

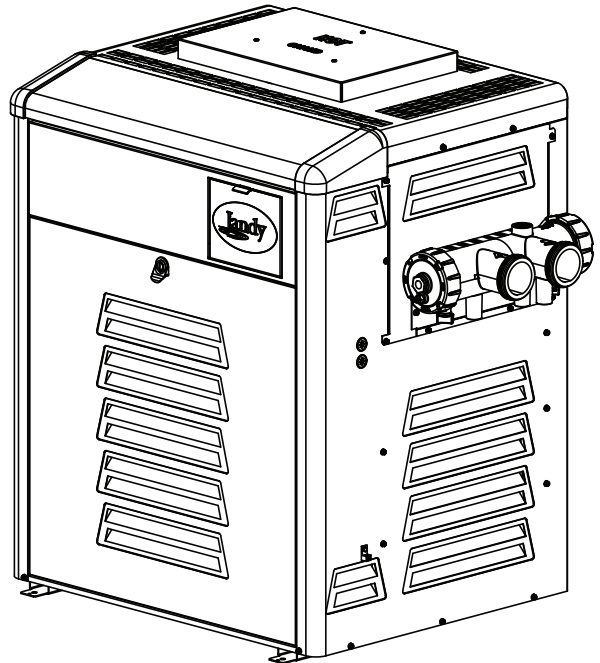
## **⚠ WARNING**

**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. For indoor installations, as an additional measure of safety, Zodiac Pool Systems, Inc. strongly recommends installation of suitable Carbon Monoxide detectors in the vicinity of this appliance and in any adjacent occupied spaces. Improper installation and/or operation will void the warranty.

# Installation and Operation Manual

## Legacy Pool and Spa Heater

### Model LRZ Millivolt Natural Gas and LP



This product is manufactured under the following listed United States patent no.: 5,163,508.

## **⚠ WARNING**

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

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

#### **WHAT TO DO IF YOU SMELL GAS**

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

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



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## Section 1. General Information

### 1.1 Introduction

This manual provides installation and operation instructions for the Legacy Model LRZ millivolt pool and spa heater. Read these installation and operation instructions completely before proceeding with the installation. Consult Zodiac Pool Systems, Inc., or local factory representative, with any questions regarding this equipment.

Certain sections of this manual are specific to either United States or Canadian installations, and are labeled as such.

The Legacy model LRZ millivolt heater is a self contained standing pilot unit and requires no external power.

The Legacy heater is specifically designed for heating fresh water swimming pools and spas, and with proper installation and care, they 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.

**NOTE** "Fresh water swimming pools and spas" include systems that utilize saltwater chlorine generator units, such as the Jandy AquaPure® Electronic Chlorine Generator. Please ensure that the salt content of the pool/spa *does not exceed* 4000 ppm and water flow rate is within 30-125 gpm (110-475 lpm).

### 1.2 Consumer Information and Safety

The Legacy 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.

#### 1.2.1 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.

##### ▲ AVERTISSEMENT

Les Règlements suivants pour Cuves Thermales, tel que recommandés par la Commission U.S. de Sécurité des Produits pour les Consommateurs, devraient être respectés lors de l'utilisation du 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.

##### ▲ AVERTISSEMENT

La U.S. Consumer Product Safety Commission indique que des températures de l'eau élevées peuvent être dangereuses. Voir la notice d'installation et de fonctionnement pour le réglage de la température.

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 1F° (1C°).
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

### 1.2.2 Swimming Pool Energy Saving Tips

Zodiac Pool Systems, Inc. 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 gas.
2. Carefully monitor the water temperature of your pool in the summertime. You can reduce heater usage due to warmer air temperatures.
3. Find the proper setting on the pool heater temperature control and use the TEMP-LOK feature to discourage further adjustments.
4. 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.
5. If the pool is only going to be used on weekends, reduce the heater temperature control setting by 8 or 10 degrees during the week. Reset it to the desired temperature level a day or so before you plan to use the pool.
6. 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.
7. Where possible, shelter the pool from prevailing winds with well-trimmed hedges or other landscaping, cabanas, or fencing.
8. Always use a pool cover when practical. Besides providing a valuable safety feature, a pool cover will reduce heat loss, conserve chemicals, and reduce the load on filter systems.

### 1.3 Warranty

The Legacy heater is sold with a limited factory warranty. Details are specified on the back cover of this manual.

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.

### 1.4 Codes and Standards

The Legacy pool and spa heaters are design certified by CSA (Canadian Standards Association) as complying with the latest edition of the "Standard for Gas Fired Pool Heaters", ANSI Z21.56 in the USA and CAN-4.7 in Canada.

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 Gas Code", NFPA 54/ANSI Z223.1. Pay particular attention to the chapter addressing "Venting of Equipment".
2. In Canada, "The Natural Gas and Propane Installation Code", CAN/CSA-B149.1.

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

### 1.5 Technical Assistance

Consult Zodiac Pool Systems, Inc. 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 Technical Service Department at (800) 822-7933.

## 1.6 Materials Installer Must Provide

### 1.6.1 Materials for All Applications

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

1. The correct size gas pipe to supply gas from the meter to the heater (see Section 4.1).
2. A manually operated gas valve to be installed in the gas line outside of the heater jacket.
3. A suitable gas union joint to connect the heater to the gas line outside of the heater.
4. Plumbing items needed to provide a sediment trap (drip leg) in the gas line between the manual gas valve and the heater (see Section 4.1).

### 1.6.2 Materials for Special Applications

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

1. A factory authorized draft hood and vent pipe for indoor installations in the USA and outdoor shelter installations in Canada (see Section 3.2.2). Draft hoods are available from your Jandy distributor.
2. Primer and cement suitable for cementing CPVC pipe to PVC pipe and an appropriate coupling for connecting the factory supplied CPVC pipe nipples to PVC pool plumbing.
3. A noncombustible platform for installation on combustible surfaces (see Section 2.3.3). Noncombustible bases are available from your Jandy distributor.
4. A factory approved vent cap for all outdoor installations where wind conditions may cause downdrafting. Vent caps are available from your Jandy distributor.

## 1.7 Specifications

### 1.7.1 General Specifications

1. Installation Location:  
 Certified for use:  
 In the USA:  

Natural Gas:	Indoor and Outdoor
LP:	Indoor and Outdoor

 In Canada:  

Natural Gas :	Outdoor and Outdoor Shelter
LP:	Outdoor and Outdoor Shelter
2. Minimum Clearance From Combustible Material:  
 See Table 2 in Section 2.3.2
3. \*Gas Pipe/Heater Gas Valve Connection:  

Natural Gas:	3/4" NPT
LP:	3/4" NPT

 \*For diameter of gas line from meter to heater see Table 4 in Section 4.1.
4. Supply Gas Type:  
 Certified for use with:  
 Natural Gas or Liquefied Petroleum Gas (LP Gas or Propane Gas).
5. Inlet Gas Supply Pressure:  

	Minimum	Maximum
Natural Gas:	5.5 "WC	10.0 "WC
LP Gas:	10.0 "WC	14.0 "WC
6. Water Pipe/Heater Connection:  
 \*2" Unthreaded PVC or CPVC  
 \*Other size pipes may be used. See Section 5.5 for details
7. Water Flow Rate:  

Maximum:	125 gpm (475 lpm)
Minimum:	30 gpm (110 lpm)
8. Working Water Pressure:  

Maximum:	75 psi
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9. Exhaust Vent Connection Size: See Figure 1 in Section 1.7.2, "Dimensions".
10. Electrical Supply: None (the Legacy LRZ millivolt heater is a millivolt heater with a standing pilot ignition).
11. Modification of Heater for High Altitude:  
 The Legacy model LRZ millivolt heater is normally shipped from the factory in the low altitude (sea level) operational configuration. When requested, the heaters can be configured and shipped for higher altitudes. For field conversions to change altitude configurations, manifold kits for mid altitudes and high altitudes are avail-

able from your Jandy dealer or by contacting the Customer Service Department at (800) 822-7933. See Section 11, "Parts List", of this manual for the correct kit number for the manifold assembly needed for your altitude. Table 1 defines the altitude designations as described by the "Standard for Gas Fired Pool Heaters", ANSI Z21.56 in the United States and "Gas Fired Appliances For Use At High Altitudes", CAN 1-2.17 in Canada.

**Table 1. Altitude Designations For The Legacy Heater**

NATURAL GAS		
ALTITUDE DESIGNATION	UNITED STATES	CANADA
LOW ALTITUDE	0-3000 FT	0-2000 FT (0-610 m)
MID ALTITUDE	3001-6000 FT	2001-4500 FT (611-1370 M)
HIGH ALTITUDE	6001-10,000 FT	NOT APPLICABLE
LP		
LOW ALTITUDE	0-5000 FT	0-4500 FT (0-1370 M)
HIGH ALTITUDE	5001-10,000 FT	NOT APPLICABLE

### 1.7.2 Dimensions

See Figure 1 for a diagram showing the heater's exterior dimensions and dimensions to critical connections on the 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. For indoor installations, as an additional measure of safety, Zodiac Pool Systems, Inc. strongly recommends installation of suitable Carbon Monoxide detectors in the vicinity of this appliance and in any adjacent occupied spaces.

#### AVERTISSEMENT

Une installation ou un entretien inadéquat peut causer la nausée ou l'asphyxie en raison du monoxyde de carbone présent dans les gaz de combustion et même entraîner des blessures graves ou la mort. Pour les installations intérieures, comme mesure de sécurité additionnelle, Zodiac Pool Systems, Inc. recommande fortement l'installation de détecteurs de monoxyde de carbone près de cet appareil ainsi que dans les espaces adjacents occupés.

Install the Legacy heaters, vent caps and draft-hoods 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 1.4 "Codes and Standards").

All gas-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 gas meter and piping
5. Proper electrical wiring (if required)
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 Legacy heater is shipped from the factory with the top assembly in the low-profile configuration for outdoor installation. The Legacy heater is design certified for indoor installation (U.S. only) when equipped with a draft hood, which must be installed without modification.

The Legacy heater is also certified for installation in an outdoor shelter in Canada when equipped with a draft hood. An outdoor shelter is an enclosure not normally occupied which does not communicate directly with occupied areas.

Check the rating plate on the heater or the Parts List (Section 11) of this manual for the correct Jandy draft hood or vent cap part number. See instructions supplied with the draft hood or vent cap for installation and attachment. When the draft hood is used, locate the heater so as to be in the same atmospheric pressure zone as the combustion air inlet to the heater.

### 2.3 Location Requirements

#### 2.3.1 Introduction

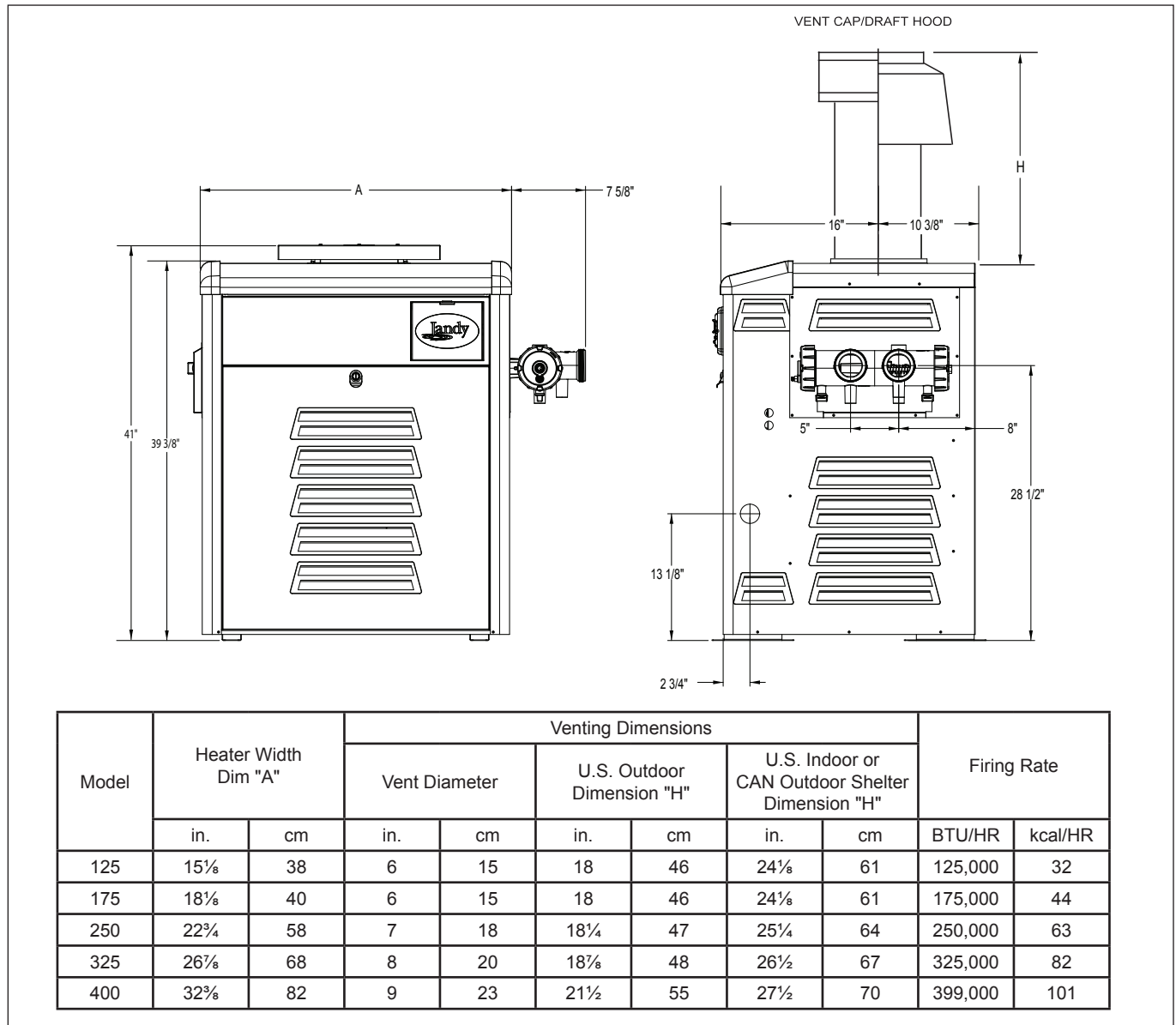
#### CAUTION

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

#### ATTENTION

Lorsque l'équipement d'une piscine est situé sous la surface de l'eau, une fuite provenant de n'importe quel élément peut causer une perte d'eau importante ou une inondation. Zodiac Pool Systems, Inc. n'est pas responsable des pertes d'eau, des inondations ou des avaries causées par une installation ou un entretien inadéquat.





**Figure 1. General Configuration**

The Legacy heater may be installed indoors or outdoors as outlined in later sections. Location of the heater below *or above* the pool water level affects operation of its water pressure switch. See sections on water piping and heater start-up 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 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 2).

At least 18 inches (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 inches (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.

Ce chauffe-piscine doit être installé au moins 5 pieds (1.52m) de la paroi interne de la piscine à moins d'être isolé de la piscine par une clôture, un mur ou autre barrière permanente.

**Table 2. Minimum Heater Clearances From Combustible Surfaces**  
**Table 2. Déagagements Minimaux à Assurer Entre les Parois de L'appareil et les Constructions Combustibles**

SIDE OF HEATER	INDOOR (OUTDOOR SHELTER) INSTALLATION		OUTDOOR INSTALLATION	
	INCHES	CENTIMETERS	INCHES	CENTIMETERS
BLANK	8	20	8	20
REAR	6	15	6	15
PIPING	14	35.6	14	35.6
TOP	44	112	OPEN UNROOFED AREA	
FRONT	18*	45.7*	18*	45.7*

Note: Clearances listed in Table 2 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 2, use the greater value to ensure safe operation.

\* In Canada - 24 in (61 cm)

### 2.3.3 Flooring

The heater must be installed on a level surface 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 Zodiac Pool Systems, Inc. is used. See the heater rating plate or the Parts List (Section 11) of this manual for the appropriate base part number. **Heaters must never be installed directly on carpeting.**

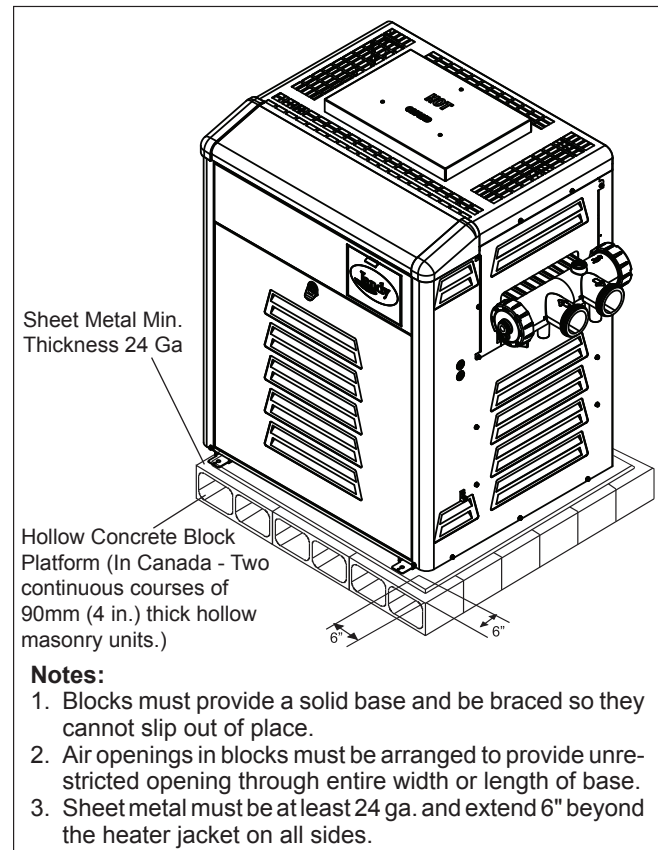
As an alternative to the Jandy noncombustible base plate, in the United States, the National Fuel Gas Code (NFPA 54 / ANSI Z223.1), and in Canada, the Natural Gas and Propane Installation Code (CAN/CSA-B149.1), allow a heater to be placed on a combustible surface when there is a platform under the heater made of hollow masonry no less than four (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 six (6) inches (153 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 2). If the heater is installed in a carpeted alcove, the entire floor of the alcove must be covered by a noncombustible panel.

### 2.3.4 Outdoor Installation

Legacy heaters can be installed in the low-profile top configuration as received from the factory, or with an optional high wind 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 build-



**Figure 2. Noncombustible Platform**

ing, 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 **or** 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 3).

**⚠ 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.

**AVERTISSEMENT**

Lorsque vous installez l'appareil de chauffage, assurez-vous que l'ouverture d'aération se trouve à un minimum de 10 pieds (3,05 m) de toute ouverture d'un bâtiment.

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

Ne pas installer ce chauffe-piscine sous une saillie mesurant moins de 5 pi de hauteur. La partie sous la saillie doit être ouverte sur 3 côtés.

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

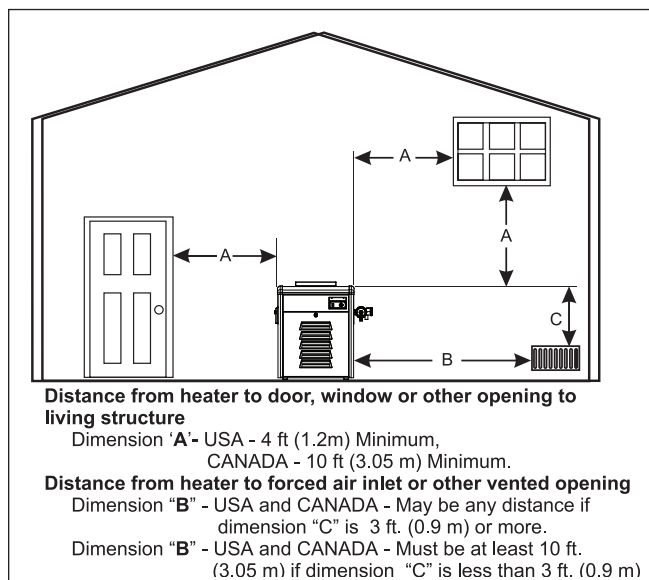


Figure 3. Outdoor Heater Installation

downdraft conditions exist, locate the heater at least 3 feet (0.91 m) from vertical surfaces (e.g., nearby buildings and walls). The addition of a vent cap may be necessary.

In Florida, it is required that the heater be securely fastened to the equipment pad. Use a size 1/4" x 1-1/2" long stainless steel Tapcon®\* type concrete screws and washers at each of the four tabs located at the base of the heater. Mounting the appliance in this manner meets the applicable requirements of the Florida Building Code.

Mounting screws are not provided with this heater. After placing the heater on the equipment pad, drill a hole in the concrete at each of the four tabs on the feet of the heater. (The correct size drill bit is usually provided with the concrete screws when purchased). Place a screw in each of the holes and fasten the heater to the equipment pad (see Figure 4). **Do not over torque the screws.**

\*Tapcon is a register trademark of Illinois Tool Works, Inc.

### 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 a factory approved vent collar. The vent collar must be installed without modification and in accordance with the instructions provided by the manufacturer.

Une remise extérieure (au Canada seulement) est un endroit inoccupé qui ne communique pas directement avec les endroits occupés. Toutes les installations intérieures et remises extérieures exigent l'addition d'une cheminée approuvée par le fabricant. La cheminée doit être installée sans aucune modification et selon les exigences fournies par le fabricant.

These codes, standards and Zodiac Pool Systems, Inc. require that the heater be properly vented as outlined in this manual. Proper ventilation of exhaust

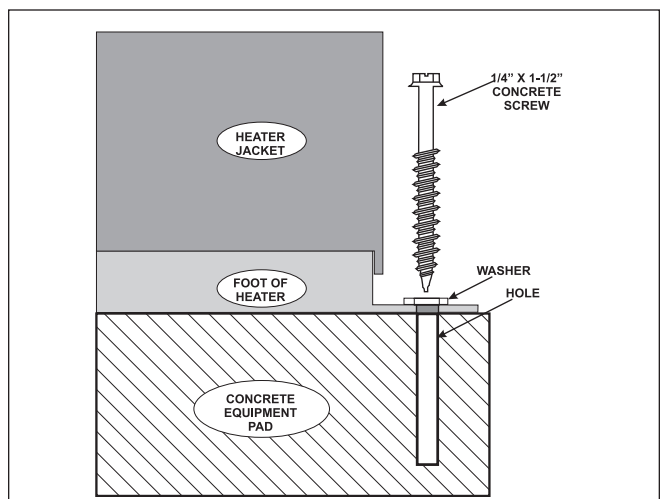


Figure 4. Anchor Heater To Equipment Pad

and combustion air are essential for the safe and efficient operation of the heater (See Section 3). An approved draft hood may be purchased from your local Jandy distributor. See Section 11 (Parts List) of this manual for the correct part number for your model and size heater.

### 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/CSA-B149.1, 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

**Table 3. Air Openings to Outside**

Model	Required Net Free Open Area* for Combustion Air Openings			
	Direct from outside		Duct from outside	
	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>
125	32	206	64	413
175	44	284	88	568
250	63	406	126	813
325	82	429	164	1058
400	100	645	200	1290

\*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 CAN/CSA-B149.1 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.*

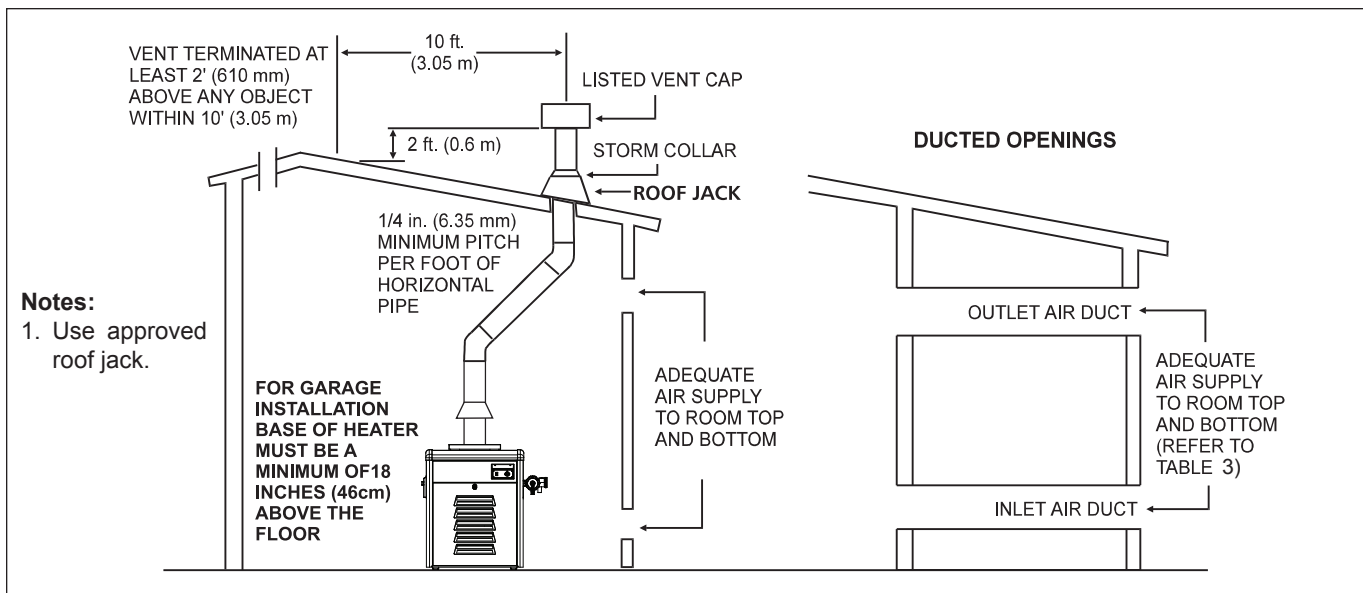
with two permanent air supply openings; one within 12 inches (305mm) of the ceiling, the other within 12 inches (305mm) of the floor. All indoor installations must have openings to outside air for combustion, ventilation, and dilution of flue gases from inside the building (see Figure 5 and Table 3). Zodiac Pool Systems, Inc. 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/CSA-B149.1. Zodiac Pool Systems, Inc. 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/h (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/h (0.6 kW). These requirements are summarized in Table 3. Note that the areas specified are net free areas and should be increased by 50 percent when the openings are covered by screens, louvers, grills or other protective covers (see Figure 5 and Table 3).

**NOTE** In Canada, follow Canadian Standard, CAN/CSA-B149.1 or local codes.

**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



**Figure 5. Indoor Installation Venting (USA), or Outdoor Shelter (Canada)**

room. Additional air must be supplied to compensate for such exhaust.

The information in Table 3 is not applicable in installations where exhaust fans or blowers of any type are used. Such installations must be designed by qualified engineers.

If a blower or fan is used to supply air to the room, the installer should make sure it does not create drafts which could cause nuisance shutdowns of the pilot.

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.

#### **⚠ AVERTISSEMENT**

N'entreposer aucun produit chimique, produit nettoyant ou produit corrosif à proximité des bouches d'air de combustion ou dans la pièce. Éviter de placer des tuyaux de ventilation pour sècheuse à proximité des bouches d'air de combustion. Le fait de laisser des matières corrosives se mélanger à l'air de combustion risque de réduire le cycle de vie de l'appareil de chauffage et de compromettre son fonctionnement.

## **3.2 Vent Pipe Sizing and General Installation**

### **3.2.1 Outdoor Installations**

For outdoor installations, 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 and cap may be added to the heater to move the exhaust vent opening to a position that complies with the requirements. When the heater is installed in areas of high wind or when unavoidably installed near a vertical obstruction where downdrafting may occur, it may be desirable to add a vent cap directly to the top of the heater. In all cases, vent pipes and caps must be of the same diameter as the exhaust outlet of the heater. Approved vent caps may be obtained through your Jandy distributor.

### **3.2.2 Indoor and Outdoor Shelter Installations**

#### **⚠ WARNING**

Vent pipe diameter must be as required by the National fuel Gas Code ANSI Z223.1 or the Canadian Installation Codes for Gas Appliances CAN/CSA-B149.1. 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.

#### **⚠ AVERTISSEMENT**

Le diamètre des tuyaux de ventilation doit répondre aux exigences du *National Fuel Gas Code* ANSI Z223.1 ou du code canadien des installations des appareils à gaz CAN/CSA-B149.1. Des tuyaux trop petits risquent d'entraîner une ventilation inadéquate et des tuyaux trop gros risquent de provoquer une condensation dans les tuyaux. Dans un cas comme dans l'autre, des produits de combustion risquent de s'échapper dans le bâtiment et causer des blessures graves ou l'asphyxie par le monoxyde de carbone.

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

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

1. Chapter covering "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/CSA-B149.1.

Avoid long horizontal runs of the vent pipe, and 90° elbows, reductions and restrictions. Horizontal runs must have at least a 1/4 inch rise per foot (20mm per meter) in the direction of flow.

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 car ports.

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 draft hood. All connections should be made with rustproof sheet metal screws. Do not weld or fasten the vent pipe to the

heater draft hood. The draft hood and heater top must be easily removable for normal heater service and inspection.

The draft hood outlet is to be connected to an unobstructed vent pipe of the same diameter, terminating outside the building. The vent must terminate at least two (2) feet (0.61 m) above the highest point of the roof or other object that is within 10 feet (3.05 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). The top of the vent cap must be at least five feet in vertical height above the draft hood outlet.

Type “B” double wall or equivalent vent pipe is recommended for the entire venting system. However, single wall metal vent pipe may be used within the structure in the latest edition of the National Fuel Gas Code ANSI Z223.1 or in Canada CAN/CSA-B149.1

**IMPORTANT NOTE** Do not use sheet metal screws at the snap lock joints of Type B gas vents.

When venting multiple appliances through one common duct, each appliance must have its own vent temperature limit switch. All vent limit switches must be wired in series so as to prevent any appliance from firing in the event of a blocked vent. Refer to ANSI Z223.1 or, in Canada, to CAN/CSA-B149.1 for more information on multiple venting.

### 3.2.3 Inspection and Replacement of Existing Vent System with New Components

If the Legacy is being installed to replace an existing pool heater, it is recommended that a new appropriate venting system be installed with the new heater. However, if an existing venting system must be used, be sure to carefully inspect the venting system to ensure that it is in good condition and continues to be appropriate for the Legacy heater. Replace any parts that are not in good and serviceable condition with new parts before completing the pool heater installation.

## Section 4. Gas Connections

### 4.1 Gas Supply and Piping

Review the following general instructions before continuing the installation.

**Important:** Do not install LP gas units indoors.

#### **WARNING**

The Legacy pool and spa heaters are designed for use with either natural gas or LP gas. Check the rating plate on the inner panel to be sure that the heater is designed to use the type of gas being supplied. **DO NOT ATTEMPT TO CONVERT THIS HEATER FOR USE WITH ANY OTHER TYPE OF FUEL.**

#### **AVERTISSEMENT**

Les appareils de chauffage à faibles émissions Legacy pour piscines et cuves thermales sont conçus pour être utilisés avec du gaz naturel ou du gaz de pétrole liquéfié (GPL). Vérifiez l'information inscrite sur la plaque signalétique du panneau intérieur pour vous assurer que l'appareil est conçu pour le type de gaz fourni. **NE PAS ESSAYER DE CONVERTIR CET APPAREIL À UN AUTRE TYPE DE GAZ.**

1. Gas piping installation must be in accordance with the latest edition of ANSI Z223.1 and all local codes. In Canada, the installation must be in accordance with CAN/CSA B149.1 and all local codes that apply.
2. Check the gas supply to be sure that it is the same as the gas indicated on the heater's rating plate. Legacy heaters, as shipped from the factory, are certified to operate within the altitude range indicated on the rating plate. If a field conversion to a different altitude range should be necessary, manifold kits are available for changing the altitude range of the heater. See Table 1 in section 1.7.1 of this manual to determine the correct altitude designation for your heater. Refer to Section 11 “Parts List” to order the correct part number of the manifold kit needed. When changing the altitude range of the heater, be sure to fill out the altitude conversion label, included in the kit. Apply the label next to the original rating plate.

#### **CAUTION**

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

#### **ATTENTION**

Vous endommagerez la soupape de gaz si vous ne respectez pas les procédures suivantes.

3. Use the figures in Table 4 to size the gas inlet piping from the gas meter to the heater. Check all local codes for compliance before installing the heater.
4. Install a sediment trap (drip leg) ahead of the gas controls (see Figure 6). Fit the trap with a threaded cap which can be removed for cleaning.
5. Install a manual gas shutoff valve for service and safety. Do not use a restrictive gas cock. **DO NOT USE FLEXIBLE GAS PIPING**, it will restrict the gas flow to the heater.

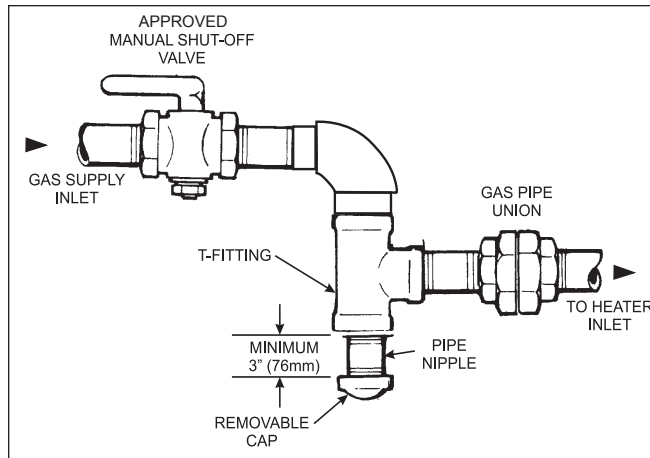


Figure 6. Proper Design for a Sediment Trap/Drip Leg

Table 4. Supply Gas Pipe Size Requirements\*

Heater Size	Distance from Gas Meter					
	0-50 feet (0-15 m)		50-100 feet (15-30 m)		100-200 feet (30-60 m)	
	in.	mm	in.	mm	in.	mm
125	3/4	19	1	25	1	25
175	1	25	1	25	1-1/4	32
250	1	25	1-1/4	32	1-1/4	32
300	1-1/4	32	1-1/4	32	1-1/2	38
400	1-1/4	32	1-1/2	38	1-1/2	38

**Notes:**

- \*1. These numbers are for natural gas (0.65 Sp. Gr.) and are based on 1/2 inch (3.45 kPa) water column pressure drop. Check supply pressure with a manometer, and local code requirements for variations. **For LP gas, reduce pipe diameter by one size, but maintain a minimum 3/4" diameter.**
- 2. Check supply pressure and local code requirements before proceeding with work.
- 3. Pipe fittings must be considered when determining gas pipe sizing.

Table 5. Gas Supply Pressure Requirements\*

Supply Pressure	Minimum	Maximum
Natural Gas	5.5 inches W.C. (1.4 kPa)	10.0 inches W.C. (2.5 kPa)
LP Gas	10.0 inches W.C. (2.5kPa)	14.0 inches W.C. (3.5 kPa)
Manifold Pressure	Nominal	
Natural Gas	4.0 inches W.C. (1.0 kPa)	
LP Gas	9.0 inches W.C. (2.2 kPa)	

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

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

**NOTE** The maximum inlet gas pressure must not exceed the specified value. The minimum value listed is for the purpose of input adjustment. Refer to Table 5.

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

**⚠ CAUTION**

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

**⚠ ATTENTION**

Certaines solutions d'essai d'étanchéité (y compris l'eau et le savon) peuvent causer de la corrosion ou de la fissuration. Rincez les tuyaux à l'eau après l'essai d'étanchéité.

## 4.2 Manifold Pressure

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

**⚠ CAUTION**

Manifold gas pressure for the Legacy natural gas heaters should be set at **4.0" WC**. Propane heaters should be set to **9" WC**.

**⚠ ATTENTION**

La pression du collecteur de pression pour les systèmes de chauffage au gaz naturel devrait être de **4.0" WC**. Pour les systèmes de chauffage au gaz propane devrait être de **9" WC**.

The manifold pressure may be checked by connecting a manometer to the pressure port on the outlet side of the valve. You will need to remove the 1/8" NPT protective plug from the port and install the appropriate 1/8" NPT fitting to connect your manometer. The pressure will be zero when the heater is not running. When the heater is operating the manifold gas pressure should be 4.0" WC for natural gas heaters and 9.0" WC for LP gas heaters.

Before adjusting the manifold gas pressure check the supply side pressure. Make certain the entire supply side gas train (gas line, shutoffs, meter, etc.) is correct for the heater size. To adjust the manifold gas pressure, first remove the slotted cap on the top of the gas valve to the right of the control knob. Under the

slotted cap is a slotted plastic screw which increases the manifold pressure when turned clockwise and decreases the manifold pressure when turned counter-clockwise.

After measurements, and adjustments if necessary, have been made, make sure to replace the 1/8" NPT plug on the manifold pressure ports, and the cap on the manifold pressure adjustment screw. It is extremely important to replace these parts before leaving the installation. Failure to do so can result in damage to property or injury or death.

*With the heater firing*, the pressure must be within the range shown in Table 5. Also check the pressure with the heater off.

### 4.3 Special Precautions for LP Gas

LP Gas is heavier than air and can therefore more readily collect or "pool" in enclosed areas if provision for proper ventilation is not made. Installation of pool heaters in enclosed areas such as pits is not recommended. However, if such an installation is required be sure to pay special attention to proper ventilation requirements for LP gas. Locate heaters a safe distance from LP gas cylinders and filling equipment. Consult the National Fuel Gas Code (NFPA 54 / ANSI Z223.1, latest edition), the Natural Gas and Propane Installation Code in Canada (CAN/CSA B149.1, latest edition), and any other local codes and fire protection authorities about specific installation restrictions in your area.

## Section 5. Water Connections

### 5.1 Water Piping

Figure 7 illustrates typical piping for pool equipment in pool/spa combination pools.

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. In special installations where a shut-off valve, diverter valve or other variable restriction is required in the plumbing between the heater outlet and the pool, Zodiac Pool Systems, Inc. recommends the installation of a pressure relief valve on the heater (see Section 5.6).

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 (6) feet below the pool water surface and no more than 15 feet above it. See instructions for pressure switch adjustment (Section 7.5) in the heater start-up section of this manual for more information about this.

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

For special installations such as water connections below the water level of the pool, or for other questions contact the Zodiac Technical Service department at (800) 822-7933.

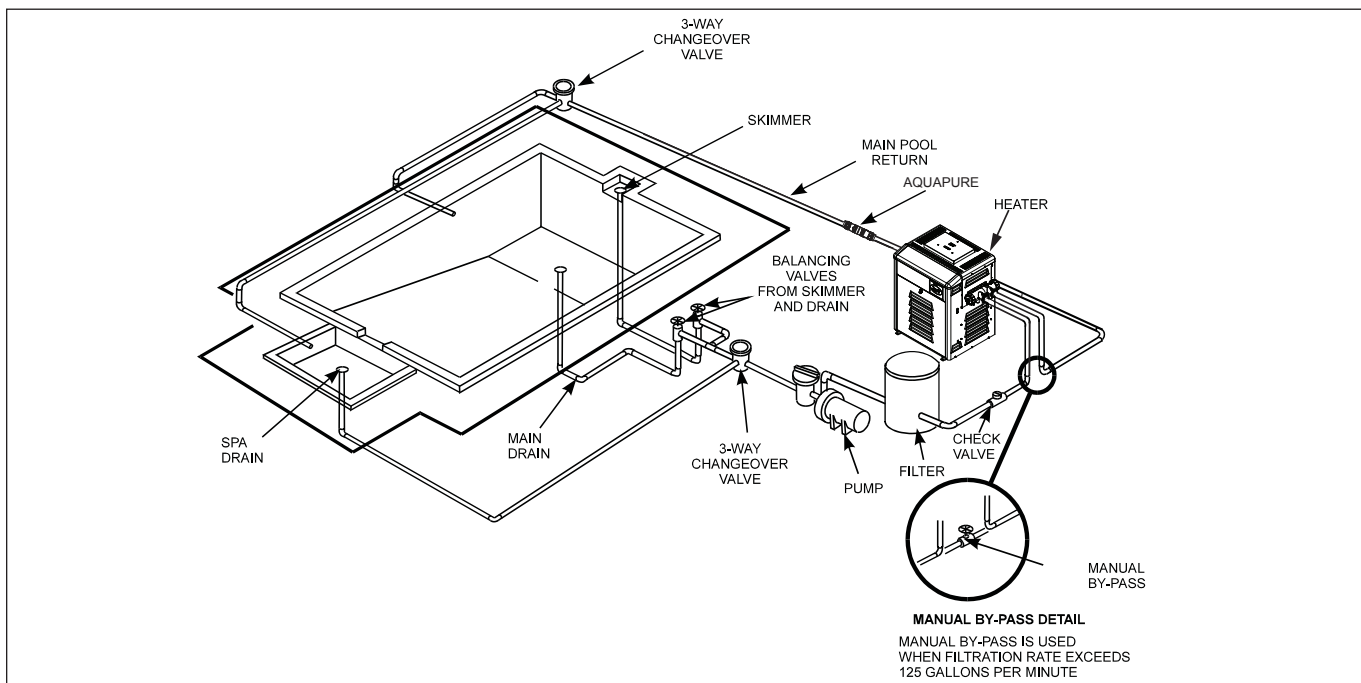


Figure 7. Typical Piping Installation



## 5.2 Check Valve Installation

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

When an automatic chemical feeder is installed in the plumbing, it must be installed downstream of the heater (see Section 5.7). A check valve must be installed between the heater and the chemical feeder to prevent back-siphoning of chemically saturated water into the heater where it will damage the components.

## 5.3 Automatic Flow Control Valve

The inlet/outlet header of the Legacy 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 125 Gallons Per Minute (GPM) (475 liters per minute [LPM]). If the filter system flow rate is higher than approximately 125 GPM (475 LPM), install a manual bypass valve (see Figure 7), then perform a temperature rise test (see Section 7.6) and adjust the flow using the bypass valve until the proper temperature rise is obtained.

## 5.4 Reversible Water Connections

The Legacy heater is shipped with water connections on the right side, but can be modified in the field to provide left-side water connections. This procedure involves removing the heat exchanger headers and reinstalling them on opposite ends of the tube assembly. Some of the heater wiring must be disconnected and re-routed, so this procedure must be done only by a trained service technician. Heat exchanger reversals are generally done before the installation of power and water to the heater. If you need to reverse the heat exchanger on a previously installed heater be sure that all electrical power, the gas supply and water supply have been turned off before starting the procedure. These instructions have been written to include the steps needed when reversing the water connections on an existing installation. If you are reversing the headers on a new installation, some steps will be ignored. Water connection reversal is illustrated in Figures 8 and 9. Proceed as follows:

1. For an existing installation, drain the heater by removing the two drain plugs on the inlet/outlet header and the drain plug on the return header.
2. Remove the heater front panel (door).
3. Remove the I/O header side cover plates, top and bottom. See Figure 10.
4. Remove the return header side cover plates, top and bottom. See Figure 10.

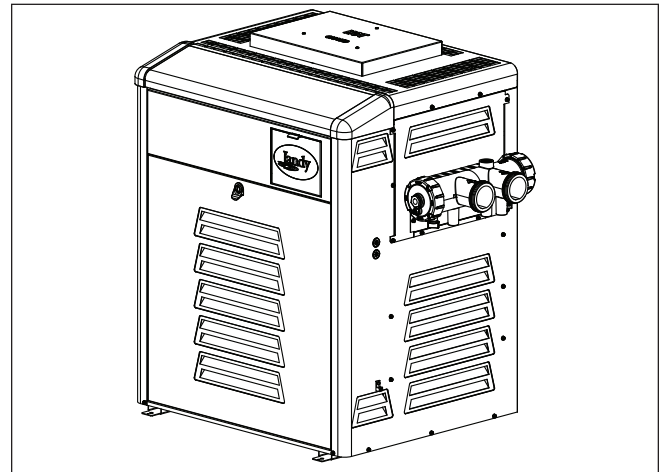


Figure 8. Water Connections as Shipped

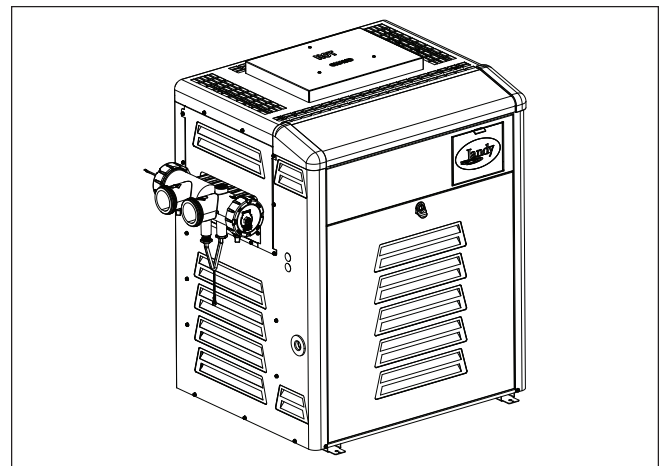


Figure 9. Water Connections Reversed

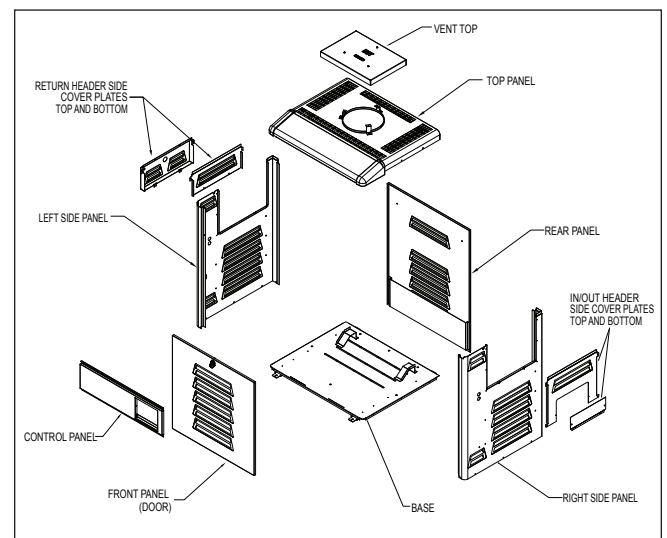


Figure 10. Legacy Panel Identification

5. Tag and disconnect the white wire on the pressure switch (PS) and the white wire on the Fireman's switch terminal which leads to the high limit switch.
6. Remove the water temperature sensor nut from the inlet/outlet header and remove the sensor.
7. Tag and disconnect the black and white wires from the water pressure switch.

**⚠ CAUTION**

In order to prevent property damage or injury, ensure that the wiring is handled and routed carefully so as not to cause any damage to it. Additionally, be careful not to create any kinks in the water pressure switch copper tubing when handling the header.

**⚠ ATTENTION**

Afin d'empêcher des dégâts matériels ou des blessures, assurez-vous que le câblage est manipulé et installé soigneusement de manière à ne pas l'endommager. De plus, vous devez faire attention à ne créer aucune imperfection dans la conduite en cuivre de l'interrupteur de pression d'eau en manipulant la tête.

8. For an existing installation, remove the coupling nuts from the header and disconnect the water supply from the heater.
9. Remove the ten (10) bolts and washers from the inlet/outlet header and remove the header from the tube assembly.
10. Remove the ten (10) bolts and washers from the return header and remove the header from the tube assembly.
11. For an existing installation, remove the tube gaskets and clean the header's mating surface of any corrosion or debris. Replace the tube gaskets with new ones. Do not use any metal tools on the header surface. Scratches may compromise the seal integrity.
12. Place the inlet/outlet header over the bolts and gasketed tubes on the left side of the tube assembly. Align the bolt and tube holes in the header with the bolts and tubes in the header bar and slide the assembly together.
13. Thread on the ten (10) bolts and washers and hand tighten.
14. Place the return header over the bolts and gasketed tubes on the right side of the tube assembly. Align the bolt and tube holes in the header with the bolts and tubes in the header bar and slide the assembly together.
15. Thread on the ten (10) bolts and washers and hand tighten.
16. Use a torque wrench to tighten the bolts on each header to four (4) foot-pounds. The bolts must be tightened in the sequence indicated in Figure 11.

**⚠ CAUTION**

Failure to tighten the header as indicated in step 16 may cause the header to leak or become permanently damaged from warping.

**⚠ ATTENTION**

Si le tuyau collecteur n'est pas serré conformément aux directives de l'étape 16, il risque d'avoir des fuites ou de s'endommager de façon permanente.

17. Remove the 3/4 inch button plug located in the left side panel below the inlet/outlet header and replace with the 3/4 inch wire grommet from the right side panel below the return header. The high limit leads were routed through this grommet prior to removal in step 5. Install the 3/4 inch plug in the opening where the 3/4 inch wire grommet was removed.
18. Reconnect the white wire on the pressure switch (PS) and the white wire on the Fireman's switch terminal.
19. Reinstall the temperature sensor in the inlet/outlet header and tighten the nut.
20. Reconnect the black and white wires to the water pressure switch.
21. Use plastic wire ties to refasten the temperature sensor, high limit switch and water pressure switch wires to each other. Bundle the wires near the control panel and fasten them with a wire tie.

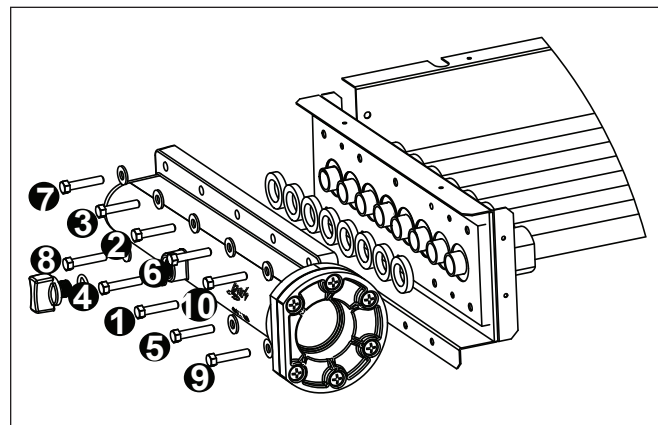


Figure 11. Header Bolt Tightening Sequence

**⚠ CAUTION**

In order to prevent property damage or injury, be sure that none of the wires are in contact with a sharp edge or a hot surface.

**⚠ ATTENTION**

Afin d'empêcher des dégâts matériels ou des blessures, assurez-vous qu'aucun des fils n'est en contact avec un bord tranchant ou une surface chaude.

22. Install the return header side cover plate on the right side of the unit.
23. Install the I/O header side cover plates, top and bottom on the left side of the unit.
24. Replace the front panel (door).

**5.5 Connections at Heater**

The Legacy heater has a standard two (2) inch water header and coupling design. With this feature, only nominal two inch PVC or CPVC may be connected to the heater. However, by installing the appropriate pipe adapters and two short pieces of two inch plastic pipe (supplied by the installer), any size existing pipe may be fitted to the heater.

To connect a section of 2" PVC or CPVC pipe to the heater, first slip a coupling nut onto the pipe. Then prepare the end of the pipe with the proper PVC/CPVC primer and glue. Follow the manufacturer's instructions provided with the primer and glue for preparation procedures and curing times. Apply the slip-fit side of the coupling to the end of the pipe. Allow the glue to cure completely. Set the o-ring into the groove on the face of the coupling. Slide the coupling nut up to the coupling and tighten it to the threaded connection on the header (see Figure 12).

**5.6 Pressure Relief Valve**

A pressure relief valve (PRV) is recommended in all installations, and is mandatory in any installation

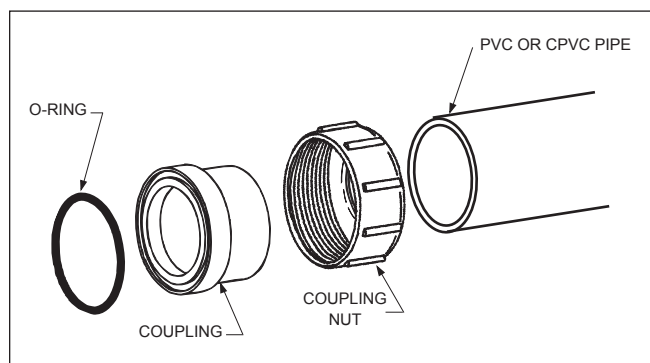


Figure 12. Piping to Heater

in which the water flow can be shut off between the heater outlet and the pool/spa.

A pressure relief valve is not supplied with the Legacy heater. However, it is recommended that a pressure relief valve be installed and may even be required by local codes. Be sure to check any applicable installation codes in your area to determine whether a pressure relief valve is required. See Section 11.2 (Parts List) of this manual for the appropriate kit part number.

The maximum working pressure of this heater is 75 psi. Be sure to take into consideration the maximum allowable pressure of the other components in the system when selecting a PRV. Any pressure relief valve installed must comply with provisions of the standard described in ANSI Z21.22 for the United States or CSA 4.4 in Canada.

Follow these steps to install a pressure relief valve:

1. To protect the threads while drilling, screw the brass adapter (included with the Jandy PRV kit) into the blind threaded hole on the top of the inlet/outlet header.
2. Using the countersink in the center of the blind hole as a guide, drill a 1/4 inch hole through the plastic (see Figure 13).
3. Open the hole by reaming it with a 3/8 inch drill bit.
4. Open the hole again by reaming it with a 1/2 inch drill bit.

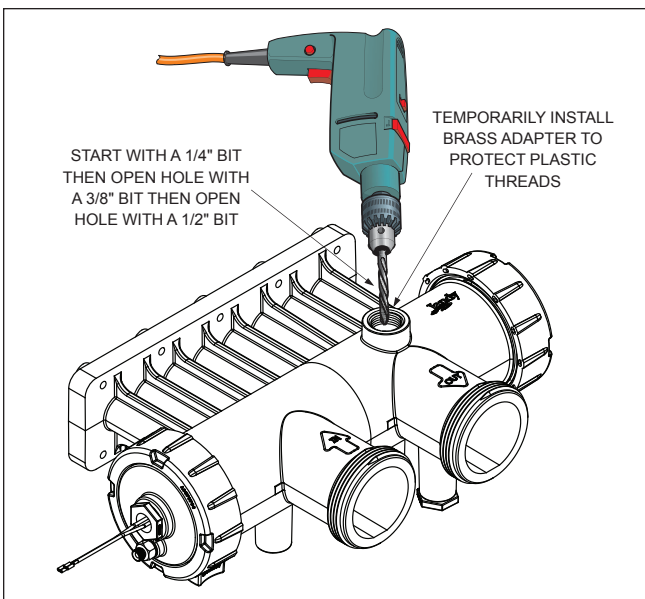
**⚠ CAUTION**

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

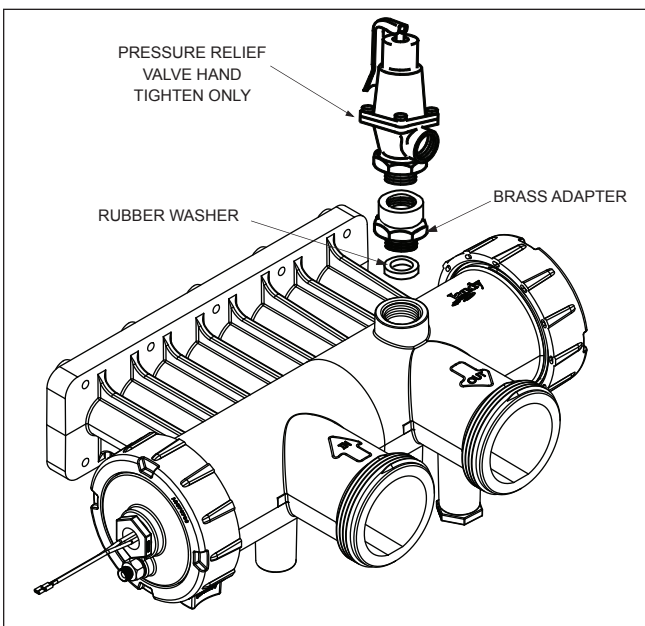
**⚠ ATTENTION**

Si vous commencez à percer le trou de 1/2" sans alésage préalable, la mèche risque de « mordre » dans le plastique. Vous risquez de vous blesser ou d'endommager le tuyau collecteur de plastique.

5. Remove the brass adapter and clean the cuttings out of the hole.
6. Install the rubber washer at the bottom of the hole (see Figure 14).
7. Thread the adapter into the hole and tighten so that it seals against the rubber washer.
8. With a permanent marker, place a mark on the adapter so that the mark faces the same direction as the water connections on the header.
9. Remove the adapter from the hole.



**Figure 13. Drill Hole for Pressure Relief Valve**



**Figure 14. Pressure Relief Valve Installation**

10. Coat the threads of the pressure relief valve (PRV) with an appropriate metal to metal thread sealant.
11. Install the adapter on the PRV and tighten using two wrenches. Use the mark made earlier on the adapter to orient the PRV to the desired direction in relation to the water connections on the header.
12. Wrap the threads of the adapter with a suitable teflon thread tape.
13. Reinstall the adapter, with the PRV, into the plastic threaded hole and tighten it until the mark on the adapter is once again facing the same direction as the water connections on the header.

### ⚠ CAUTION

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

### ⚠ ATTENTION

N'utilisez ni pâte à joint ni pâte lubrifiante sur le filetage du raccord intermédiaire ou sur toute pièce qui entre en contact avec le tuyau collecteur. Ces produits risquent d'endommager le tuyau après un certain temps.

### ⚠ CAUTION

In order to prevent property damage, do not overtighten. Overtightening may crack the header.

### ⚠ ATTENTION

Afin d'empêcher des dégâts matériels, ne serrez pas trop. Le serrage excessif peut provoquer des fissures dans la tête

### DO NOT TIGHTEN WITH A WRENCH.

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

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

The Legacy 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 Zodiac Pool Systems, Inc. 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 install an in-line check valve between the heater and the feeder (a minimum of 18" is required between the heater and the check valve).
- Wire any electrical chemical feeder so that it cannot operate unless the filter pump is running. If the feeder has an independent clock control, synchronize it with the filter clock.
- Never deposit chemicals directly in the pool skimmer.

## 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.

### ⚠ ATTENTION

Au moment de l'entretien des commandes, étiquetez tous les fils avant de les débrancher. Des erreurs de câblage peuvent entraîner un fonctionnement inadéquat et dangereux.

### 6.1 Main Power

The Legacy heater does not require an external source of electrical power to operate. The power for the gas valve and safety circuit are generated by a thermopile. The thermopile generates a millivolt signal when heated by the pilot flame. Figure 16 shows the internal electrical wiring diagram and schematic of the heater.

### 6.2 Bonding

#### ⚠ CAUTION

To prevent premature failure of the appliance resulting from stray voltages and voltage differentials, the heater must be bonded to other equipment which is part of the pool plumbing system with a solid copper wire not smaller in diameter than 8 AWG, 6 AWG in Canada.

#### ⚠ ATTENTION

Pour éviter le bris prématuré de l'appareil dû à des tensions vagabondes et à des différences de tension, le chauffe-piscine doit être scellé à l'équipement faisant partie de la plomberie de la piscine à l'aide d'un fil de cuivre massif dont le diamètre n'est pas inférieur à un calibre 8, et un calibre 6 pour le Canada.

Zodiac Pool Systems, Inc. requires that the appliance be connected to a "bonding loop" that includes all electrical equipment in the system and on the equipment pad. Bonding lugs must be connected with a solid copper wire not smaller than 8 AWG (6 AWG in Canada). Failure to do so will void warranty.

Additionally, in the United States the National Electrical Code and in Canada the Canadian Electrical Code, require that all metallic components of a pool structure, including reinforcing steel, metal fittings and above ground components be bonded together (forming a "bonding grid") with a solid copper conductor not smaller than a 8 AWG (6 AWG in Canada).

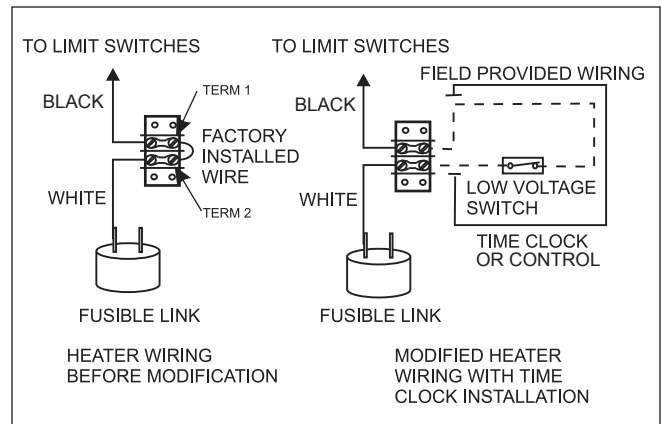


Figure 15. Time Clock Wiring or Control Connection

The NEC and the CEC also require that the equipment and/or appliances associated with the pool water circulating system, including, but not limited to, pump motors and heaters be bonded together as part of the equipotential bonding grid. Zodiac provides a special labeled bonding lug on the right side of the heater to accommodate this requirement.

### 6.3 Auxiliary Time Clock Wiring

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

To install a time clock auxiliary switch into the heater wires (see Figure 15):

1. Remove heater door.
2. Remove the factory installed wire between terminals 1 and 2 on the terminal strip (see Figure 15).
3. Connect the wires from the time clock auxiliary switch to the two terminals. Use American Wire Gauge (AWG) No. 14 gauge stranded copper wire with a temperature rating of 221°F (105°C) or greater.

The length of the wire between the heater and the time clock should not exceed 10-15 feet (4.57 m). The contact points of the time clock switch should be silver, or a low resistance alloy.

# MILLIVOLT HEATER ELECTRICAL DIAGRAM

## Schéma Électrique Du Chauffe-Eau Modèle Millivolt

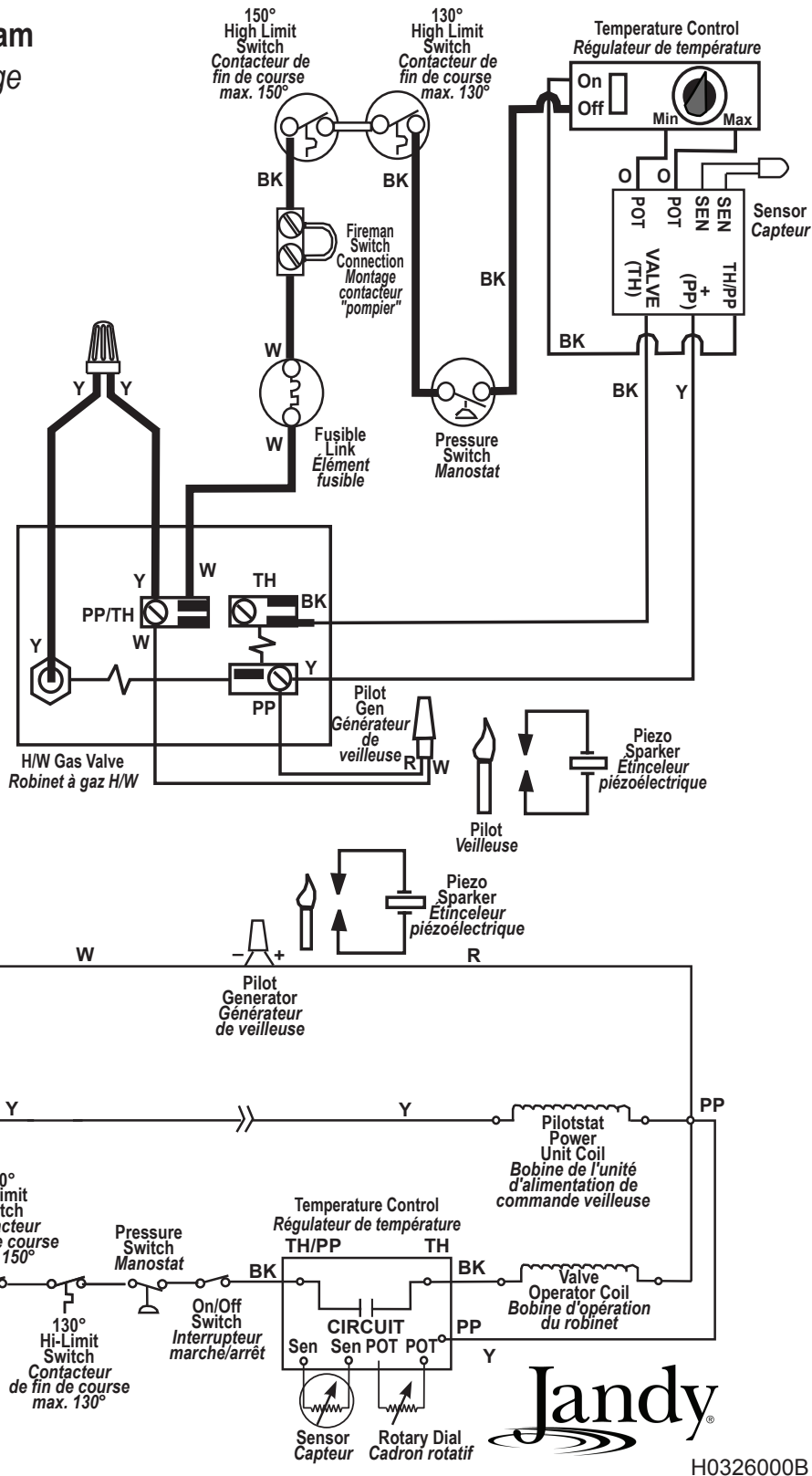
### Connection Diagram

### Schéma de montage

- BK - Black    BK - Noir
- W - White    W - Blanc
- Y - Yellow    Y - Jaune
- R - Red       R - Rouge

IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE HEATER MUST BE REPLACED, APPLIANCE WIRING MATERIAL RATED FOR 105°C MUST BE USED. WHERE MARKED WITH APPLIANCE WIRING MATERIAL FOR 200°C MUST BE USED.

Si l'un quelconque des fils d'origine fournis avec le chauffe-eau doit être remplacé, un fil pour appareils électriques à tolérance nominale de 105°C doit être employé. Si le fil porte le symbole, le remplacer uniquement par un fil pour appareils électriques à tolérance nominale de 200°C.



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Figure 16. Legacy Connections/Schematic Wiring Diagram

## Section 7. Operating Instructions

### 7.1 Normal Operation

The Legacy model LRZ millivolt heaters are capable of automatic operation based on a call for heat at a preset temperature. 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's pilot is lit and the pilot generator is providing a millivolt signal to the safety circuit, 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 temperature control circuit is closed, activating the gas valve and the gas valve is opened. Gas flows through the burners, is mixed with air in the combustion chamber, and is ignited by the pilot. 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 temperature control circuit opens and shuts off the gas valve.

### 7.2 Start-Up

#### 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 gas control which has been under water.

#### ATTENTION

N'utilisez pas cet appareil s'il a été plongé dans l'eau, même partiellement. Faites inspecter l'appareil par un technicien qualifié et remplacez toute partie du système de contrôle et toute commande qui ont été plongés dans l'eau.

#### CAUTION

Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the heater.

#### ATTENTION

En cas de surchauffe ou si l'alimentation en gaz ne s'arrête pas, fermez manuellement le robinet d'arrêt de l'admission de gaz.

#### CAUTION

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

#### ATTENTION

Ne tentez pas d'effectuer des réparations au système de régulation du débit du gaz ou à l'appareil. Toute modification non autorisée est dangereuse et entraîne l'annulation de toutes les garanties.

#### CAUTION

Keep all objects off the top of the heater. Blocking air flow could damage the heater, and may void the warranty.

#### ATTENTION

Ne posez aucun objet sur le dessus de l'appareil. Il pourrait empêcher la circulation de l'air, ce qui risquerait d'endommager l'appareil et d'annuler la garantie.

#### WARNING

Vent pipes, draft hoods, and heater tops get hot! These surfaces can cause serious burns. Do not touch these surfaces while the heater is in operation. Adding a vent cap reduces the temperature on the top.

#### AVERTISSEMENT

Les tuyaux d'aération et le dessus de l'appareil deviennent chauds! Ils peuvent causer de graves brûlures. Ne touchez pas à ces surfaces lorsque l'appareil est en marche.

#### WARNING

For your safety, when starting the heater, keep your head and face well away from the lower firebox opening to prevent any risk of personal injury.

#### AVERTISSEMENT

Pour votre sécurité personnelle lorsque vous mettez l'appareil en marche, tenez votre tête et votre visage loin du brûleur pour éviter tout risque de blessure.

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

The heater may not start on the first try. Air in the gas line or other start-up situations may cause it to cycle.

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

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

#### ⚠ WARNING

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

#### ⚠ AVERTISSEMENT

Lorsque l'appareil est mis en marche pour la première fois, le matériau liant réfractaire de la chambre de combustion est expulsé par la chaleur de la flamme. De la fumée blanche et de fortes odeurs peuvent se dégager du tuyau d'aération à ce moment-là. N'inhalez les fumées de combustion à aucun moment, surtout au moment où elles sont émises. Cette période de combustion ne durera que quelques minutes.

### 7.3 Lighting and Shutdown Procedures

Before starting your heater, be sure that you are familiar with the setting and operation of the heater controls. Once the controls are set to your preferences, follow the instructions outlined on the following page (Figure 18). **Read and follow all safety instructions first.**

A more detailed set of instructions of the operation of the controller follows in the next section.

**NOTE:** If your heater is configured to operate on LP gas and the LP tank runs out of fuel, turn off gas at the heater. After the tank is refilled, the heater must be relit following the instructions found on the inside of the heater. A copy of these instructions appears on the following page.

#### ⚠ WARNING

DO NOT attempt repairs on the gas control or heater. Tampering can cause severe bodily injury or death and voids all warranties.

#### ⚠ AVERTISSEMENT

AVERTISSEMENT N'ESSAYEZ PAS de faire vous-même des réparations sur le contrôleur de gaz ou le réchauffeur. L'altération du produit peut causer des blessures corporelles graves ou même la mort et annule toutes les garanties.

#### ⚠ WARNING

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

#### ⚠ AVERTISSEMENT

Ne tentez pas d'opérer l'appareil sans que la porte soit en place. Vous pourriez être victime de blessures corporelles graves.

### 7.4 Turning the Heater On/Off and Setting the Temperature Control

The temperature control (see Figure 17) is calibrated at the factory and covers a range from approximately 70°F to 104°F (21°C to 40°C). Use an accurate pool thermometer to determine the best water temperature for your uses.

The Legacy temperature control panel has a rocker switch to turn the heater on and off. It also has a rotary dial to set the desired thermostat setting (see Figure 17).

Once the heater has been lit by following the safety and lighting procedures in Section 7.3, set the toggle switch on the control panel to “ON” to start the heater operation. If the heater senses that the pump is on and the thermostat setting is higher than the temperature of the pool/spa water, the pilot will ignite the main burners.

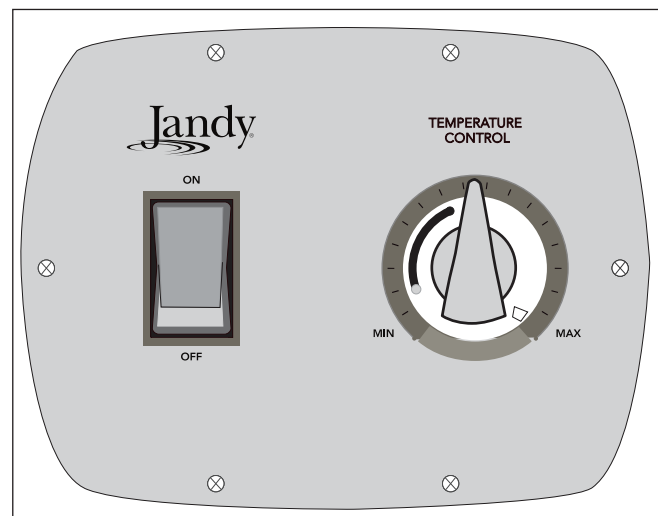


Figure 17. Temperature Control



**FOR YOUR SAFETY READ BEFORE OPERATING**

**PRÉCAUTIONS À LIRE AVANT D'UTILISER**




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

**⚠AVERTISSEMENT :** Si vous ne suivez pas ces instructions à la lettre, il y a risque d'incendie ou d'explosion, pouvant entraîner des dégâts matériels et des blessures graves voire mortelles.

**LIGHTING INSTRUCTIONS**

**INSTRUCTION D'ALLUMAGE**



**INSTRUCTIONS TO LIGHT HEATER**

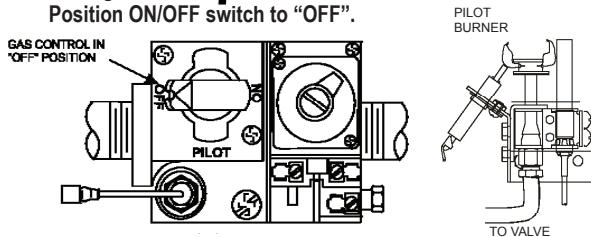
1. Position ON/OFF switch to "OFF"
2. Turn gas control knob clockwise  until it stops at "OFF" position.
3. Wait five (5) minutes before lighting pilot.
4. Turn knob on gas valve counterclockwise  to "PILOT" then push control knob all the way and hold down. Push the button of the sparker, repeating until confirming that pilot lights, by observing reflection on burner tray mirror. Continue to hold the control knob in for about one (1) minute after the pilot is lit. If it goes out, repeat steps 3 and 4.
5. Turn gas control knob counterclockwise  to "ON".
6. After replacing door, set thermostat to desired setting and turn appliance ON/OFF switch to "ON". Valve has built-in delay before coming on.

**RELIGHTING**



If pilot goes out, repeat steps 1 through 6.

**TO SHUT OFF HEATER**

To shut off main burners turn gas control knob clockwise  until it stops at "PILOT". For complete shut-off press down slightly on knob while turning clockwise  to "OFF". Do not force. Position ON/OFF switch to "OFF".





**INSTRUCTION D'ALLUMAGE DU CHAUFFE-PISCINE**

1. Placer l'interrupteur général de l'appareil à la position "OFF".
2. Faire tourner le bouton du robinet à gaz vers la droite  jusqu'à ce qu'il s'arrête à la position "OFF".
3. Attendre cinq (5) minutes avant d'allumer la veilleuse.
4. Faire tourner le bouton du robinet à gaz vers la gauche  jusqu'à la position "PILOT" puis enfoncer le bouton complètement à fond et le maintenir dans cette position. Faire tourner le bouton de la génératrice d'étincelles de façon répétée jusqu'à confirmer que la veilleuse s'est allumée en observant sa réflexion sur la cuvette du bec de gaz. Continuer à maintenir le bouton en position enfoncée pendant environ une (1) minute après l'allumage de la veilleuse. Si elle s'éteint, répéter les étapes 3 et 4.
5. Faire tourner le bouton du robinet à gaz vers la gauche  jusqu'à la position "ON".
6. Après avoir remis en place le panneau d'accès, régler le thermostat sur la valeur voulue, et mettre l'interrupteur général de l'appareil sur la position "ON". Le robinet à gaz incorpore un retardement d'allumage.

**RÉALLUMAGE**

Si la veilleuse s'éteint, répéter les étapes 1 à 6.

**POUR ARRÊTER LE CHAUFFE-PISCINE**

Pour éteindre les brûleurs principaux, faire tourner le bouton du robinet à gaz vers la droite  jusqu'à ce qu'il s'arrête à la position "PILOT". Pour arrêter complètement l'appareil, enfoncer le bouton et continuer à le faire tourner vers la droite  jusqu'à la position "OFF". Ne pas forcer. Mettre l'interrupteur général sur la position "OFF".

**IMPORTANT INFORMATION**

**RENSEIGNEMENTS IMPORTANTS**

1. CAUTION: Do not store pool chemicals or flammable materials near this appliance.
2. PH LEVEL: Pool Water must be maintained between 7.4 and 7.6 when operating unit (See section entitled "Water Chemistry" in operating manual).
3. BACKWASHING: Turn heater off 20 minutes before backwashing or shutting down filter to prevent damage to unit.
4. WINTERIZE: All gas to unit must be shut off and all water drained from unit to protect it from freezing damage.

1. AVERTISSEMENT: Ne pas ranger de produits chimiques ni de matériaux inflammables près de cet appareil.
2. NIVEAU DE pH de l'eau de la piscine doit rester entre 7.4 et 7.6 pendant le fonctionnement de l'appareil. (Voir la section autorisé "la Chimie d'Eau" du manuel d'utilisation.)
3. RETRE-RINCAGE: Arrêter le chauffe-eau 20 minutes avant le rétro-rincage ou l'arrêt du filtre pour éviter d'endommager l'appareil.
4. PREPARATION POUR L'HIVER: Couper l'alimentation en gaz de l'appareil pour le protéger du gel.

**NOTE:** THIS DOOR MUST BE FITTED TO UNIT DURING NORMAL OPERATIONS.

**REMARQUE:** CETTE PORTE DOIT ÊTRE BIEN AJUSTÉE SUR L'APPAREIL PENDANT SON FONCTIONNEMENT NORMAL.

**FOR YOUR SAFETY**

**AVERTISSEMENT DE SÉCURITÉ**

DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS OR LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

NE PAS ENTREPOSER NI UTILISER DE L'ESSENCE OU TOUTE AUTRE VAPEUR ET LIQUIDE INFLAMMABLES AUX ALENTOURS DE CET APPAREIL OU DE TOUT AUTRE APPAREIL.

**NOTE:** SOME EXPOSED PARTS OF THIS HEATER MAY BE HOT WHEN OPERATING.

**REMARQUE:** PENDANT LE FONCTIONNEMENT, CERTAINES PIÈCES EXPOSÉES DE CE CHAUFFE-PISCINE PEUVENT DEVENIR TRÈS CHAUDES.



H0325000-

Figure 18. Legacy Lighting and Shutdown Procedures

### ⚠ CAUTION

In order to prevent property damage, the heater is designed to run only when the filter pump is running. If the heater does not immediately turn off when the pump turns off, turn the heater off at the control panel. The heater's pressure switch may need adjusting (see Section 7.5)

### ⚠ ATTENTION

Pour éviter les dommages à la propriété, le réchauffeur est conçu pour fonctionner seulement lorsque la pompe à filtration est en marche. Si le réchauffeur ne s'éteint pas immédiatement lorsque vous arrêtez la pompe, éteignez le réchauffeur sur le panneau de commandes. Le commutateur de pression du réchauffeur devra peut-être être ajusté (voir la Section 7.5).

Once the pool/spa water temperature reaches the thermostat setting, the heater will automatically stop firing. As the pool/spa water temperature falls below the thermostat setting the heater will once again start the heating cycle.

Rotate the thermostat dial clockwise to increase the temperature setting and counterclockwise to decrease the setting. It may take several attempts to set the thermostat dial to the desired temperature. Be sure to use an accurate thermometer to measure water temperature. Once the desired temperature setting is found, loosen the screw on the Temp-Lok ring and rotate the ring until the stop rests against the knob. Tighten the screw to hold the knob in position. This will prevent accidental moving of the dial and possible overheating of the water.

**IMPORTANT:** The temperature controls cannot be calibrated in the field. If the control is faulty, shut down the heater by following the procedures in Section 7.3 and have a qualified service technician replace the control. **DO NOT** use the thermostat switch to completely shut down the heater.

## 7.5 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.

### ⚠ ATTENTION

Le manocontact de pression d'eau doit être réglé de façon à ce que l'appareil cesse de fonctionner si la pompe s'arrête. Si le manocontact est réglé pour se fermer lorsque le débit d'eau est trop faible, l'appareil risque de s'endommager. Réglez le manocontact pour qu'il arrête l'appareil, et non pour qu'il le mette en marche.

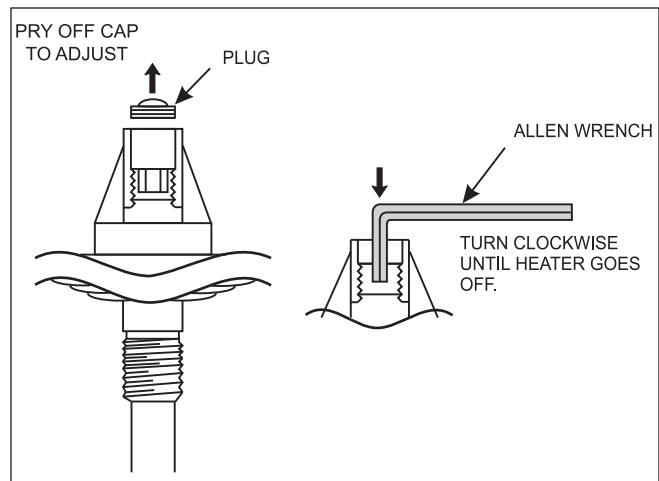


Figure 19. Pressure Switch Adjustment

The pressure switch is preset at the factory for activation at 2 psi (14 kPa). Do not adjust the pressure switch if the heater is installed more than 15 feet (4.57 m) below 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 (see Figure 19).

1. Turn the heater control to OFF. See Figure 17.
2. Remove the side panel above the front header to access the water pressure switch.
3. Start the filter pump and confirm by means of a voltmeter that the pressure switch closes (if the switch fails to close, replace it with a switch that has a lower minimum setting).
4. Turn the heater ON. Set the temperature control to the max position. Heater should start.
5. Pry out the top cap on the pressure switch.
6. Use a 7/32 inch Allen wrench to turn the adjustment screw very slowly clockwise until the heater goes off.
7. Slowly turn the pressure switch adjustment screw **counterclockwise** one-quarter turn. The heater should come back on.
8. Check the adjustment by turning the filter pump OFF. The heater burners should shut off immediately. If they do not, restart the filter pump and

repeat Steps 6 and 7. Check the adjustment again.

9. 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.

## 7.6 Temperature Rise

The Legacy pool and spa heaters have an internal bypass which accommodates a wide range of water flow. The bypass is easily adjustable to change the temperature rise for optimum performance and length of heater life. The bypass assures constant heat exchanger flow even though flow through the filter system will vary depending on how dirty the filter is.

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

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

Before checking the temperature rise, make sure that the pool filter is clean and that gas supply and manifold pressures are correct. If necessary, clean all components of the filter system. Temperature rise is measured in the return header of the Legacy. To measure the temperature rise, turn off the filter pump

and remove the plastic plug protruding through the cabinet on the return header side of the heater. See Figure 20. 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 11 of this manual for the correct kit number.

The internal bypass can be adjusted by means of a screw on the right-hand side of the header. To adjust the temperature rise to within the ranges specified in Table 6, proceed as follows:

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

\* Pete's Plug is a registered trademark of the Peterson Equipment Co.

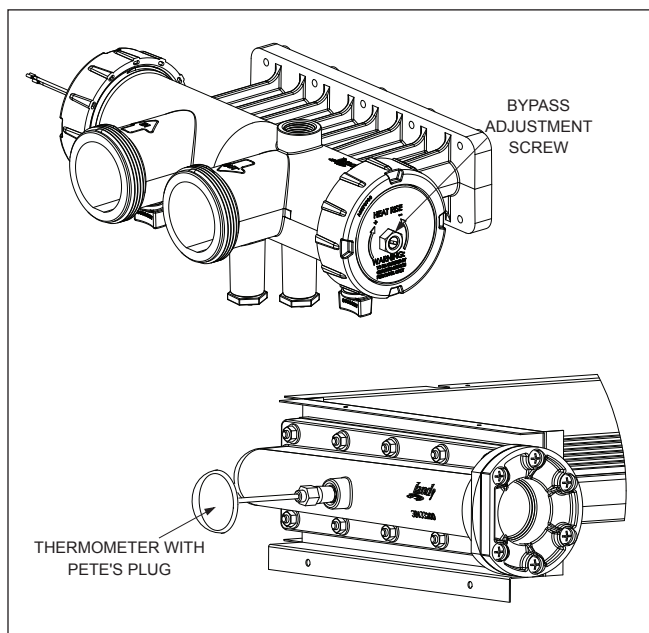


Figure 20. Temperature Rise Measurement

**Table 6. Water Temperature Rise and Flow Rates  
(Measured at Return Header)**

Model	Minimum Temp Rise, °F (°C)	Maximum Temp Rise, °F (°C)	Minimum System Flow GPM (lps)
125	3 (2)	7 (4)	30 (1.9)
175	5 (3)	10 (6)	30 (1.9)
250	7 (4)	15 (8)	30 (1.9)
325	9 (5)	17 (9)	30 (1.9)
400	11 (6)	20 (11)	30 (1.9)

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

## Section 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 tests for mineral content. One of these kits will detect copper in the system. This is usually a warning that corrosion is taking place, possibly due to a low pH value combined with other chemistry problems. The condition can be corrected by changing the spa water and closely monitoring the pH factor and chemical properties of the water. Be sure to keep your chemical levels within the values indicated in Table 7. **Zodiac Pool Systems, Inc. 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 7. Optimal Water Chemistry Ranges\***

Test	Recommended Level
Free Chlorine	1.0 to 3.0 ppm
Bromine	2.0 to 4.0 ppm
pH	7.2 to 7.8 (ideal range of 7.4 to 7.6)
Total Alkalinity (TA)	80 to 120 ppm
Calcium Hardness (CH)	175 to 400 ppm
Cyanuric Acid	50 to 75 ppm
Total Dissolved Solids (TDS)	1000 to 2000 ppm (Excluding dissolved NaCl from a Salt Chlorine Generator)
Copper	0 ppm

\* Concentration levels taken from "Basic Pool and Spa Technology" published by APSP (Association of Pool and Spa Professionals).

## 8.2 Seasonal Care

### ⚠ CAUTION

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

### ⚠ ATTENTION

Ne faites pas fonctionner cet appareil à l'extérieur à des températures inférieures à 20 degrés Fahrenheit (°F) (-7 degrés Celsius [°C]).

### 8.2.1 Spring and Fall Operation

During periods when the pool is only going to be used occasionally, turn the temperature control down to the MIN setting. This prevents the pool water from becoming chilled, and minimizes the time required to raise the pool water back up to the desired temperature.

In areas subject to only short freeze periods, turn off the heater and run the pump continuously for the length of the freeze period.

If the heater is not going to be used for a long period of time, shut it down completely. Follow the instructions found on the inside of the heater, or page 25 of this manual.

### 8.2.2 Winterizing

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 gas supply valve to the heater, outside the heater jacket.
2. Remove heater door.
3. Shut down the heater following the shutdown instructions found on the inside of the heater or on page 25 of this manual.

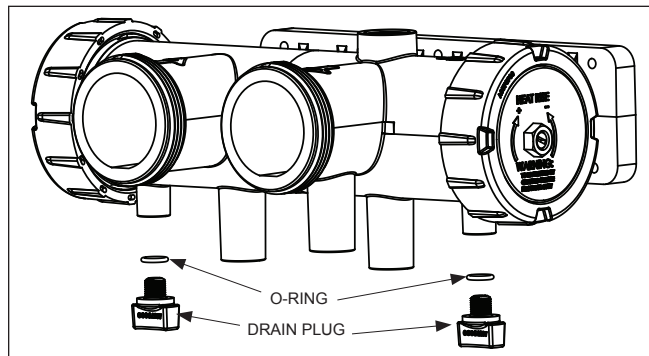


Figure 21. Draining the Heater

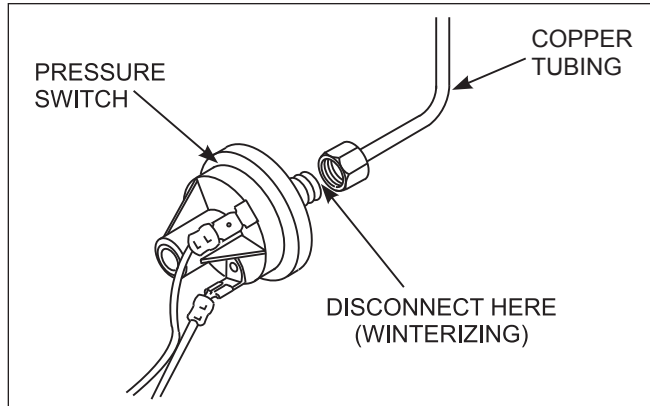


Figure 22. Pressure Switch Copper Tubing

4. Remove the drain plug from the inlet/outlet header, and completely drain the heater before the first frost. See Figure 21.
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. Inspect the gaskets on the drain plugs and reinstall the plugs, but do not tighten.
8. Disconnect the pressure switch from the copper tubing. See Figure 22.

### 8.2.3 Spring Start-up

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

1. Attach the copper tubing to the pressure switch (see Figure 22).
2. Tighten the drain plugs.
3. Turn on the filter pump and circulate water through the heater for 5 minutes. Check for leaks while circulating.
4. Turn on the main gas supply valve to the heater, outside the heater jacket.

5. Turn on the heater following the lighting instructions found on the inside of the heater, or page 25 of this manual.

## 8.3 Inspection and Service

The Legacy heater is designed and constructed 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. Improper maintenance can result in conditions where nausea or asphyxiation from carbon monoxide or flue gases could cause severe injury, property damage or death.

### ⚠ WARNING

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

### ⚠ AVERTISSEMENT

Une installation ou un entretien inadéquat peut causer la nausée ou l'asphyxie en raison du monoxyde de carbone présent dans les gaz de combustion et même entraîner des blessures graves ou la mort.

### 8.3.1 Owner Inspection

Zodiac Pool Systems, Inc. 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.

### ⚠ CAUTION

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

### ⚠ ATTENTION

Ne pas entreposer ni utiliser d'essence ni d'autres vapeurs ou liquides inflammables à proximité de cet appareil ou de tout autre appareil.

### ⚠ WARNING

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 gas control which has been under water.

### ⚠ AVERTISSEMENT

N'utilisez pas cet appareil s'il a été plongé dans l'eau, même partiellement. Faites inspecter l'appareil par un technicien qualifié et remplacez toute partie du système de contrôle et toute commande qui ont été plongés dans l'eau.

3. 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.
4. Be sure all combustion air and ventilation openings are not blocked. Check for spider webs and other debris inside the heater, in the vents on all sides of the heater jacket and in the exhaust outlet— especially after a long period of nonuse.

### 8.3.2 Professional Inspection

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. Inspect the venting system for blockage, leakage, and corrosion.
2. Inspect burners and verify that they are clean. Clean with a wire brush if necessary to remove debris.
3. Check for spider webs and other debris in the pilot and main burner orifices - especially at spring start-up.
4. Check for loose or broken wires and terminal connections.
5. 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.
6. Make a visual check of the main burner flame. The flame can be seen in a mirror arrangement

held beneath the burners. The flame should be

- a. Blue in color.
- b. 1 to 4 inches (25mm to 102mm) above burner surface (see Figure 23).

7. Inspect the gas and electronic controls, including the following:
  - a. High temperature limit switch
  - b. Water pressure switch
  - c. Automatic gas valve
  - d. Fusible Link
  - e. Temperature control
8. Perform a temperature rise test in accordance with Section 7.6.
9. If the heater is equipped with a pressure relief valve, check for corrosion in and around the valve. 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.
10. Inspect the external surfaces of the heat exchanger tubes for black carbon soot buildup by placing a mirror between and under the burners when the heater is firing. Remove any soot that has collected on the tubes, and correct the cause.

**NOTE** 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.

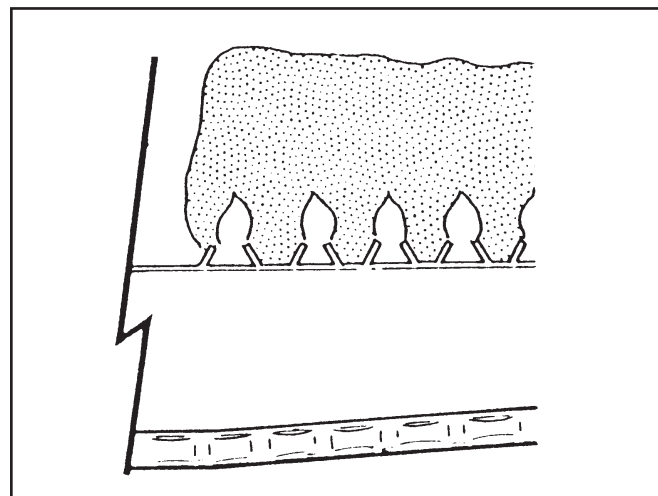


Figure 23. Main Burner Flame

11. Conduct a normal operating cycle and observe that the sequence proceeds as intended.

**⚠ CAUTION**

For your safety, when starting the heater, keep your head and face away from the burner area opening to prevent any risk of personal injury.

**⚠ ATTENTION**

Pour votre sécurité personnelle, lorsque vous mettez l'appareil en marche, tenez votre tête et votre visage loin du brûleur pour éviter tout risque de blessure.

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

## Section 9. Troubleshooting

### 9.1 General Heater Troubleshooting

Table 8 lists some of the more common problems, causes and solutions encountered when running the heater. Most problems occur when the heater is being started for the first time after installation or at spring start-up. Careful installation and maintenance will help ensure years of trouble free use from your Legacy heater.

Table 8. Legacy Troubleshooting Guide

#	Symptom	Cause	Remedy
1.	Pump not operating	A. No power B. Pump defective C. Incorrectly wired	A. Check circuit breakers and power source. B. Replace. C. Recheck wiring.
2.	Pilot outage	A. Inlet gas pressure too low B. Inlet gas pressure too high causing an unstable blowing pilot C. Weak or defective thermocouple D. Damaged pilot or thermocouple E. Dirty pilot F. Plugged or undersized pilot orifice	A. Consult gas utility company. Inlet gas pressure to heater should be 5.5" to 10.0" water column on natural gas. 10.0" to 14.0" on propane gas. B. Pressure should be regulated within limits shown above. C. Replace thermocouple. D. Replace. E. Blow dust or lint out of pilot. F. Clean or replace pilot orifice.
3.	Flame roll-out at start-up	A. Blocked flue B. Pilot out of position (delayed ignition) C. Blocked heat exchanger D. Refractory tile out of place E. Altered vent cap F. Low gas pressure	A. Remove blockage. B. Correct pilot position. C. Clean and correct as necessary. D. Clean and correct tile as necessary. E. Install factory provide vent cap. F. Check and correct gas pressure.
4.	Spillage at draft hood	A. Cold chimney B. Vent pipe pitches down to chimney C. Blocked chimney D. Altered draft hood E. Prefabricated chimney with incorrect cap	A. Allow heater to operate five (5) minutes to create draft action. B. Reinstall vent pipe to pitch up from the heater to chimney. C. Remove blockage. D. Install factory-provided draft hood. E. Install U.L. listed vent cap.
5.	Lazy flame with yellow tip	A. Low primary air	A. Correct manifold pressure according to rating plate. Correct orifice size if necessary (see parts list). Clean burner ports if dirty.
6.	Not enough heat	A. Inadequate gas supply B. Low manifold gas pressure C. Heater size inadequate D. Low temperature rise	A. Gas meter too small. Gas line from meter to heater too small. B. Gas pressure on heater manifold, should be adjusted to 4.0" W.C. (natural gas), 9.0" W.C. (propane gas). C. Replace with heater of higher input. D. Check and correct water flow.
7.	Heater pounding or knocking	A. Inadequate water flow through heater	A. Check temperature rise between inlet and outlet heater piping. See section 7.6 for recommended range of temperature rise. If temperature rise is above the maximum recommended, check for closed valve in system.
8.	Heater condensing	A. Low water temperature	A. Flue product moisture will condense at the start-up until the heater water temperature reaches the normal operating conditions.
9.	Pressure relief valve opens	A. Restriction in water flow system at or downstream of heater	A. Check for proper operation of all valves, bypass valve and any equipment between pool and heater outlet.
10.	Pilot is lit but main burners will not come on	A. Gas valve not at "on" position B. Hi-limit switches failed C. Pressure switch failed or out of adjustment D. Fusible link failed E. Gas valve failed F. Broken wire in thermostat circuit or defective thermostat G. Heater wired incorrectly	A. Turn knob to "on" position. B. Investigate reason for overheating and replace hi-limit switch as necessary. C. Adjust pressure switch (see Section 7.5) or replace as necessary. D. Investigate reason for flame rollout and replace fusible link as necessary. E. Check and replace gas valve as necessary. F. Check continuity through thermostat circuit with wires disconnected. G. Check heater wiring against wiring diagram in Section 6, correct as necessary.
11.	Heater short cycles	A. Low water flow through heater B. Failing hi-limit switch	A. Increase size of pump or increase piping size. B. Check hi-limit switches and replace as necessary.



## Section 10. Professional Maintenance and Service

### ⚠ WARNING

#### SERVICING SAFETY

Some of the servicing procedures for the Legacy heater are hazardous because they involve fuel gas, electricity, moving parts and procedures which require testing or temporary bypass of safety controls. For this reason, the heater must be serviced only by a qualified professional service technician.

#### IMPROPER SERVICE HAZARD

The Legacy heater incorporates unique design features. Incorrect service of this heater can result in personal injury or damage to property. To avoid such hazards, the heater must be serviced only by a qualified professional service technician.

### ⚠ AVERTISSEMENT

#### PRÉCAUTIONS LORS DES RÉPARATIONS ET DE L'ENTRETIEN

Certaines procédures d'entretien et de réparation des appareils de chauffage à faibles émissions Legacy et Legacy présentent des dangers, car elles mettent en jeu des gaz combustibles, des composants électriques, des pièces mobiles et des procédures qui nécessitent des mises à l'essai ou la dérivation temporaire des commandes de sécurité. Pour cette raison, l'appareil de chauffage doit être entretenu et réparé uniquement par un technicien professionnel qualifié.

#### DANGERS D'UN ENTRETIEN INADÉQUAT

Les appareils de chauffage à faibles émissions comportent des caractéristiques techniques uniques. Une réparation ou un entretien inadéquat peut entraîner des blessures corporelles ou des dommages à la propriété. Pour cette raison, l'appareil de chauffage doit être entretenu et réparé uniquement par un technicien professionnel qualifié.

### 10.1 General Information

A qualified professional technician must service the Legacy model LRZ millivolt pool heater using Zodiac Pool Systems, Inc. service procedures. Before calling for service, however, the owner should check for obvious problems. The other components in the pool system, including pump, filters and strainers, water valves, gas supply and time clocks have an effect on heater operation.

Confirm that the Legacy heater control switch is set to 'ON' and that the temperature control knob is set high enough to make the heater operate. Make sure the pump is operating, that the filter and strainers are not clogged, that there are no mis-positioned water valves, that the gas is not shut off and that time clocks are

properly adjusted. Also be sure that there is no blockage of the vent or louvers which supply combustion air to the burners.

### 10.2 Natural-Draft Combustion System

The Legacy model LRZ millivolt pool heater has an atmospheric combustion system. This system is illustrated in Figure 24.

As the heated exhaust gases rise out of the combustion chamber, flow is created through the system and fresh combustion air is drawn into the heater through the louvers cut into the front and sides of the heater. Gas is forced through an orifice into the open end of a burner. When the gas flows into the burner, a "negative" pressure is created at the opening of the burner. This negative pressure pulls air into the burner with the gas and mixes the two together. As the gas/air mixture flows through the burner ports it is ignited in the combustion chamber. Hot combustion products then rise through a highly efficient heat exchanger. Combustion products then enter a flue collector and are directed to the outdoors through the grate top of the heater or a vent pipe and cap.

### 10.3 Heater Components and Their Operation

1. **Gas Valve / Regulator** - The gas valve controls gas flow into the manifold. It provides flow only when the temperature controls require heat and only if all safety controls enable operation. It is also a *positive pressure regulator*. It regulates the gas pressure in the manifold to specifications addressed earlier in this manual. This is necessary for proper operation of the burner system.

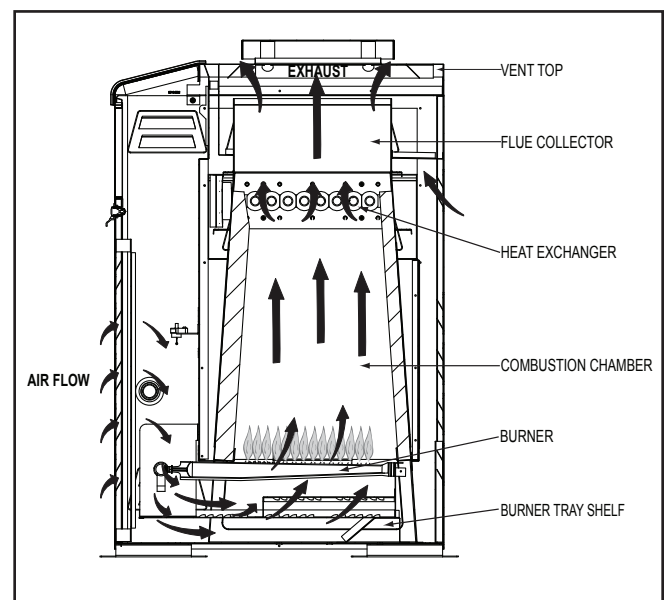


Figure 24. Atmospheric Combustion System

2. **Temperature Control** - The Jandy Legacy controller is an electronic control which senses water temperature by means of a thermistor and controls heater operation to bring the water to the desired temperature. The desired temperature is set by rotating a knob on the face of the control panel. To achieve accurate water temperatures, the pool/spa water must be monitored with an accurate pool thermometer.
3. **Pilot/Pilot Ignition** - The Legacy heater relies on a standing pilot to ignite the burners when the temperature control calls for heat. When lit the pilot receives a constant flow of gas from the gas valve. If the pilot extinguishes, the gas valve is automatically signalled to stop the flow of gas to the pilot and the burners to prevent a gas build up in the heater. Igniting the pilot is achieved by means of a piezo spark igniter mounted on the inner front panel of the controls compartment of the heater.
4. **Pilot Generator (Thermopile)** - The pilot generator is a device, that when heated by the flame of the pilot, generates a small electrical voltage of approximately 750 millivolts. The voltage is placed across the temperature controller and safety circuit of the heater. If this current is broken at any time, the gas valve is immediately shut off and the heater stops firing. This voltage is also used to activate the gas valve's pilot coil which allows gas to flow to the pilot after the gas valve knob is released.
5. **Limit Switches** - Two limit switches prevent excessive water temperature - one within the heat exchanger and one for water leaving the heater. If either senses excessive temperature, burner operation is interrupted.
6. **Water Pressure Switch** - This control senses whether or not water is available to the heater by measuring back pressure inside of the heat exchanger. If the pool water pump fails or the water filter is blocked, the pressure switch prevents operation of the burner.
7. **Fusible Link** - This is a single-use switch which detects abnormal temperature in the component vestibule. It is a fusible link which is held to the inner panel just above the burner tray by a sheet metal bracket. Excessive temperature in the component compartment, possibly due to a blocked flue or flame roll-out, will cause the link to fail. This opens the safety circuit which shuts off the gas valve and shuts the heater down.

## 10.4 Electrical Troubleshooting

This section describes procedures for checking the pilot generator and control components of the heater one at a time and in the order they appear in the control circuit.

**NOTE** Pump must be running during the troubleshooting procedure.

These procedures require a voltmeter with a minimum 0-1000 mVDC range. Figure 25 shows the pilot generator and control circuits, and where to take measurements. Location numbers and letters in circles have been added, and will be referenced in the following sections.

As stated at the beginning of this manual, some of these procedures are hazardous. Only a qualified service technician should service the heater.

During the trouble shooting procedure, the filter pump must be on, the pilot on the heater must be lit, the ON/OFF switch on the heater must be in the ON position and the control knob must be turned to the maximum setting so that there is a call for heat. We recommend turning the gas valve control knob to the "PILOT" position to prevent the main burners from firing throughout the procedure. Before starting the procedure, be sure that the pilot has been lit for at least 2 minutes and that the pilot generator (thermopile) is positioned correctly within the flame of the pilot.

The pilot generator also operates the pilot coil of the gas valve, allowing gas to flow to the pilot when the gas valve knob is released from the pilot lighting position (see Section 7.3 "Lighting and Shutdown Procedures"). If the pilot will not stay lit when the gas valve knob is released, check the pilot generator output as described in Section 10.4.2 and replace if necessary. If the pilot generator output is sufficient, then check the gas valve as outlined in Section 10.4.1.

### 10.4.1 Gas Valve

The gas valve consists of two (2) separate internal operating valves. The main valve supplies gas to the main burners for heater operation. The pilot valve supplies gas to the pilot when the pilot generator activates the pilot coil.

If the pilot will not stay lit after following the lighting instructions in Section 7.3, check for the following:

- Pilot generator output
- Correct type of gas supplied
- Correct gas supply pressure
- Air in the gas line
- Pilot coil wire connections clean and tight

If the pilot will not stay lit after checking the items listed above, the pilot coil may be causing the fault. Replace the gas valve.

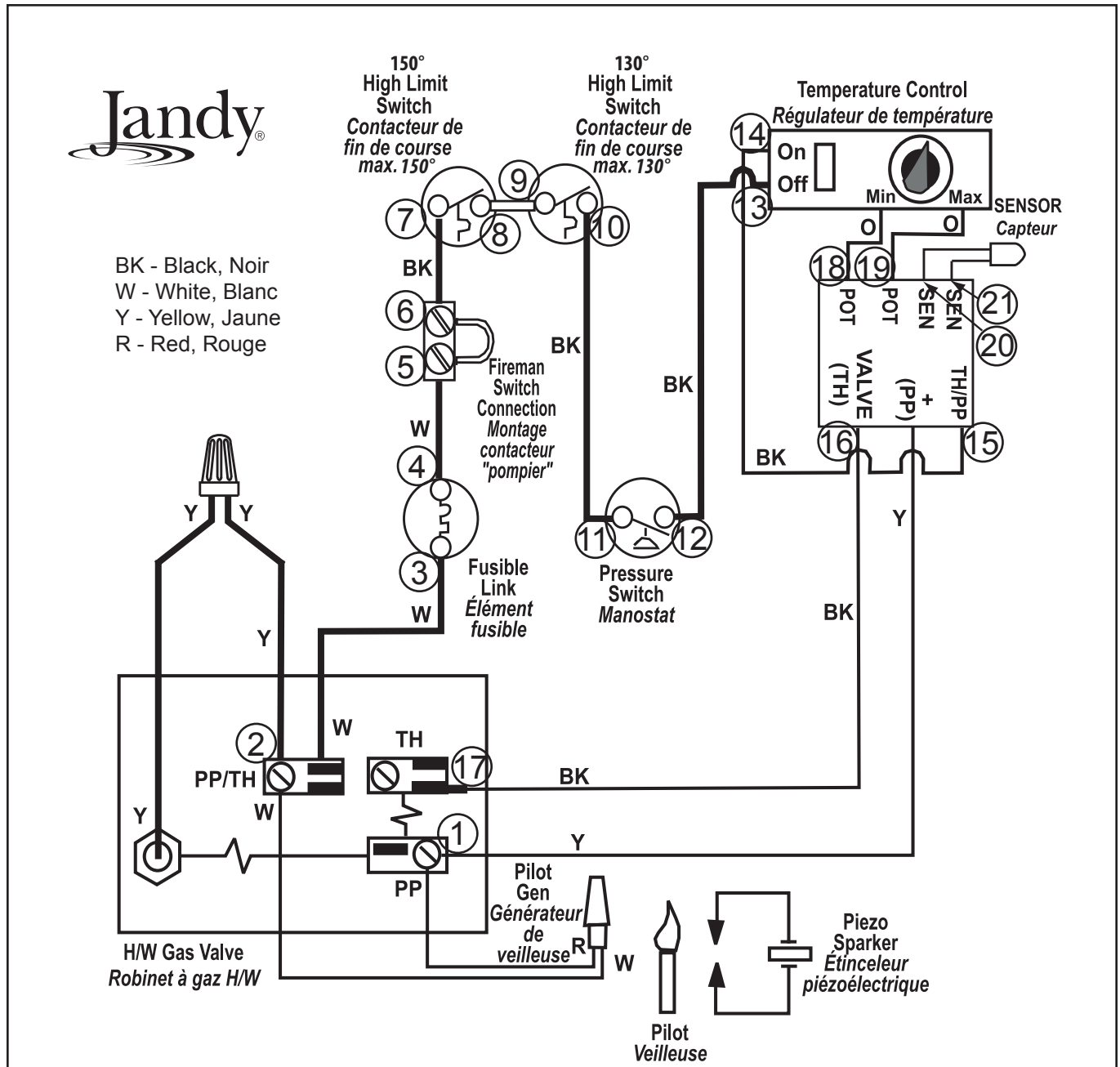


Figure 25. Test Point Identification Diagram

If the main burners will not light after following the lighting instructions in Section 7.3, check the voltage reading between the PP terminal on the gas valve (test point 1) and the TH terminal on the gas valve (test point 17). If the meter shows less than 220mVDC then there is a problem with the pilot generator, the sensors in the safety loop or the control panel. Follow the trouble shooting procedure as outlined in sections 10.4.2 through 10.4.7.

If the meter shows more than 220mVDC at test point 17, then check for the following:

- Correct type of gas supplied
- Correct gas supply pressure
- Correct gas manifold pressure
- Correct orifice size
- Air in the gas line

If the main burners will not stay lit after checking the items listed above, the gas valve may be causing the fault. Replace the gas valve.

#### 10.4.2 Pilot Generator

The pilot generator generates a 700-750mVDC signal when heated by the pilot flame. When the pilot generator is connected to the heater's control components, there will be some voltage drop in the circuit so that the measured voltage will be less than 750mVDC. But the measured voltage should never be below 500mVDC when the ON/OFF switch is in the "OFF" position or 220mVDC when the ON/OFF switch is in the "ON" position.

With the pilot generator connected to the gas valve and the ON/OFF switch in the OFF position, place the red lead of the voltmeter on the PP terminal (test point 1) of the gas valve. Place the black lead of the meter on the PP/TH terminal (test point 2) of the gas valve. The meter should show a minimum of 500mVDC. If the meter show less than 500mV, check for partial shorts, loose or corroded connections or partially broken wires between the pilot generator and the gas valve.

If the wires and connections are sound, check the pilot generator output. You will need alligator clips to do this. Disconnect the pilot generator from the gas valve. The pilot will go out. Light the pilot while pressing down on the gas valve control knob. Continue holding the knob for at least one minute. Immediately measure the voltage between the two wires of the pilot generator. If the meter does not show at least 700mV, replace the pilot generator.

#### 10.4.3 Fusible Link

Check the voltage going to the safety circuit. Be sure that the pilot generator is correctly wired to the gas valve, the pilot is lit and the control knob on the gas valve is in the "PILOT" position. Leave the red voltmeter lead in place at test point 1. Touch the black

lead of the meter to the terminal of the fusible link where the white wire from the gas valve is connected (test point 3).

If no voltage is detected at test point 3, the wire between the gas valve and the fusible link is broken. Replace the wire.

If there is a minimum of 220mV at test point 3, move the black meter lead to the other terminal of the fusible link (test point 4).

If no voltage is detected at test point 4, the fusible link has failed. This indicates higher than normal temperatures in the component compartment (vestibule). Normal component compartment temperature is well below 300°F. The fusible link is designed to fail at temperatures above 305°F. Excessive temperature might be due to a blocked flue or heat exchanger. Clean the heat exchanger and clear the flue and vent of any restrictions. Sometimes the fusible link fails due to flame roll-out. Flame roll-out may be caused by delayed ignition or downdrafting in windy areas. Thoroughly investigate the causes for flame roll-out and correct the problem when replacing the fusible link.

#### 10.4.4 Fireman Switch and External Interlocks

Check the voltage going to the external device. Touch the black lead of the meter to the fireman switch terminal strip where the white wire from the fusible link is connected (test point 5). The meter should read at least 220mV. If the voltage is less than 220mV, there may be a bad connection or wire between the fusible link and the terminal strip. The wire may need to be replaced. If voltage of 220mV or more is detected at test point 5, move the black lead of the meter to the fireman switch terminal strip connection where the white wire from the high limit is connected (test point 6). The meter should read at least 220mV. If there is no voltage, the time clock switch or other external interlock may be mis-adjusted, mis-connected or defective. Correct this external problem.

#### 10.4.5 Limit Switches

Since the limit switches are not easily accessible, you can check the voltage going into the component after the limit switches in the circuit. If voltage is detected there, then the limit switches are closed and are operational.

Check the voltage going to the water pressure switch. Leave the red voltmeter lead in place at test point 1. Touch the black lead of the meter to the terminal of the water pressure switch where the white wire is connected (test point 11).

If the voltage is less than 220mV, there may be a bad connection, a partial short or a faulty sensor. If there is no voltage, one of the limit switches is open. This is normally due to excessive water tempera-

ture, which should be thoroughly investigated before replacement of limit switches. Excessive water temperature may be caused by low water flow. Water flow deficiency may be due to obvious problems such as a defective pump or blocked water filter. Alternatively, excessive water temperature may be due to over-firing, or to a problem with the water piping or the heater's internal bypass control. Over-firing might be a result of an incorrect gas orifice or supply of propane gas to a heater intended for natural gas.

If there are no such fundamental problems, identify which of the switches is open. Limit switch access is through the limit switch plugs on the inlet/outlet header. Remove the limit switch plugs from the bottom of the header and gently remove the limit switches from the wells. Move the black lead of the meter to the terminal on the 150°F limit switch (test point 7) that is connected to the fireman switch terminal block. Less than 220mV at this point means that the wire between the terminal block and the limit switch has a poor or broken connection or a partial short. Replace the wire assembly. If at least 220mV is detected at test point 7, then move the black lead of the meter to the other terminal of the 150°F limit switch (test point 8). Low or no voltage here means that the limit is open and must be replaced.

If 220mV or more is detected at test point 8, move the black lead of the meter to the terminal on the 130°F limit switch (test point 9) that is connected to the 150°F limit switch. Less than 220mV at this point means that the wire between the two limit switches has a poor or broken connection or a partial short. Replace the wire assembly. If at least 220mV is detected at test point 9, then move the black lead of the meter to the other terminal of the 130°F limit switch (test point 10). Low or no voltage here means that the limit is open and must be replaced. If voltage is detected at test point 10, move the black lead of the meter to the terminal of the water pressure switch where the white wire from the high limits is connected (test point 11). Less than 220mV at this point indicates that the wire connecting the high limits to the water pressure switch is faulty or poorly connected. Correct the problem or replace the wire.

**NOTE** The limit switches have different trip points, and it is important that replacements are correct. The 150°F switch has a red dot on the top of the switch, and must be installed in the rear port of the header. The 130°F switch has no dot and must be installed in the front port of the header.

#### 10.4.6 Water Pressure Switch

If the meter shows at least a 220mV signal at test point 11, move the black lead of the meter to the other terminal on the water pressure switch (test point 12).

If there is no voltage, the pressure switch contacts are open. This is almost always due to a water flow deficiency, the most common one being a blocked water filter or defective pump. However, sometimes it is due to blockage of the copper tube or mis-adjustment of the switch. Investigate thoroughly, referring to Section 7.5 on "Water Pressure Switch Adjustment". If there is no problem with the pool system or pressure switch adjustment, replace the pressure switch.

#### 10.4.7 Temperature Control Circuit

The temperature control circuit consists of four (4) major components which must all be working correctly for the signal to be transmitted to the gas valve. The four components are the ON/OFF toggle switch, the variable temperature control (potentiometer), the temperature sensor (thermistor) and the temperature control board. Use the following procedure to check each component for functionality.

Check the temperature control as a complete circuit before checking each component individually. With the red lead of the meter still at test point 1, place the black lead of the meter on the TH terminal of the temperature control circuit board (test point 16). If the meter shows more than 220mV at the pressure switch (test point 12) but not at test point 16, then one of the components of the temperature control circuit is faulty. Proceed with the following sections to test the components.

##### 10.4.7.1 ON/OFF Toggle Switch

Remove the temperature control panel from the bezel on the front of the heater to gain access to the switch. Be sure that the toggle switch is in the "ON" position. Place the black lead of the meter on the toggle switch terminal (test point 13) that is connected to the pressure switch. Less than 220mV at this point indicates that there is a problem with the black wire that connects the pressure switch to the toggle switch. If at least 220mV is detected at test point 13, move the black meter lead to the other terminal on the toggle switch (test point 14). A reading of less than 220mV here indicates a faulty switch. If the reading is more than 500mV, turn the switch "OFF" and then "ON" again to be sure that the internal contacts are working correctly. The volt meter reading should drop to zero when the switch is "OFF" and return to at least 220mV when the switch is placed back in the "ON" position.

##### 10.4.7.2 Variable Temperature Control

The variable temperature control is a 0-10,000 ohm variable resistor. Set your ohmmeter to the 0-20K range. Remove the temperature control wires from the control circuit board. Place one lead of the meter on each of the wires (test points 18 & 19). With the control set to MIN the meter should read near 10,000 ohms. Now turn the control to the MAX position. The meter should read close to zero. If the meter shows an

open circuit, or readings outside of the range stated above, replace the controller. If the control is working correctly, reconnect the wires to the circuit board.

#### 10.4.7.3 Temperature Sensor

The temperature sensor is a 0-20,000 ohm thermistor. Set your ohmmeter to the 0-20K range. The meter readings will depend on the temperature of the water in the header. See Table 9 for approximate readings at various temperatures.

To test the temperature sensor, circulate water through the heater for five (5) minutes. Remove the temperature sensor wires from the temperature control board. Place one lead of the meter on each wire of the temperature sensor (test points 20 & 21). Record the reading. Measure and record the water temperature of the pool near the inlet of the filter system. Find the temperature in the chart that is closest to your temperature reading of the pool water. Compare your ohmmeter reading to the resistance number in the chart. Remember that this is an approximate reading and numbers may vary. If your reading is close to the numbers indicated in the chart then the temperature sensor is working correctly. Reconnect the wires to the circuit board. If your reading is vastly different or outside of the ranges shown the temperature sensor should be replaced.

**Table 9. Temperature Sensor**

WATER TEMP. IN HEADER °F (°C)	APPROX. RESISTANCE IN 1000'S OF OHMS (kOhms)
50 (10)	19.9
60 (15)	15.3
70 (21)	11.9
80 (26)	9.3
90 (32)	7.3
100 (38)	5.8

#### 10.4.7.4 Temperature Control Circuit Board

With the red lead of the meter still at test point 1, place the black lead of the meter on the TH/PP terminal of the temperature control circuit board (test point 15). If there is more than 220mVDC at this point but not at the TH terminal of the temperature control circuit board (test point 16) as tested in section 10.4.7, then the control circuit board is faulty. Replace the board.

## Section 11. Replacement Parts

### 11.1 Ordering Information

To order or purchase parts for the Legacy pool and spa heater, contact your nearest Jandy dealer or distributor. See the web site at [www.jandy.com](http://www.jandy.com) for the nearest service center. If they cannot supply you with what you need, contact Customer Service at Zodiac Pool Systems, Inc., Telephone (800) 822-7933.

**NOTE** To supply the correct part it is important that you state the model number, serial number and type of gas when applicable. This information is on the rating plate inside the heater.

The following pages contain a parts list, general exploded view, and detailed exploded views to aid in parts identification. Please refer to these pages when ordering parts for your Legacy pool/spa heater.

## 11.2 Parts List

Key No.	Description	Model No.	Order Part No.	Key No.	Description	Model No.	Order Part No.
<b>Pilot/Igniter System</b>				<b>Electrical System (Continued)</b>			
1	Pilot, Main Burner Assembly, Natural	All	R0494700	43	Fusible Link Bracket	All	R0337200
1	Pilot, Main Burner Assembly, Propane	All	R0494800	44	Terminal Block	All	R0097800
2	Pilot Burner, Natural	All	R0492900	<b>Vent System</b>			
2	Pilot Burner, Propane	All	R0493000	45	Top Enclosure	125-400	R0470301-05
3	Pilot Electrode	All	R0471400	46	Vent Cover	125-400	R0470401-05
4	Pilot Generator	All	R0471500	47	Rainshield (Partition)	125-400	R0478201-05
5	Ceramic Insulator	All	R0471600	48	Flue Collector Assembly	125-400	R0470501-05
6	Burner, Main w/ Pilot Bracket	All	R0471700	49	Outdoor Vent Cap	125-400	R0491601-05
7	High Voltage Lead Assembly	All	R0493400	50	Indoor Draft Hood	125-400	R0499601-05
8	Pilot Tubing	All	R0037000	51	Adapter Plate	125-400	R0478301-05
9	Piezo Lighter Assembly	All	R0355900	52*	Clip	All	R0500200
10	Mounting Bracket Assembly	All	R0471800	<b>Water System-Polymer</b>			
<b>Main Gas Assembly</b>				53	Inlet/Outlet Header Assy, Polymer	125-400	R0470800
11	Burner Tray Assy, Natural	125-400	R0471101-05	54	Return Header Assy, Polymer	All	R0454200
11	Burner Tray Assy, Propane	125-400	R0471201-05	55*	Header Hardware Set, Polymer	All	R0454500
12	Burner Tray, Shelf Only	125-400	R0469101-05	56	Heat Exchanger Assembly, Complete, Copper	125-400	R0470606-10
13	Gas Valve, Natural	All	R0493100	56	Heat Exchanger Assembly, Complete, CuNi	125-400	R0500706-10
13	Gas Valve, Propane	All	R0493200	57	Heat Exchanger Drain Plugs (2), Polymer	All	R0446000
14*	Orifice Set, Natural Gas, 0-3K ft.	All	R0469200	58	3" Coupling Nut Kit w/ O-ring	All	R0454000
14*	Orifice Set, Natural Gas, 3-6K ft.	All	R0469300	59	Bypass Assembly, Polymer	125-400	R0453700
14*	Orifice Set, Natural Gas, 6-10K ft. (US only)	All	R0469400	60	Bypass Spring, Adjustable, Polymer	All	R0453900
14*	Orifice Set, L.P. Gas, 0-5K ft.	All	R0469500	61	Tailpiece w/ Union Nut (Set of 2), Polymer	All	R0449000
14*	Orifice Set, L.P. Gas, 5-10K ft. (US only)	All	R0469600	<b>Water System-Bronze</b>			
15	Manifold Assy, Natural Gas, 0-3K ft.	125-400	R0496101-05	62	Heat Exchanger Assy, Complete, Copper	125-400	R0470706-10
15	Manifold Assy, Natural Gas, 3-6K ft.	125-400	R0496201-05	62	Heat Exchanger Assy, Complete, CuNi	All	R0500806-10
15	Manifold Assy, Natural Gas, 6-10K ft. (US only)	125-400	R0496301-05	63	Inlet/Outlet Header Assy, Bronze, 2"	125-400	R0476601-05
15	Manifold Assy, L.P. Gas, 0-5K ft.	125-400	R0496401-05	64	Return Header Assy, Bronze (includes set of 9 gaskets)	All	R0476700
15	Manifold Assy, L.P. Gas, 5-10K ft. (US only)	125-400	R0496501-05	65	Bypass Assembly, Bronze	125-400	R0476801-05
16	Anti-Rotation Bracket	All	R0469700	66	Bypass Spring, Bronze	125-400	R0476901-05
17	Burner, Main	All	R0469800	67	Bypass Gasket, Bronze	All	R0011400
18	Burner Manifold	125-400	R0469901-05	68	Heat Exchange Hardware Kit, Bronze	All	R0477200
<b>Electrical System</b>				69	Temp Sensor Mounting Bracket, Bronze	All	R0477400
19	Temp Control/User Interface	All	R0471901	70	Water Pressure Switch Tubing, Bronze	All	R0477501
20	Temp Control/User Interface w/ Bezel	All	R0491700	71	Flange & Gasket Kit, Bronze	All	R0461500
21*	Wire Harness Set	All	R0472400	72	Flange Bolts, Bronze	All	R0477800
22	On-Off Switch	All	R0099800	73	3/4 NPT Plug, Bronze	All	R0477900
23	Temperature Control Label	All	R0472100	74	Header, Drain Plug, Bronze	All	R0478000
24	Pool/Spa Control	All	R0472500	<b>Water System-All</b>			
25	Temperature Sensor (Regular)	All	R0456500	75	Header Gasket Assembly (Set of 16)	All	R0454300
26*	Temperature Sensor (Salt)	All	R0477300	76*	Bypass Hardware, Gaskets	All	R0453800
27	Gasket, Temperature Control Bulb	All	R0456600	77	Heat Exchanger Tube Assy, Copper	125-400	R0490101-05
28	Thermostat Knob, Black	All	R0010700	78	Heat Exchanger Tube Assy, CuNi	125-400	R0490301-05
29	Stop Plate, "Temp-Lok"	All	R0472200	79*	Baffles, Heat Exchanger	125-250	R5000001-03
30*	Temperature Control Gasket	All	R0472300	<b>Firebox Components</b>			
31	Temperature Control Plate Assembly	All	R0472001	80	Combustion Chamber Panels	125-400	R0494906-10
32*	Stop Plate Screw	All	R0474600	<b>Jacket Components</b>			
33	Temperature Sensor Plug	All	R0456800	81	Door with Latch	125-400	R0470901-05
34	Cap, Sensor & Pressure Switch w/ O-Ring	All	R0455400	82	Latch Assembly	All	R0334900
35	Pressure Switch, 2 PSI	All	R0013200	83	Grommet, Sealing, 2"	All	R0460300
36*	Pressure Switch, 1-10 PSI	All	R0015500	84	Button Plug, 7/8"	All	R0491100
37	Water Pressure Switch Tubing	All	R0483600	85	Rear Panel Assy	125-400	R0482301-05
38	High-Limit Switch Assembly	All	R0457401	86	Side Panel, Right	All	R0482400
39	High Limit Set (130°F & 150°F)	All	R0457200	87	In/Out Cover Panel, Top	All	R0482500
40	High-Limit Switch, 130°F	All	R0457300	88	In/Out Cover Panel, Bottom	All	R0482600
41	High-Limit Switch, 150°F	All	R0023000	89	Side Panel, Left	All	R0482700
42	Fusible Link Assembly	All	R0012200	90	Return Side Cover, Top	All	R0482800

## 11.2 Parts List (Continued)

Key No.	Description	Model No.	Order Part No.
<b>Jacket Components (Continued)</b>			
91	Return Side Cover, Bottom	All	R0482900
92	Heat Shield	125-400	R0483101-05
93	Heat Deflector Guard, Front	125-400	R0483201-05
94	Rear Partition	125-400	R0483401-05
95	Heat Deflector Guard, Rear	125-400	R0483501-05
96	Controller Mounting Panel	125-400	R0483901-05
97	Weather Stripping	All	R0491000
98	Grommet, 7/8"	All	R0492800
<b>Optional Components</b>			
99*	Noncombustible Base	125-400	R0471001-05
100*	Press Relief Valve Kit, 75 PSI, Bronze	All	R0040400
101*	Press Relief Valve Kit, 75 PSI, Polymer	All	R0336100
102*	Touch-up Spray Paint, Pewter	All	R0335800
103*	Temp Rise Measurement Kit	All	R0336000

### NOTES:

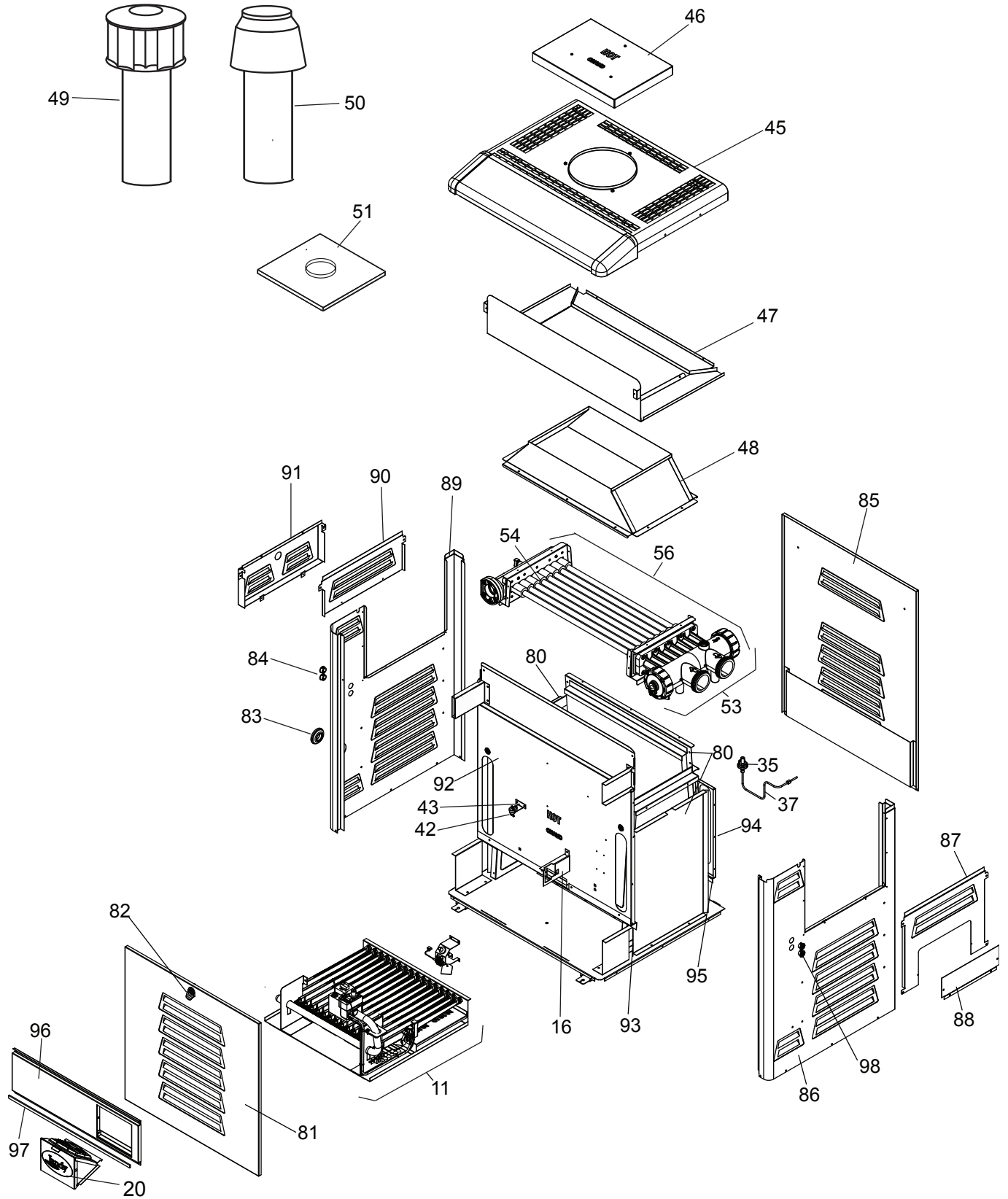
1. All hardware sets contain all pieces necessary for assembly, including gaskets.
2. Gaskets and hardware are included in all kits that involve the removal of a gasket as part of the procedure to replace a part.

\* PARTS NOT SHOWN ON KEY VIEW

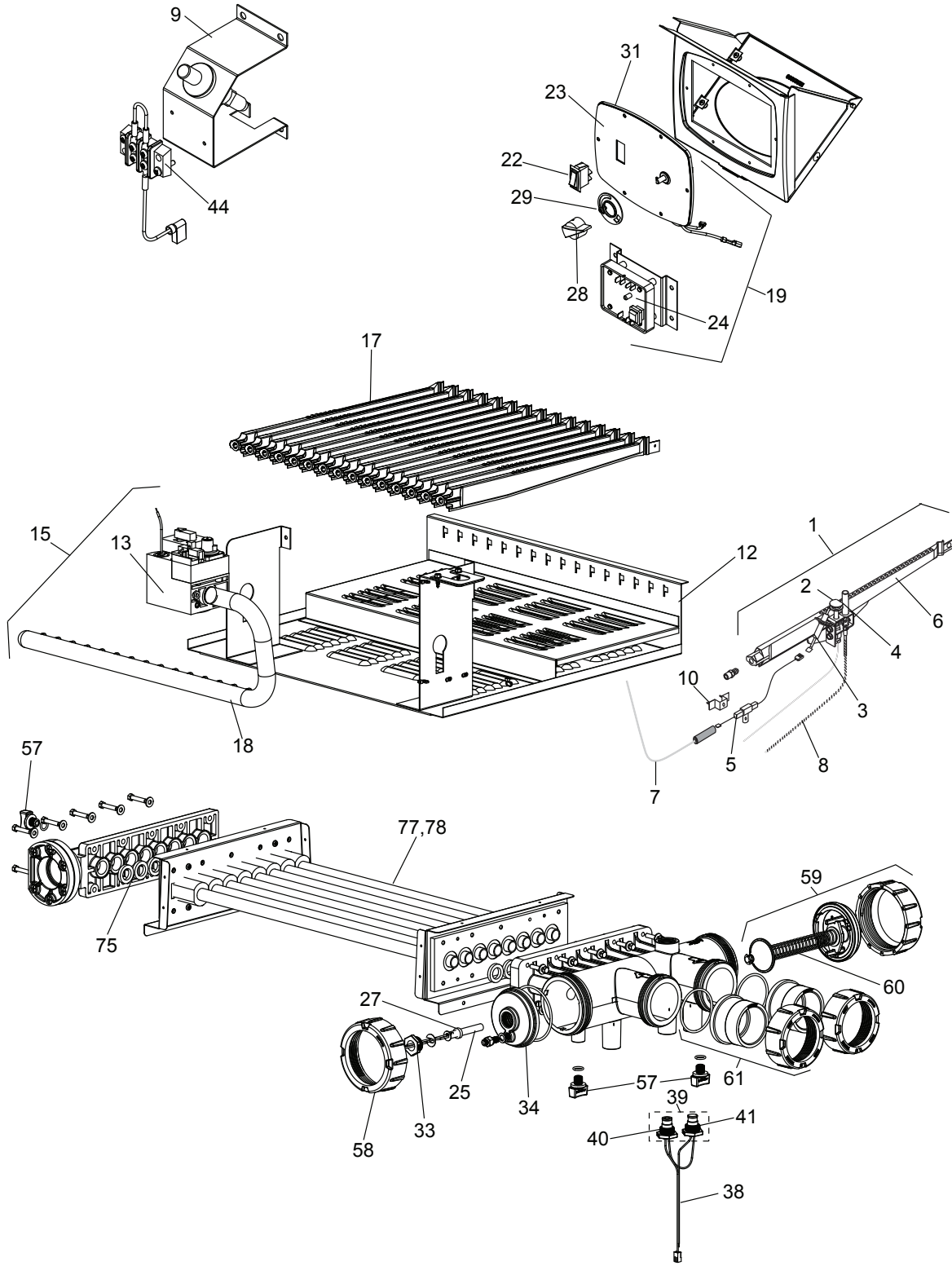
\*\* MANIFOLD KIT INCLUDES INSTALLED ORIFICES BUT DOES NOT INCLUDE GAS VALVE

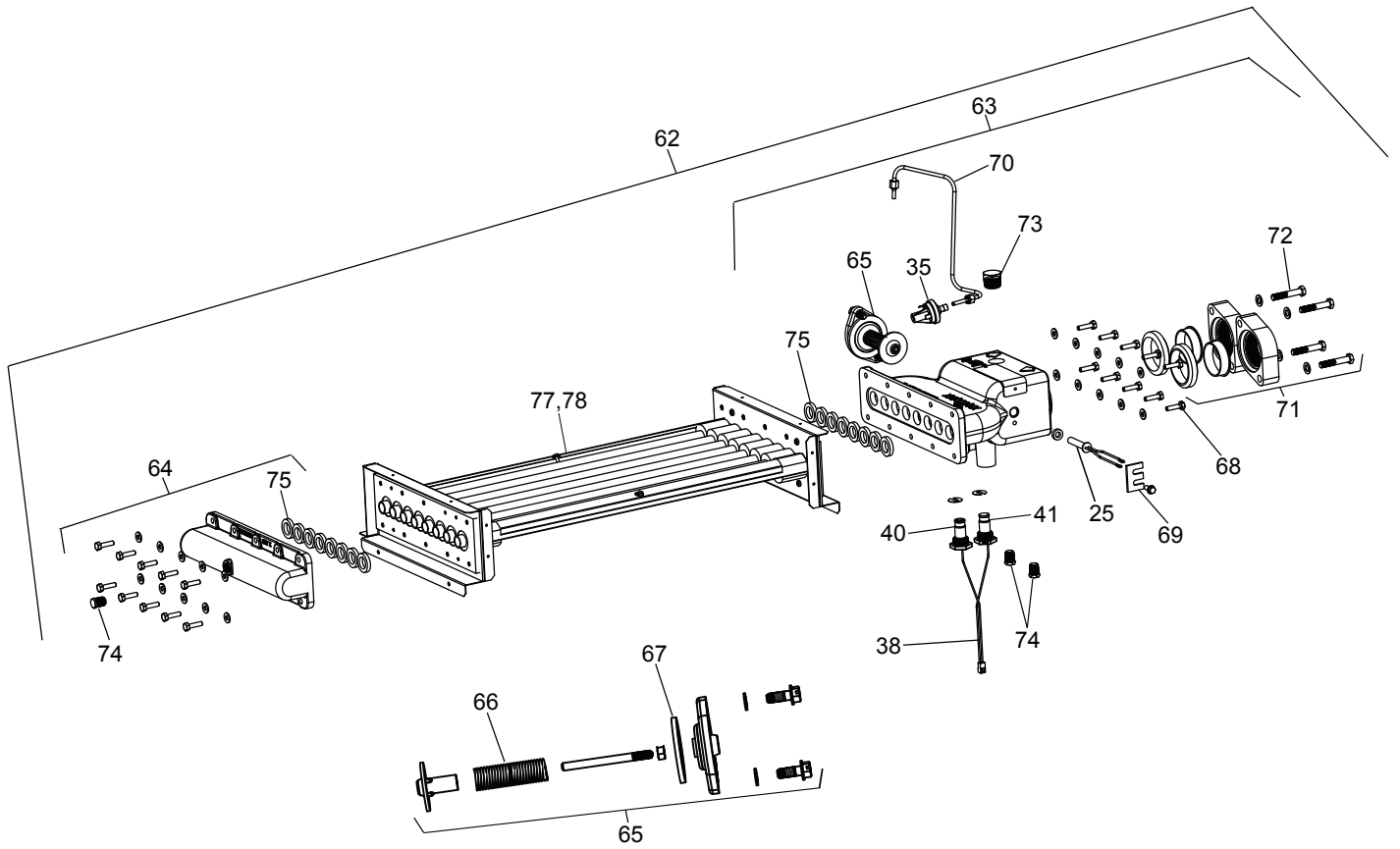


### 11.3 General Exploded View



### 11.4 Detailed Exploded View





## LIMITED WARRANTY

Thank you for purchasing Jandy® pool and spa products. Zodiac Pool Systems, Inc. warrants all parts to be free from manufacturing defects in materials and workmanship for a period of one (1) 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 (2) years.
- Never Lube® valves are warranted for the life of the pool and/or spa on which they were originally installed.
- AquaPure® Electronic Chlorine Generator Electrolytic Cells carry a five (5) year limited warranty on a prorated basis.
- Heat pumps are covered for two (2) years. There is a lifetime warranty on titanium tubing.
- The heat pump compressor is covered for five (5) years.
- The DuoClear® Electrolytic Cells carry a three (3) year limited warranty on a prorated basis.
- The DuoClear® Vessels carry a three (3) year limited warranty.

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 Zodiac Pool Systems, Inc. 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, or any other materials required to make the repair. Refrigerant or other expendables are not covered by the warranty. 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, which are 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 levels between 7.2 and 7.8, with ideal ranges being between 7.4 and 7.6, Total Alkalinity (TA) between 80 to 120 ppm, Total Dissolved Solids (TDS) less than 2000, not including salt ppm].
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 Zodiac Pool Systems, Inc. No one is authorized to make any other warranties on behalf of Zodiac Pool Systems, Inc. **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. ZODIAC POOL SYSTEMS, INC. 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 that 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 to obtain 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](http://www.jandy.com) or by calling our technical support department at 1.800.822.7933 in the United States or 1.888.647.4004 in Canada. All returned parts must have a Returned Material Authorization number to be evaluated under the terms of this warranty.



**Jandy**®

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