 VAC, 60 Hz, single phase field electrical supply (voltage may vary by $\pm 10\%$). Do not attempt to connect the heater to any other type of electrical source. Doing so will damage the heater and void the warranty. Electrical connections must be done by a certified electrician only, as with all wiring.

CAUTION

Do not provide power to the heater from the high voltage side of a time clock or pump relay. Doing so may cause damage to the heater or surrounding plumbing.

To wire the Laars XL-3 heater to a 115V/60 Hertz (Hz) electrical source:

1. Remove the door of the heater.
2. Remove the screws that hold the connection box cover and remove the cover.
3. Connect the wires from the power source to the leads on the right side of the heater in the connection box. Connect the ground wire to the ground screw at the bottom of the connection box that is labeled for that purpose.

NOTE: No external junction box is required.

Run all field-supplied wires in conduit to the knockout at the bottom of the ON/OFF switch box.

A separate lug is on the exterior of the heater for a system bonding conductor as required by Article 680 of the National Electric Code, ANSI C1 -1975.

6.3 Bonding

CAUTION

This heater must be connected to a bonding grid with a solid copper wire not smaller in diameter than 8 ga.

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.

6.4 Auxiliary Time Clock Wiring

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.

A time clock which will automatically turn the pool system OFF and ON provides convenience and safety, and is more economical. 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 allows the water flow to carry away residual heat in the firebox without damage to the heater or other parts of the system and increase efficiency by removing any residual heat contained in the heat exchanger and directing it back to the pool.

To install a time clock auxiliary switch into the heater circuit, follow these instructions:

1. Remove heater door.
2. Locate and remove the wire nut at the fireman switch connection. The connection has a tag identifying the wires and showing instructions for the connection.
3. Run the wires to the heater through the knockout on the right side of the heater body.
4. Connect the low voltage wires from the time clock auxiliary switch to the two wires of the fireman switch connection. Use American Wire Gage (AWG) No. 14 gauge stranded copper wire with a temperature rating of 227°F (105°C) or greater. Position the field-installed wires away from the inner panel.

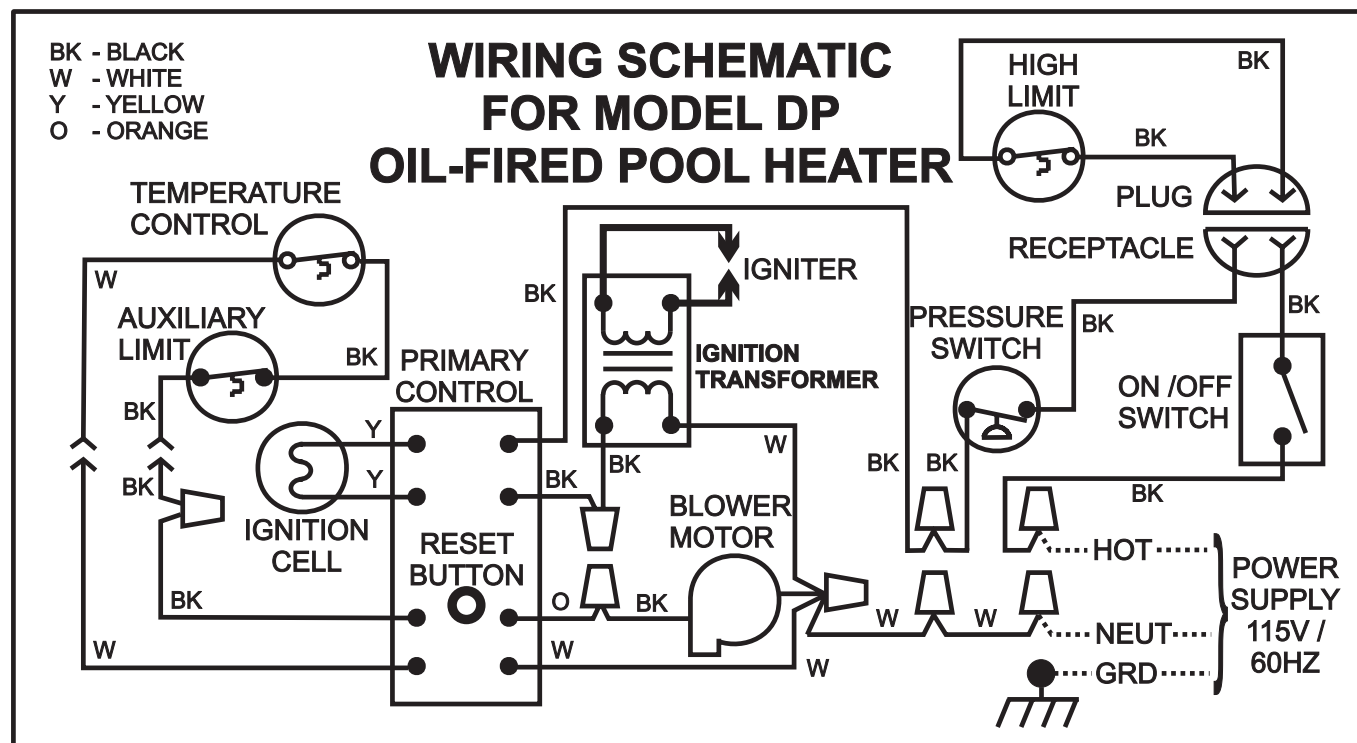


Figure 14. Wiring Diagram, 60 Hz Model.

SECTION 7. Operating Instructions

7.1 Normal Operation

The XL-3 heater is capable of automatic operation based on a call for heat at preset temperatures. The heater has an internal safety system which allows operation in a variety of conditions and prevents operation when certain adverse conditions are encountered.

When the heater is powered, water is flowing through the heater, and the temperature of the water entering the heater is below the temperature control setting, an operating cycle is initiated by the automatic control. The ignition cell will energize, the burner motor will start and fuel will be forced through the nozzle into the firebox where it is ignited. Operation will continue until the temperature of the water entering the heater reaches the temperature control setting.

If ignition is unsuccessful, or if the flame fails during normal operation, the ignition control shuts off the motor. Subsequent cycles are initiated after the reset button on the ignition control is pushed.

When every part of the system is working properly, the heater will go through the following detailed sequence:

1. When the filter pump builds up enough pressure in the piping, the contacts in the heater pressure switch close.

2. The heater thermostat calls for heat completing the circuit between the two thermostat terminals on the primary control of the oil burner.
3. The primary safety control on the oil burner goes through a self-test sequence. One of the steps in the sequence is to check out the cadmium cell flame detector. If the cad cell senses light, the burner will not fire. If everything checks out, the burner motor and ignition transformer are powered. The ignition transformer operates during the entire burner operation.
4. If the cad cell does not sense a good flame within 30 seconds the primary control de-energizes the motor and ignition transformer. This turns off the heater. It can be manually restarted by pushing the reset button after waiting about one minute.
5. During the period when the filter pump is running, which is set by the time clock, the thermostat will turn the burner on and off as required to maintain the water temperature set on the thermostat.
6. If a time clock is used, the contacts in the Fireman switch open about 20 minutes before the pool filter cycle is completed. This shuts off the oil burner. The oil burner cannot be restarted during this period. The filter pump continues to run for another 20 minutes, transferring any heat stored in the firebox to the pool.

7.2 Start-up

⚠ WARNING

Vent pipes, and heater tops get hot! These surfaces can cause serious burns. Do not touch these surfaces while the heater is in operation.

⚠ CAUTION

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

⚠ CAUTION

Should overheating occur or the fuel supply fail to shut off, turn off the manual shut-off valve at the storage tank.

⚠ CAUTION

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

Be sure that there is water in the pool and that the surface level is above the skimmer or other inlet of the pool's filter system.

Confirm that pool water is flowing normally through the pool system and equipment. With any new pool or spa installation, operate the filter pump with the heater off long enough to completely clean the water. This will remove any installation residue from the water. Clean the filter at the end of this operation, before starting the heater.

⚠ WARNING

Inspect the firebox after installation and after prolonged periods of non use. Do not try to light the burner if the firebox shows any signs of damage or deterioration. Call your service technician.

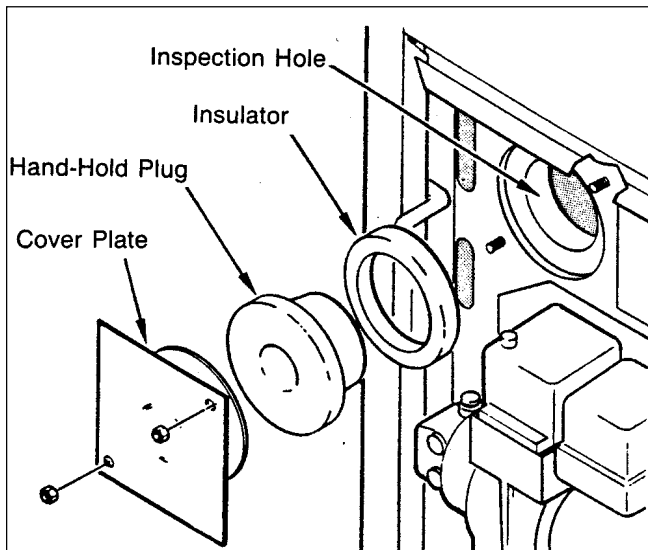


Figure 15. Inspection Hole Location.

Each heater is fully inspected and tested before it leaves the factory. However, rough handling may cause damage to the firebox during shipping. At initial start-up and at start-up after a prolonged period of non use, inspect the firebox for damage or deterioration. Remove the cover plate and plug from the inspection hole (see Figure 15). Use a mechanic's mirror to inspect the inside of the firebox. If the firebox shows cracks or deterioration, do not attempt to start the heater. Immediately call your service technician.

Start the heater in accordance with the Operating Instructions section of this manual, with particular attention to the lighting instructions and temperature control operation.

To start the heater, be sure the pump is running and move the lever of the ON/OFF switch to the on position (see Figure 16). The heater may not start on the first try. Air in the fuel line (see Section 7.4) or other start-up situations may cause it to cycle. To provide additional attempts, push the reset button on the ignition control.

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 may last an hour or more.

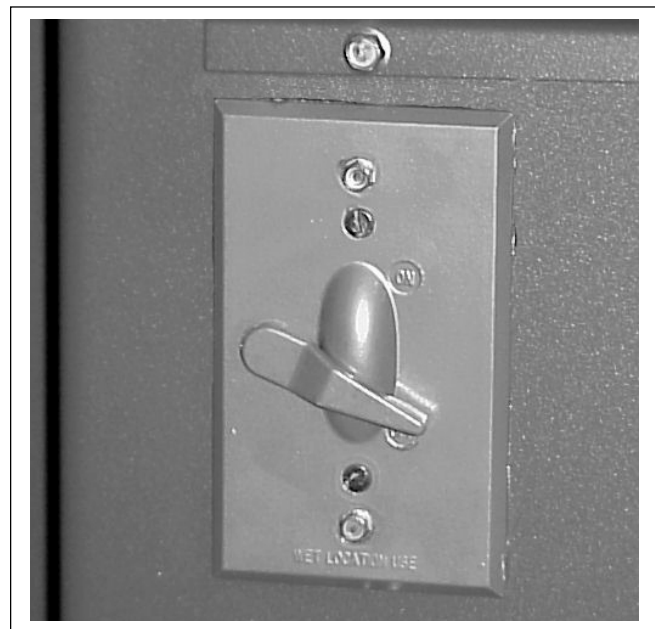


Figure 16. Heater's ON/OFF switch in OFF position.



Figure 17. Heater's Temperature control.

When raising the temperature of a cold pool, program the time clock to turn the pump off 23 hours after the start time (i.e. If the start time is 2:00 PM, then set the stop time at 1:00 PM.). This lets the filter system and heater operate continuously until the water reaches the temperature setting on the temperature control. When that happens, the heater will automatically shut off, but the filter pump will continue running.

7.3 Temperature Control

The XL-3 heater has an ON/OFF switch located on the right side of the heater (see Figure 16). This switch must be in the ON position for the heater to operate.

There is a temperature control located just above the inlet/outlet header (see Figure 17). The temperature control has a thermostat that will sense the temperature of the water entering the heater and will automatically turn the heater off when the water has reached the temperature set by the control knob. The control is not calibrated to show actual temperature settings. The water in the pool must be monitored with an accurate pool thermometer. When the water in the pool reaches the desired temperature, slowly turn the knob on the temperature control counterclockwise until the burner shuts off.

Important: The temperature controls cannot be calibrated in the field. If the control is faulty, shut down the heater, turn off the fuel supply and have a qualified service technician replace the control.

7.4 Lighting the Heater

Before starting the oil burner, check the wiring to make sure there are no loose connections. Check all fuel line connections for tightness. Open the fuel shutoff valves at the heater and the tank.

Caution

Do not try to light the burner if excessive oil has accumulated in the firebox, or when the heater is full of vapors.

ONLY A QUALIFIED SERVICE TECHNICIAN MUST START THE OIL BURNER FOR THE FIRST TIME AND AFTER A PROLONGED PERIOD OF NON USE.

Check the operation of the burner. Make sure of the proper air adjustment. The air shutter is factory set for 12% CO₂, but verify this after installation. When starting the heater, follow these steps:

1. Start the filter pump. Let it run for about five minutes to free any trapped air.
2. Set the thermostat well above the pool water temperature.
3. Turn the heater switch to the ON position. If the burner motor does not start immediately, reset the manual overload switches on the motor and primary control. If the motor runs but the burner fails to light, it may be necessary to bleed air from the fuel line.
4. When the heater is attached to a two-pipe system, the fuel pump will automatically vent air out of the fuel lines. If there is a lot of air, the primary control may shut the burner down before all the air has been purged. If this happens, wait 2 minutes, then press the reset button on the primary control. Repeat this procedure until all the air has been vented and the unit fires properly (see NOTE below). If a one-pipe system is used, it must be thoroughly purged of air using the vent plug on the oil pump. See the instructions included in the bag attached to the oil pump for more details.
5. On initial start-up and at the start-up after a prolonged period of non use such as the beginning of a new pool season also do the following.

Check the initial air adjustment (see Fig. 18). Normally, the bulk air band (A) and the end air shutter (B) should be partially open. It is factory set for both indoor and outdoor installations, but check it again after completing the installation by measuring the CO₂. It should be 12% CO₂ with zero smoke. Set a barometric draft control to give .02" to .03" W.C. draft below the draft control when the heater is installed indoors.

IMPORTANT: If there is no ignition after three reset attempts, stop. Check for accumulated oil in the firebox. Remove all unburned oil with dry rags before continuing the restart procedure. If there is no oil accumulated, try three more resets. If there is still no ignition, have a qualified oil service technician bleed the fuel line and check for ignition problems.

When the heater does fire, oil which is in the firebox will cause considerable smoke as it burns off.

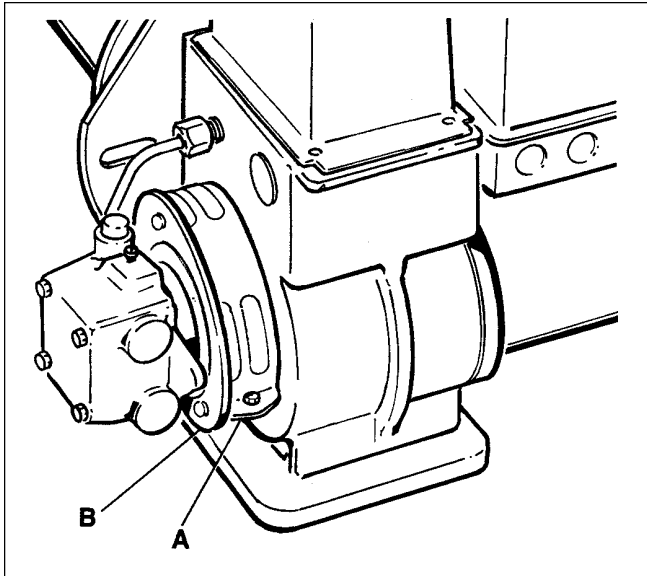


Figure 18. Initial Air Adjustment.

- Set the thermostat to the desired temperature. Until the pool water reaches a temperature of approximately 70°F (21°C), there may be condensate on the heat exchanger. This will stop after the water reaches the right temperature.

If the heater is installed in an enclosed area, keep all doors and windows open during the first two hours of operation. After a long shutdown, there may be some smoke-like emissions from the heater when it is first fired. This condition will only last a few minutes.

7.5. Setting the Time Clock

The most economical and trouble-free way of operating a pool heater and filter system is to include a time clock in the system for automatic cycling.

Adjust the stops on the time clock to provide a single filter cycle every 24 hours.

The ON cycle should be at least 12 hours to allow the filter system to properly clean the pool. Set the ON cycle at least 4 to 6 hours before the pool is to be used. During cold spells, the heater may have to be on longer to maintain the proper pool temperature.

Remove all stops on the time clock during these periods.

IMPORTANT: Run the heater continuously during the initial warm-up period by removing all time clock stops. If the pool temperature is going to be maintained on standby temperature, operate the filter pump until the water temperature reaches 70°F (21°C). If the pool is going to be used for swimming, bring the water up to swimming temperature before replacing the time clock stops.

When the water reaches the temperature level on the thermostat, the heater will turn off automatically, but the filter pump will continue to run for about 20 minutes.

7.6 Adjusting the Water Pressure Switch

⚠ CAUTION

The water 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. Adjust the switch to turn the heater off, not on.

The pressure switch is preset at the factory for activation at 2 psi (14 kPa). However, it is adjustable in the range of 0.5 psi to 15 psi. Adjust the pressure switch **only** if any part of the filter system piping or water level of the pool is 3 feet (0.91 m) or more above or below the top of the heater jacket.

Do not adjust the pressure switch if the heater is installed more than 15 feet (4.57 m) below or 6 feet (1.83 m) above the pool surface. Consult your local Jandy representative for recommendations.

On some installations, the piping from the heater to the pool is very short. The back pressure could be too low to trigger the pressure switch. If this happens, it may be necessary to install a directional fitting or elbows where the return line enters the pool. This will increase back pressure enough for the heater to operate properly.

Make sure the pool filter is clean before making any pressure switch adjustment: A dirty filter will restrict the water flow and the pressure switch cannot be adjusted properly.

To adjust the pressure switch, proceed as follows:

- Set the heater control to the "OFF" position.
- Start the filter pump and confirm by means of a meter that the pressure switch closes. If the switch fails to close, slowly turn the thumb wheel on the pressure switch counterclockwise (when looking at the electrical connections end of the switch) until the switch closes. If the switch still fails to close call your Jandy representative or the Water Pik Technologies Technical Service Department at 707.776.8200 extension 260.
- Turn the thermostat to the maximum setting and set the heater control to the 'ON' position. The heater should start.
- Turn the thumb wheel on the pressure switch very slowly clockwise until the heater goes off.
- Slowly turn the pressure switch thumb wheel **counterclockwise** one-quarter turn. The heater should come back on.

6. Check the adjustment by turning the filter pump OFF. The heater's burner should shut off immediately. If it does not, restart the filter pump and repeat Steps 5 and 6. Check the adjustment again.
7. 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.

7.7 Temperature Rise

The Laars XL-3 pool and spa heater has an internal bypass which accommodates a wide range of water flow. 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 60 gpm (3.8 l/s), an external bypass will 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 1/4" brass 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 19). With the plug removed, install the special thread adapter and "Pete's" plug fitting and insert a pocket thermometer. A temperature rise measurement kit is available through your Jandy distributor. See section 10 of this manual for the correct kit number.

Use the following procedure to adjust the external bypass valve to assure proper water flow through the heat exchanger.

1. Clean the filter.
2. Install a thermometer in the 1/4" NPT threaded opening in the front header casting as shown in Figure 19.
3. Close the manual bypass valve.
4. Set the heater's control to the "OFF" position.
5. Start the filter pump.

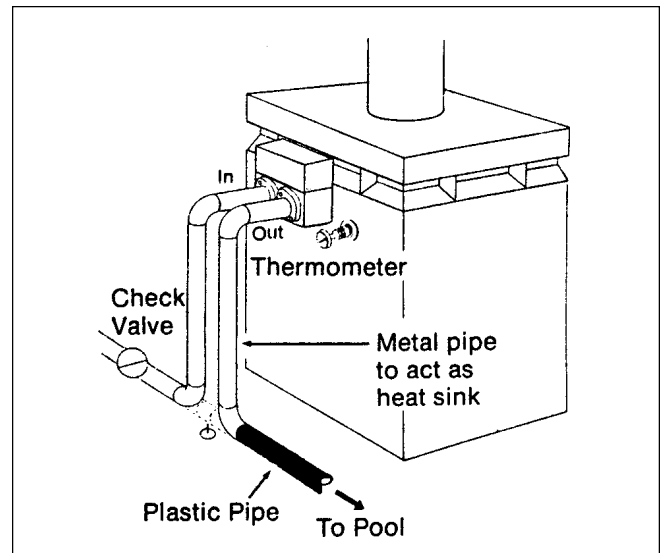


Figure 19. Thermometer Placement.

6. After three minutes, note and record the thermometer reading. This is the pool water temperature.
7. Start the heater by setting the control to the "ON" position and set the thermostat high enough to call for heat. 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. If your measured temperature rise is within the range of 16° to 20°F (8.9° to 11.1°C), skip step 8.
8. Gradually open the manual bypass valve until the temperature rise falls within the range of 16° to 20°F (8.9° to 11.1°C)
9. After obtaining the correct temperature rise, scribe a line on the bypass shaft and case to mark the correct adjustment position. Wire or remove the valve handle to prevent tampering.

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 any changes, verify proper heater operation. A problem with the heater's internal bypass assembly will effect measured temperature rise.

SECTION 8.

Maintenance

8.1 Water Chemistry

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.

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.

Proper chemical balances are necessary for sanitary bathing conditions as well as ensuring your heater's long life. Kits are available from your local pool supply dealer for making the various test for mineral content. One of these kits will detect copper in the system. The 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. Be sure to keep your chemical levels within the values indicated in Table 4. **Water Pik does not warrant heat exchangers damaged by corrosive chemical levels or excess dissolved solids in pool or spa water.**

For spas, it is also necessary to perform water changes in addition to chemical treatment. It is recommended to change the spa water every 60 days for light usage and every 30 days if usage is heavy.

Table 4. Chemical Concentration Levels

Test	Recommended Level
Free Chlorine or	1.0 to 3.0 ppm
Bromine	3.0 to 5.0 ppm
pH	7.2 to 7.6
Total Alkalinity (TA)	80 to 120 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 2000 ppm
Copper	0 ppm

8.2 Seasonal Care

CAUTION

Do not operate this heater outdoors at temperatures below 32 degrees Fahrenheit (°F) (0 degrees Celsius [°C]).

8.2.1 Spring and Fall Operation

During periods when the pool is only going to be used occasionally, set the control temperatures to the lowest setting possible. See Section 7.3. This prevents the pool water from becoming chilled, and minimizes the time required to raise the pool water back up to the desired temperature.

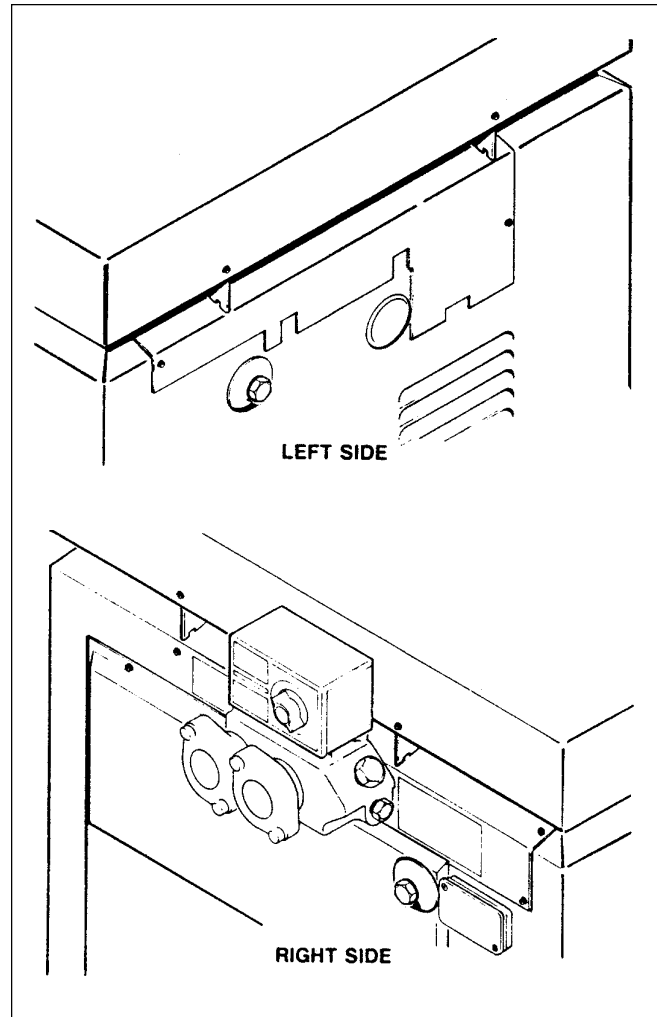


Figure 20. Heater Drains.

If the heater is not going to be used for a long period of time, shut it down completely by turning off the main switch on the right side of the heater.

8.2.2 Winterizing

The heater could be seriously damaged by freezing temperatures if it is not properly drained. Evidence of improper winterizing will void the warranty

In areas where freezing temperatures occur in winter and the pool or spa will not be used, have your service technician perform the following steps:

1. Turn off the main fuel supply to the heater, using the shut off valve in the supply line at the storage tank.
2. Remove heater door.
3. Turn off the heater at the main switch on the right side of the heater. If the heater is on it's own circuit breaker, it is a good idea to switch the breaker off.

4. Remove both drain plugs from the heater. One is located on the right side of the inlet/outlet header (see Figure 20), The other is located on the left side of the heater in the return header. Completely drain the heater before the first frost.
5. After all water has drained from the heater, check for mineral buildup in the openings.
6. Use compressed air to blow out any standing water remaining in the heat exchanger.
7. Grease the threads on both drain plugs and ports and place the drain plugs in a safe place for the winter. Do not reinstall the drain plugs until the heater is to be started again.
8. Remove the siphon loop cover from the right side of the heater.
9. Remove the compression nut attaching the siphon loop tube to the pressure switch near the front of the heater.
10. Allow the siphon loop to drain.

NOTE: The XL-3 heater is not designed for continuous use to combat freezing temperatures. Keep the temperature at a minimum 70°F (21°C) or shut the heater down completely.

Operating the heater for long periods at or near freezing water temperature can seriously damage the heater, and may create a dangerous condition by fouling the external heat exchanger passages, causing incomplete combustion. Even with water flowing through the system, ice may build up in the pipes, restricting the flow of the water to the heater and damaging the heat exchanger.

8.2.3 Spring Start-up

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

1. Fill the siphon loop with approximately 5cc of SAE 50, non-detergent oil. Attach the copper tubing to the pressure switch.
2. Install the drain plugs in the ports on both headers.
3. Make sure that power is supplied to the pump. Turn on the filter pump and circulate water through the heater for 5 minutes. Check for leaks while circulating.
4. Turn on the main fuel supply to the heater at the shut off valve near the storage tank.

5. If a circuit breaker was switched off during the winter, be sure that the breaker is back on.
6. Turn on the heater following the start-up instructions in this manual (see Section 7.2).

8.3 Inspection and Service

Water Pik Technologies designs and constructs the Laars XL-3 heater to provide long performance life when installed and operated properly under normal conditions. Periodic inspections, especially at spring start-up, are important to keep your heater running safely and efficiently through the years.

WARNING

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

8.3.1 Owner Inspection and Maintenance

Water Pik Technologies recommends that you inspect the heater on a continual basis and especially after abnormal weather conditions. The following basic guidelines are suggested for your inspection:

1. Keep the top and surrounding area of the heater clear of all debris.
2. Keep the area around and beneath the heater clean and free of all combustible materials such as paper, leaves, etc.
3. Do not store or use gasoline or other flammable vapors, liquids or chemicals in the vicinity of this or any other appliance.
4. Do not use this heater if any part has been under water. Immediately call a qualified service technician to inspect the heater and replace any part of the control system, firebox and any fuel control which has been under water.
5. If the heater is equipped with a pressure relief valve, check for corrosion in and around the valve. Twice a year, with the filter pump on, lift the release lever on the top of the valve to make sure that water runs freely through it. If corrosion is found, replace the pressure relief valve. When replacing the valve, be sure that the pump is off. Install the valve so that the discharge is directed away from any area that may be damaged by water.
6. Be sure all combustion air and ventilation openings are not blocked. Check for spider webs and other debris in the air band, end air shutter and in the exhaust outlet—especially after a long period of nonuse.
7. Visually inspect the firebox for damage and deterioration.

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

8.3.2 Professional Inspection and Maintenance

Inspections performed at least once a year by a qualified technician are required to maintain your heater's safe and efficient operation. The following basic safety checks must be performed.

1. Check for loose or broken wires and terminal connections.
2. 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.
3. Inspect the electrical controls, specifically the following:
 - a. High limit controls.
 - b. Water pressure switch.
 - c. Fuel burner operation.
 - d. Temperature control.
 - e. Control circuit fuse.
 - f. Ignition control.
 - g. Cad cell.
4. Inspect the venting system for blockage, leakage, and corrosion.
5. Replace the in-line oil filter cartridge once a year.
6. Check for spider webs or other obstructions in the air shutters and bands – especially at Spring start-up. Clean with wire brush if necessary.
7. Conduct a normal operating cycle and observe that the sequence proceeds as intended.
8. If the heater is equipped with a pressure relief valve, clean any accumulated corrosion and make sure that water runs freely.
9. Inspect the inside of the firebox and burner for deterioration and indication of improper operation.
10. Perform a temperature rise test in accordance with Section 7.7 of this manual.
11. Regularly inspect electrical controls for deterioration. Repair and replace as necessary.

12. Clean the heat exchanger using the following schedule:

After installation and first start-up, check the heat exchanger for black carbon soot buildup after the following periods of operation: 24 hours, 7 days, 30 days, 90 days and once every 6 months thereafter, preferably at the end of the swimming season.

Caution

Black carbon soot on a dirty heat exchanger can, under certain circumstances, be ignited by a random spark or open flame. To prevent this from happening, dampen the soot deposits with a wet brush or fine water spray before servicing or cleaning the heat exchanger.

Caution

Be careful to avoid damaging the firebox material when cleaning the heat exchanger or inspecting the heater. Keep water out of the firebox. Be sure to replace the gasket, inspection plug and retainer when the cleaning or inspection is complete.

Clean the heat exchanger as follows:

- a. Remove the heater top assembly and flue collector.
- b. Remove the inspection hole cover (see Fig. 15).
- c. Remove the “V” baffles (the retaining wire does not have to be replaced)
- d. Use an ordinary kitchen brush to brush across the top of the heat exchanger between the tube fins.
- e. Use a bottle brush to brush down between the tube fins toward the firebox.

The ash can be softened for easier removal by lightly dampening with a wet brush. Do not let water get in the firebox. **DO NOT** use a water hose to clean the heat exchanger while it is still installed in the heater. Water will damage the firebox material.
- f. Reach through the inspection hole and brush across the bottom of the tube fins using the kitchen brush.
- g. Carefully remove all dirt and soot from the firebox by inserting a vacuum cleaner nozzle through the inspection hole.
- h. Replace the flue collector and top assembly.

For more thorough cleaning, remove the heat exchanger completely and wash it with a garden hose.

13. Replace the oil nozzle once each season (see the oil burner manual).
14. Oil the burner motor every three months. Use non-detergent #40 motor oil at both oil holes.

SECTION 9. Troubleshooting

9.1 Home Owner Heater Troubleshooting

Problems which may come up with the pool heater operation or performance will require a trained, professional technician. There are a few preliminary symptoms the pool owner should check before calling a technician:

9.1.1 Oil Burner Does Not Fire

1. Is the pool temperature control set high enough to call for heat?
2. Is the pool heater switch ON? Are all circuit fuses and remote switches ON?
3. Is the pool filter clean?
4. Is there enough fuel in the tank? Is the fuel valve turned ON?

If the answer to all of these questions is yes, try the manual overload reset switches on the burner motor and primary control. If burner does not fire, turn the heater switch OFF then ON, and try the reset switches again. If the burner still refuses to fire, call the service technician.

9.1.2 Heater Does Not Maintain the Desired Water Temperature

1. Is the temperature control set high enough?
2. Is the filter cycle setting on the time clock long enough to permit the heater to raise the temperature?
3. Is the heater the right size for the pool?

If these conditions are satisfactory, the heat exchanger could be fouled, or the heater controls may not be functioning properly. Call a service technician.

9.1.3 Burner Operates, But There is Smoke or Pulsating Combustion

This is usually caused by improper combustion adjustment, fouled heat exchanger or a fuel supply problem. Call a service technician.

9.1.4 Pool Water Overheating

Turn the heater switch OFF and call a service technician.

9.2 Professional Troubleshooting Guide

9.2.1 Introduction

A qualified oil burner technician must service this equipment. Frequently, this service is available through the fuel oil supplier.

WARNING

Some of these procedures involve exposing the line voltage circuit. There is considerable danger of electric shock.

The XL-3 is an oil-fired pool heater designed to burn No. 2 fuel oil or No. 2 diesel fuel. Do not use other fuels. The burner assembly comes standard with a two-stage pump. This allows the heater to be installed a relatively long distance from the fuel tank.

9.2.2 Initial Checks

1. Is the oil burner connected to a one- or two-pipe system? All units are factory set for one-pipe systems. To convert a unit to a two-pipe system, a bypass plug must be installed in the fuel pump. The plug is supplied with the oil burner. There is a decal located on the fuel pump showing where the bypass plug goes.

If a fuel unit is set up for a two-pipe system, but is actually connected to a one-pipe system, the pressure in the fuel pump builds up to over 300 psi when the burner turns on. This will cause the motor to bind and stop running or ruin the pump seals, or both.

2. An oil filter must be installed on the inlet line. A very small amount of dirt in the oil can plug the nozzle. A properly sized oil filter is shipped with the heater (see Figure 8).
3. Is there oil in the storage tank?
4. Are all of the shut-off valves on the oil lines open?
5. Are the fuel lines adequately sized according to the Table 3 on page 10?
6. Are there any leaks in the fuel line? A very small leak can cause the fuel pump to suck air into the system, resulting in failure to operate or a pulsating, noisy fire.
7. Is the unit properly grounded electrically? This is extremely important. Use of PVC piping in the pool filter system prevents grounding through the piping.

8. If a time clock is installed, is there power to the timer? Is the timer motor working? There is usually a visual motor check opening on the timer mechanism. Is the switch located below the timer dial "ON"?
9. Are there any loose wires or terminals?
10. Is the pool filter clean, and is the pump operating properly?

9.2.3 Troubleshooting

NOTE: These troubleshooting procedures require connections to electrical terminals and jumper wires to check operation. To avoid electrical shock, turn off electric power before servicing line voltage controls. Never leave a jumper wire in place to fix a heater. This would bypass safety and operating controls. See Figure 21 for burner parts identification.

9.2.3.1 Burner will not start (motor and transformer do not come on)

1. Is there power to the heater? Have you checked the reset buttons on the motor and primary control?
2. Place a jumper wire across the two terminals on the cad cell. If the burner starts, the problem is in the heater control circuit. This circuit consists of the pressure switch, high limit control, safety switch, thermostat, time clock switch (if one is installed) or the wire harness. Check the wire harness for any loose wires or worn insulation. Then jumper each control until the problem is located.
3. Press the reset button on the primary control. If the unit does not start, go to step 5. If the unit starts, turn off the power and check the following items that can lock out the primary control:
 - a. Dirty or defective cad cell.
 - b. Defective primary control.
 - c. Oil level in tank too low or water in the tank.
 - d. Poor combustion caused by:
 - Fouled nozzle
 - Fuel line air leaks
 - Improper nozzle pressure (pressure should be 100 psi)
 - Improper air setting (see Section 9.2.3.4)
4. Press the reset button on the motor. If the unit does not start, go to step 5. If the unit starts, shut off power and check the blower wheel and flexible coupling between the motor and the fuel pump. Make sure the blower wheel and fuel unit are not binding. Make sure the return fuel line is not restricted.

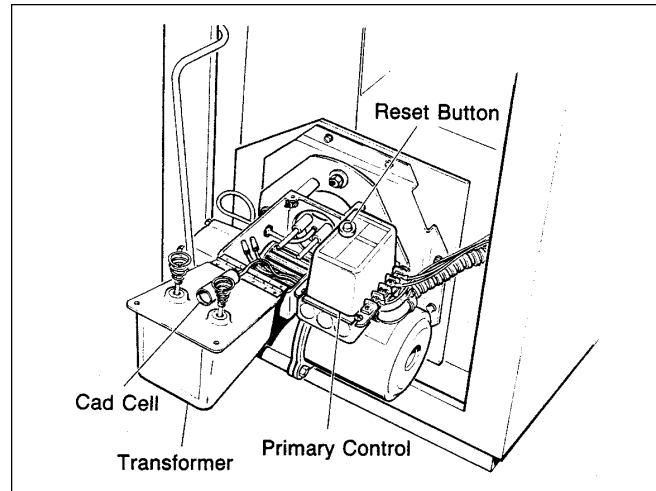


Figure 21. Cad Cell and Primary Control.

5. Remove one cad cell wire from the primary control. If the burner starts, replace the cad cell.
6. Turn off electric power to the heater. Short out the high limit switch, in the high voltage circuit. If the burner starts when power is restored, the switch is faulty.
7. Turn off electric power and inspect the wiring below the primary control and the ignition transformer. Make sure there are no loose connections.
8. If the wiring is okay, and the blower wheel rotates freely, replace the primary control.

9.2.3.2 Burner Tries to Start, but the Primary Control Shuts Off (either motor or transformer or both come on)

1. Is the burner motor turning? If yes, go to next step.
2. Press the reset buttons on the motor and primary control. If the motor does not start, but transformer is providing spark at the electrodes, go to step 3.
3. Lift the ignition transformer and make sure the motor rotates freely. If it does not rotate freely, replace the motor. If the motor is internally binding, replace the motor.
4. Open the inspection port and use a mirror to check combustion. If there is no ignition before the primary control shuts the burner down, go to step 6. If the burner does ignite with a good flame, go to step 5. If the burner tries to ignite, but the flame is intermittent, go to step 8.
5. Check the cad cell and primary control.

6. Lift up the ignition transformer and put tape over the front of the cad cell (the burner will not start unless the cad cell senses no light). Disconnect the black lead going to the motor. Press the primary control reset button. Use an insulated screwdriver to touch the metal blade to one spring contact on the transformer, and about 3/8" away from the other spring contact. If there is good spark between the blade and the spring, go to the next step. If there is no spark, replace the transformer.
7. Remove the electrode-nozzle assembly and inspect the high voltage sections for fouling, cracked insulators or burnt electrodes. Replace any defective parts.
8. If the flame is poor quality or intermittent, use a pressure gauge to check the nozzle pressure. If the pressure is below 100 psi, but steady, reset it to 100 psi and go to step 9. If the pressure is not steady, use the attached Sundstrand Field Service bulletin to check out the fuel unit. An unsteady pressure reading could be a sign of a dirty oil filter.
9. Replace the burner nozzle with the nozzle called out on the heater rating plate and go to step 10. Replace nozzles once a year as part of the annual cleaning and inspection service.
10. Check the CO₂ Of the flue gases. The reading should be between 11.5 to 12.5%. If the reading is different, go to Section 9.2.3.4.

9.2.3.3 Oil Burner Will Not Shut Off

Remove one of the thermostat leads from the primary control. If the oil burner shuts off, the problem is in the heater control circuit. The circuit includes the

pressure switch, high limit safety switch, thermostat and wire harness. Check for worn insulation on the wire harness, which could cause a short. Check operation of the thermostat and pressure switch.

9.2.3.4 Setting the Correct Fuel-Air Mixture

Measure the CO₂. If it measures less than 11.5%, decrease the air supply. If it measures higher than 12.5%, increase the air supply.

When the fuel-air setting is correct, there will be zero smoke. If there are still traces of smoke after adjusting the fuel-air mixture, slowly increase the air supply until the smoke disappears.

Use the proper instruments to measure both the smoke and CO₂.

1. Too Much Air (low CO₂)

Too much air decreases the efficiency of the heater, and causes overheating of the jacket by pressurizing the firebox. Too much air can also cause poor ignition and a pulsating flame. If the CO₂ reading is below 11.5%, reduce the air adjustment openings on the burner.

2. Not Enough Air (high CO₂)

Not enough air is much easier to detect. The flame is dark yellow and the heater will smoke. Generally, the CO₂ reading will be above 12 % when not enough air is provided.

Lacking proper instruments, a temporary fuel-air adjustment can be made. Close the end shutter and then slowly close the air bank until the heater starts to smoke. Slowly open the end shutter until the smoke completely disappears. The fuel-air mixture will be close to the correct setting.

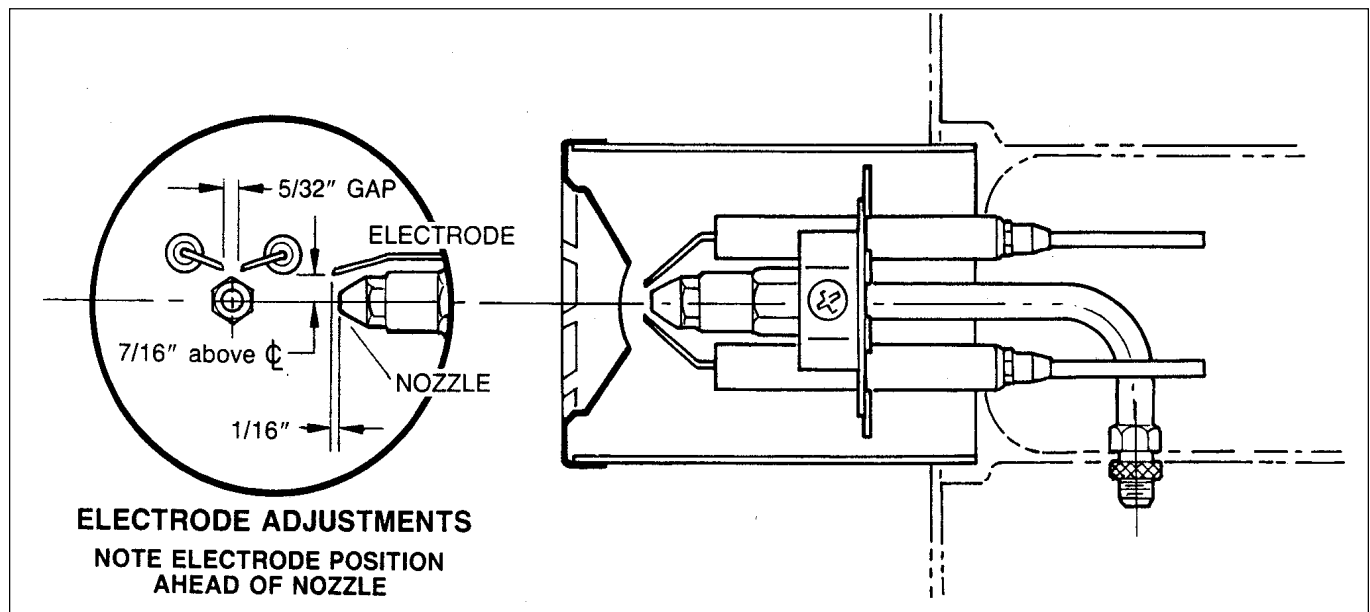


Figure 22. Electrode Adjustment.

9.2.3.5. Control & Cad Cell Troubleshooting Guide

Symptom	Possible Cause
Burner runs all the time	Defective primary control
No combustion	No power to the primary. Limit switch turned off. Defective limit switch. Bad wire connection. Bad burner motor. No power from fuse box. Defective primary
Ohmmeter pointer above 2	Partly plugged nozzle. Cad cell dirty. Cad cell misaligned. Defective cell.
Ohmmeter pointer below 3	Not enough combustion air. Cad cell sees too much light. Adjust alignment.
Primary won't lock out	Defective primary
Ohmmeter pointer below 50	Stray light in burner housing. Defective cad cell.
Burner won't start	Open circuit in thermostat wiring. Dirty thermostat contacts. Defective thermostat.
Burner runs with thermostats contacts open	Short circuit in thermostat wiring

SECTION 10. Replacement Parts

10.1 Ordering Information

To order or purchase parts for the Laars XL-3 pool and spa heater, contact your nearest Jandy dealer or distributor. See the Jandy web site at www.jandy.com for the nearest service center. If they cannot supply you with what you need, contact Customer Service at Water Pik Technologies, P.O. Box 6000, Petaluma, California, 94954, Telephone (707) 776-8200 extension 245.

NOTE: To supply the correct part it is important that you state the model number and serial number. This information is on the rating plate inside the heater.

10.2 Parts List

Key No.	Description	Model No.	ORDER PART NO.
FUEL SYSTEMS			
1	Oil Burner Assembly	3000	R0389702
2	Oil Filter With Cartridge	All	R0389800
3	Oil Filter Cartridge	All	R0389900
4	3/8" Oil Line, Pump to Filter	3000	R0390002
ELECTRICAL SYSTEM			
5	Thermostat	All	R0318800
6	Thermostat Knob	All	R0010700
7	Thermostat Control Box	All	R0349100
8	Pressure Switch, 1-10 PSI	All	R0045400
9	Siphon Loop Cover	All	R0390200
10	Siphon Loop Assembly	All	R0057800
11	High-Limit Switch Set Contains:	All	R0390300
12	High-Limit Switch, 135°F	All	R0022700
13	High-Limit Switch, 150°F	All	R0390100
14	High-Limit Switch Harness 150°F	All	R0057500
15	High-Limit Switch Harness 135°F	All	R0057700
16	High-Limit Switch Cover with Gasket	All	R0390400
17	ON/OFF Switch with Cover and Gask.	All	R0390500
19	Gasket Only	All	R0390600
20	Oil Burner Harness	All	R0057600
21	Connector Elbow 90°	All	R0390700
WATER SYSTEMS			
22	Heat Exchanger Assembly, Complete	3000	R0390802
23	Heat Exchanger	3000	R0390902
24	Inlet/Outlet Header	All	R0391000
25	End Cap (1/2" tap)	All	R0391100
26	End Cap (No tap)	All	R0391200
27	End Cap (1/4" tap)	All	R0391300
28	"V" Baffle (5 included)	3000	R0391402
29	End Baffle (2 included)	3000	R0391502
30	Tube Gaskets (12 included)	All	R0391600
31	Heat exchanger Hardware Kit Contains:	All	R0391700
32	Grommet (2 included)	All	
33	Brass Plug, 3/4"	All	
34	Drain Valve Extension (2 included)	All	
35	Drain Plug, 1/4" (3 included)	All	
36	By-Pass Assembly Contains:	All	R0391800
37	By-Pass Valve Rod	All	
38	By-Pass Valve Disc	All	
39	By-Pass Valve Rod Retainer	All	
40	By-Pass Valve Spring Only	All	R0391900
41	Flange & Gasket Assembly Contains:	All	R0031900
42	Flange, 1 1/2" with Bolts	All	R0392000
43	Flange Gasket and Sleeve, 1 1/2"	All	R0392100

Key No.	Description	Model No.	ORDER PART NO.
FIRE BOX & JACKET COMPONENTS			
44	Burner Tube Gasket	All	R0392200
45	Burner Support Bracket	All	R0392300
46	Burner Compartment Door	3000	R0392402
47	Fire Box Plug Kit Contains:	All	R0392500
48	Fire Box Cover Plate		
49	Fire Box Plug		
50	Fire Box Plug Insulator		
51	Gap Spacer (Return)	All	R0392600
52	Flue Collector Assembly	3000	R0392702
53	Flue Top Assembly	3000	R0392802
54	Inner Stack	All	R0392900
55	Flue Collector Shield	3000	R0393002
56	Vent Blade (10 included)	All	R0393100
57	Gap Spacer (In/Out)	All	R0393200
58	Hold Down Clip (2 RH and 2 LH included)	All	R0393300
59	Fire Box	3000	R0393402
60	Fire Box Cover (2 included)	3000	R0393502
OIL BURNER PARTS & COMPONENTS (Not Shown)			
61	End Air Shutter	All	R0387800
62	Bulk Air Band	All	R0387900
63	Tube Gasket	All	R0388000
64	Motor, 1/7 H.P. , 3450 RPM	All	R0388100
65	Blower Wheel 4- 1/4" x 3- 7/16"	All	R0388200
66	Flexible Coupling	All	R0388300
67	Fuel Unit, Two Stage	All	R0140100
68	Pump Outlet Fitting	All	R0388400
69	Connector Tube Assembly	All	R0388500
70	Ignition Transformer	All	R0140200
71	Contact Spring Terminals	All	R0388600
72	Air Tube Combination	All	R0388700
73	Nozzle Line Electrode Assembly	All	R0393900
74	Electrode Rod & Tip	All	R0393600
75	Burner Head & Screws	3000	R0389500
76	Delavan Nozzle, 2.25	3000	R0362400
77	Primary Control	All	R0140300
78	Honeywell Cad Cell	All	R0389600
79	Fuel Unit Hardware Kit Contains		R0393700
	By-Pass Plug	All	
	By-Pass Plug	All	
	1/8" Burner Head Plug	All	
	1/4" Burner Head Plug	All	
OPTIONAL EQUIPMENT			
80	Pressure Relief Valve, 3/4" NPT, 75 PSI	All	R0040400
81	Chimney Cap - 9"	All	R0393800

LIMITED WARRANTY

Thank you for purchasing Jandy® pool and spa products. Waterpik Technologies (manufacturer of Jandy products, including Laars® pool and spa heaters, Air Energy Heat Pumps, and Clormatic Electronic Chlorine Generators) 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.
- AquaPure™ Electronic Chlorine Generator Electrolytic Cells carry a 5 year limited warranty on a prorated basis.

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 Waterpik 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 Waterpik Technologies. No one is authorized to make any other warranties on Waterpik 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. WATERPIK 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.

