

IN REVIEW

# INSTALLATION AND OPERATION MANUAL

# E3T

*Electric 3-Series Titanium*



## Electric Heater MODELS

**ELS 0005, ELS 0011,  
ELS 0018, and ELS 0027**



**Intertek**  
4000856

Tested to UL Standard 1261

**FOR YOUR SAFETY:** Do not store or use gasoline or other flammable vapors and liquids or other combustible materials in the vicinity of this or any other appliance. To do so may result in an explosion or fire.

**NOTE:** The instructions in this manual are for the use of qualified individuals specially trained and experienced in the installation and maintenance of this type of equipment and related system components. Installation and service personnel are required by some states to be licensed. Persons not qualified shall not attempt to install, service, or maintain this equipment.

This manual should be maintained in legible condition and kept adjacent to the electric heater or in a safe place for future use.

**Raypak®**  
A Rheem® Company

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**Revision 5 reflects the following changes:**

Installation text revised on page 4. Figure 2, Table B and Table C revised on page 6. Wiring Diagram revised on page 11. Illustrated parts List added starting on page 12. Warranty added starting on page 14.

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# 1. WARNINGS

## Pay Attention to these Terms

|                  |                                                                                                                                                                             |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>▲ DANGER</b>  | Indicates the presence of immediate hazards which will cause severe personal injury, death or substantial property damage if ignored.                                       |
| <b>▲ WARNING</b> | Indicates the presence of hazards or unsafe practices which could cause severe personal injury, death or substantial property damage if ignored.                            |
| <b>▲ CAUTION</b> | Indicates the presence of hazards or unsafe practices which could cause minor personal injury or product or property damage if ignored.                                     |
| <b>CAUTION</b>   | CAUTION used without the warning alert symbol indicates a potentially hazardous condition which could cause minor personal injury or product or property damage if ignored. |
| <b>NOTE</b>      | Indicates special instructions on installation, operation, or maintenance which are important but not related to personal injury hazards.                                   |

**▲ WARNING:** Do not use this heater if any part has been under water. Immediately call a qualified service technician to inspect and replace the heater.

**▲ WARNING:** To minimize the possibility of improper operation, serious personal injury, fire, or damage to the heater:

- Always keep the area around the heater free of combustible materials, gasoline, and other flammable liquids and vapors.
- Heater should never be covered or have any blockage to the flow of fresh air to the heater.

**EFFICIENCY TESTING NOTICE:** For purposes of verifying or testing efficiency ratings, the test procedure in Title 10 APPENDIX P to Subpart B of Part 430 (Uniform Test Method for Measuring the Energy Consumption of Pool Heaters).

**▲ WARNING:** Risk of electrical shock. More than one disconnect switch may be required to de-energize the equipment before servicing.

## 2. WATER CHEMISTRY

**⚠ CAUTION:** Corrosive water voids all warranties

For your health and the protection of your pool equipment, it is essential that your water be chemically balanced. The levels shown in **Table A** must be used as a guide for balanced water.

### Pool/Spa Water Chemistry

Occasional chemical shock dosing of the pool or spa should not damage the heat exchanger providing the water is balanced. Automatic chemical dosing devices and salt chlorinators are usually more efficient in heated water. If not controlled, they can lead to high chemical levels which can damage the heat exchanger. Further advice should be obtained from your pool or spa builder, accredited pool shop, or chemical supplier for the correct levels for your water.

| Water Chemistry              | Allowable Levels   |
|------------------------------|--------------------|
| Water Temperature            | 68-104°F (20-40°C) |
| pH                           | 7.6-7.8            |
| Total Alkalinity (ppm)       | 80-120             |
| Calcium Hardness (ppm)       | 200-400            |
| Salt (ppm)                   | 4500 Maximum       |
| Free Chlorine (ppm)*         | 2-3                |
| Total Dissolved Solids (ppm) | 3000 Maximum**     |

\*Free Chlorine MUST NOT EXCEED 5 ppm!

\*\*In saltwater chlorinated pools, the total TDS can be as high as 6000 ppm.

**Table A. Spa and Pool Water Chemistry**

### Automatic Chlorinators and Chemical Feeders

All chemicals must be introduced downstream of the heater and completely diluted into the water before being circulated through the heater. Chlorinators must feed downstream of the heat exchanger and have an anti-siphoning device or check valve to prevent chemical back-up into the heat exchanger when the pool filtration pump is shut off.

**⚠ CAUTION:** High chemical concentrations from feeders that are out of adjustment will cause rapid corrosion of the heat exchanger. Such damage is not covered under the warranty.

**⚠ CAUTION:** Failure of a heat exchanger due to lime scale build-up on the heating surface, low pH, or other chemical imbalance is not covered under the warranty.

## 3. SAFETY INFORMATION

Pool water temperatures typically range from 78°F (26°C) to 82°F (28°C). The American Red Cross recommends

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a temperature of 78°F (26°C) for competitive swimming. However, this may be too cool for young children and the elderly, who may require a temperature of 80°F (27°C) or higher.

## IMPORTANT SAFETY INSTRUCTIONS

### READ AND FOLLOW ALL INSTRUCTIONS GIVEN IN THIS MANUAL.

The water in a spa or pool should never exceed 104°F (40°C). A water temperature in excess of 104°F (40°C) is considered unsafe for all persons. Lower water temperatures are recommended for extended use (exceeding 10-15 minutes) and for young children.

Excessive water temperatures have a high potential for causing fetal damage during the early months of pregnancy. Pregnant or possibly pregnant women should limit spa or pool water temperatures to 100°F (38°C).

Before entering a spa or pool, the user should measure the water temperature at several locations using an accurate thermometer since the tolerance of water temperature - regulating devices may vary as much as +/- 5°F (3°C)

Alcohol, drugs or medication should not be used before or during spa or pool use since their use may lead to unconsciousness with the possibility of drowning.

Persons suffering from obesity or with a medical history of heart disease, low or high blood pressure, circulatory system problems, or diabetes should consult a physician before using a spa or pool.

Persons using medication should consult a physician before using a spa or pool since some medication may induce drowsiness while other medication may affect heart rate, blood pressure and circulation.

Prolonged immersion in hot water may induce hypothermia. Hypothermia occurs when the internal temperature of the body reaches a level several degrees above normal body temperature of 98.6°F (37°C).

The symptoms include dizziness, fainting, drowsiness, lethargy and an increase in the internal temperature of the body. The effects of hypothermia include: Unawareness of impending hazard, failure to perceive heat, failure to recognize the need to exit spa or pool, physical inability to exit spa or pool, fetal damage in pregnant women and unconsciousness resulting in a danger of drowning.

## SAVE THESE INSTRUCTIONS

## 4. OVERVIEW

Congratulations on the purchase of the most advanced spa/pool electrical heater in the market. To get the best performance and savings from your new heater, it is important to install the heater in accordance with our instructions and the electrical, plumbing codes applicable to your area. If you have any questions, please contact your Authorized Dealer, or visit our website at [www.raypak.com](http://www.raypak.com)

## 5. BEFORE INSTALLATION

Please read these instructions thoroughly and completely before installation and before use. Failure to do so could cause property damage or serious personal injury or death and void your warranty.

By installing this product, you acknowledge the terms of the manufacturer's warranty and your Authorized Dealer's return policies. The heaters that have been installed cannot be returned. If you have any questions regarding the warranty or product return policies, please consult your Authorized Dealer prior to installation.

Open the box and carefully unpack the heater. Inspect all components.

## 6. INSTALLATION

The heaters are designed for indoor or outdoor use. The heater should be mounted on a level, non-combustible surface. Heater must not be installed on carpeting. Do NOT use the shipping crate base as an installation base.

- The heater must be mounted on a vertical position over a ground level base or a wall.
- Secure the heater to the base with screws (not provided).

**CAUTION:** Combustible materials should be kept at least 24" (610 mm) away from the heater.

Recommended Clearances:

- TOP: 18" (45.7 cm)
- SIDES: 6" (15.2 cm) away from your heater and the outlet hot water pipe.

## 7. WATER CONNECTION

**IMPORTANT:** When preparing the connections going to heater, make sure you do not use glue or putty. Any glue or putty going into the heater will damage the flow sensor permanently. Prior to the final connections to the heater, flush all the lines to clear any debris.

**NOTE:** When using two-speed pumps, do not install a gate valve on the inlet. No shutoff valves are to be installed in the piping between the spa heater outlet and the spa. If using an in-line chlorinator, a check valve must be used. Any chlorinator valves that can cause return line blockage will VOID the warranty.

Please follow all plumbing instructions carefully. This product must be installed by a licensed and qualified plumber in accordance with all applicable national, state, provincial, and local plumbing codes.

- The heater must be installed after installation of the filter.
- Models ELS 0005 and 0011 are supplied with

1-1/2" NPT inlet and outlet plumbing connections.

- Models ELS 0018 and 0027 are supplied with 2" NPT inlet and outlet plumbing connections.
- All heater models are rated operation ONLY on 240V single-phase, 60Hz power.
- Heaters are flow activated.
- No Hartford loop is required.

After tightening both fittings at the water heater, start the pump to allow water to run through the spa/pool heater for at least 5-10 minutes. This process purges all the air from the water lines and must be performed prior to turning on the power at the heater.

**CAUTION:** Failure to follow this step can cause permanent damage to the heating elements.

When any maintenance is performed on the spa/pool that may introduce air into the plumbing pipes, it is important to turn the power off to the heater and purge the air out of the lines before allowing the heater to power up.

## Dry-Firing of Elements

Dry-firing of elements is caused by water voids when power is on. All air must be purged from the system before any heat start-up. It is important to purge all air after cleaning or changing a cartridge filter. The filter casing acts as an air reservoir during this procedure, the circulation system must be on for at least two (2) minutes before you turn power on to this heater.

The heater must have an adequate flow of water for proper operation. Adequate water flow removes the heat produced by the heater and transfers the heat to the spa/pool and prevents overheating. Low water flow usually results from dirty filter or improperly adjusted manual bypass. The heater is designed to run at a minimum flow rate of 15 gpm (57 lpm) and maximum of 60 gpm (227 lpm). A manual bypass valve is needed when the flow rate exceeds 60 gpm (227 lpm). The heater will not energize elements if the water flow is under 15 gpm (57 lpm). Once 15 gpm (57 lpm) has been established, the heating elements will energize 1-minute after flow is configured. This is to make sure the tank is completely filled with water and any air in the tank has had time to escape.

**RAIN WATER RUNOFF.** The heater is designed to operate outdoors and can be exposed to rain. However, rain water runoff falling directly onto the heater from a roof can cause damage and/or shorten the life of your heater. Such damage will not be covered under warranty. Install rain gutters or rain diverters on your roof if the heater is installed in a position where contact with rain runoff may occur.

**CAUTION:** The heater's supporting base must be high enough to keep completely free of standing water at all times.

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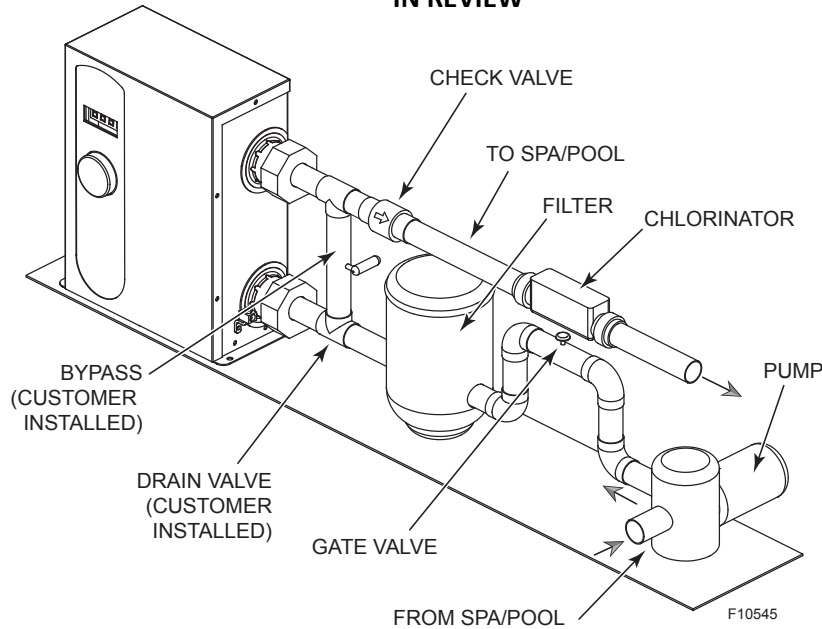


Figure 1. Spa/Pool Installation Diagram

## 8. FREEZE PROTECTION

If the heater is installed in a location subject to freezing conditions, it is important to protect the water circuit from freezing, just as should be done for the pump and filter.

### System Drain-Down

1. Make sure the heater is disconnected or turned off.
2. With the pool pump OFF, loosen the PVC unions supplied with the heater on both inlet and outlet pipes.
3. This should allow all of the water inside the heater to drain out and prevent freeze damage to the heater.

## 9. ELECTRICAL CONNECTIONS

**⚠ WARNING:** Please read these instructions thoroughly and completely before installation and before use. Failure to do so could cause property damage or serious personal injury, or death and void your warranty.

**⚠ WARNING:** Risk of electrical shock. More than one disconnect switch may be required to de-energize the equipment before servicing.

This product must be installed by a licensed and qualified electrician in accordance with Article 680 of the National Electrical Code, NFPA 70 and with the requirements of the authority having jurisdiction and all applicable national, state, provincial, and local electrical codes.

As with all electrical appliances, under no circumstances should you attempt to install, repair or disassemble this heater without first shutting off all power to the heater directly at the fuse or breaker box.

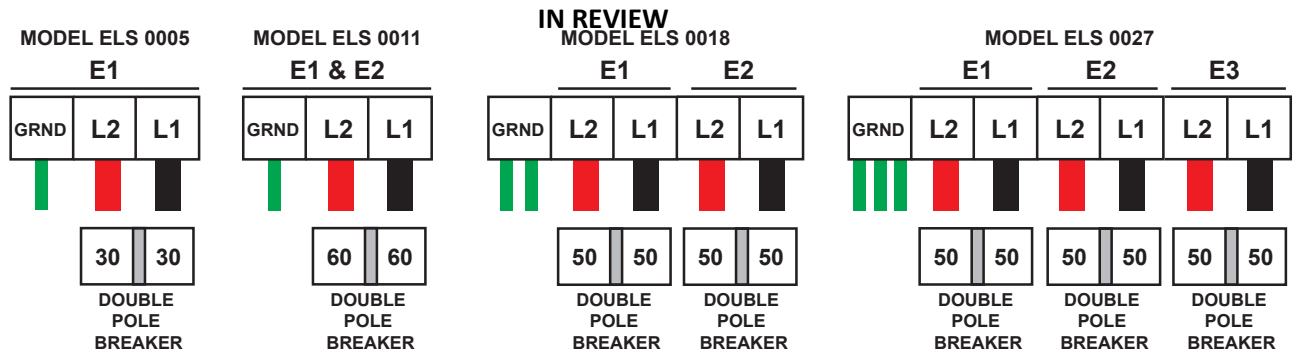
**⚠ WARNING:** Serious bodily injury or death could occur if you ignore shutting off all power to the heater at the fuse or breaker box.

All wiring (wire gauge) and circuit protection (breakers) must comply with the U.S. National Electrical Code (NEC) in the U.S.A., or the Canadian Electrical Code (CEC) in Canada. Failure to do so could result in property damage and/or personal injury, and void your warranty.

**NOTE:** The Canadian Electrical Code generally requires that all supply wires and corresponding circuit protection (breakers) used for hot water heating applications be sized to a minimum of 125% of the maximum current rating of the heater (see model specifications below for details).

Before installing this product, ensure that the home has sufficient electrical power available to handle the maximum amperage load of the applicable model. **All heaters have one (1) minute time delay on start.** The heater will not energize the elements until 15 gpm (57 lpm) is established. A separate ground conductor for each incoming circuit is required.

**⚠ CAUTION:** Make sure that the electrical connections are correct and all wire connections are tight and secure. Make sure that the correct breaker size and wire gauge has been used. Make sure that the heater has been connected to a ground in accordance with applicable codes.



| Properties                      | Models   |             |               |               |
|---------------------------------|----------|-------------|---------------|---------------|
|                                 | ELS 0005 | ELS 0011    | ELS 0018      | ELS 0027      |
| Elements                        | 1        | 2           | 2             | 3             |
| Voltage                         | 240 V    | 240 V       | 240 V         | 240 V         |
| Frequency (HZ)                  | 60       | 60          | 60            | 60            |
| Power (kW)                      | 5.5      | 11          | 18            | 27            |
| Each Element Supply (kW)        | 5.5      | 5.5 (Qty 2) | 9 (Qty 2)     | 9 (Qty 3)     |
| Amp Draw per Element (Nominal)  | 23       | 23 x 2      | 37.5 x 2      | 37.5 x 3      |
| Total Amp Draw (Nominal)        | 23       | 46          | 75            | 112.5         |
| Required Breaker (min/max amps) | 30/30    | 60/60       | 50/50 (Qty 2) | 50/60 (Qty 3) |
| Electrical Service (amps)       | 100      | 150         | 150           | 200           |

**Table B. Electrical Specification**

| Properties       | Models      |             |               |               |
|------------------|-------------|-------------|---------------|---------------|
|                  | ELS 0005    | ELS 0011    | ELS 0018      | ELS 0027      |
| Wire Gauge       | #10         | #6          | #8            | #8            |
| Wire Set         | 1           | 1           | 2             | 3             |
| Breaker Amperage | 30          | 60          | 50/50 (Qty 2) | 50/60 (Qty 3) |
| Breaker Type     | Double Pole | Double Pole | Double Pole   | Double Pole   |
| Breaker Quantity | 1           | 1           | 2             | 3             |

**Table C. Circuit Breaker Specification**

## 10. OPERATION

Once the heater is installed, it can be used year-round. The user **MUST** make sure the pump is not disengaged to allow it to run until the desired temperature setting is reached.

The heater will function only when there is sufficient flow through it [15 gpm (57 lpm) minimum]. On the digital control panel, press and hold the knob for five (5) seconds to check the flow rate in the unit.

Models ELS 0005 and 0011 display the inlet temperatures on the GPM screen by turning the knob to the right. The outlet temperature is displayed by turning the knob to the left.

Models ELS 0018 and 0027 have the outlet and inlet temperatures displayed at all times.

The unit also has a one (1) minute built-in TIME DELAY to protect it from air in the lines and to avoid burning out the elements as a result of it. When the unit senses sufficient water flow, it will automatically activate.

# 11. CONTROL

Turn the control knob to set your desired temperature. When the set temperature is reached the heater will go to idle and the elements will not draw power.

**NOTE:** If the controls and display are active, they still draw some power.

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### Digital Control Temperature Setting

The heater comes with a digital temperature control located in the front panel that can be set from 40°-104°F (4°C-40°C) in one (1) degree increments by a simple turn of the knob.

The heater is turned OFF by pushing the control knob once. Hold the knob for two (2) seconds to switch from Fahrenheit to Centigrade.

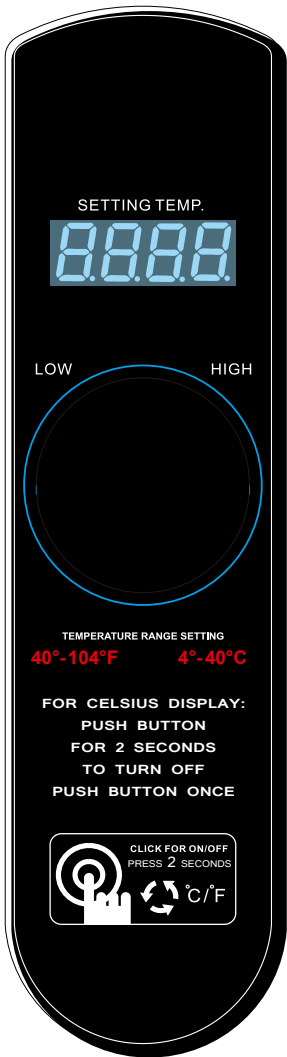


Figure 3. Digital Control for Models ELS 0005 and 0011

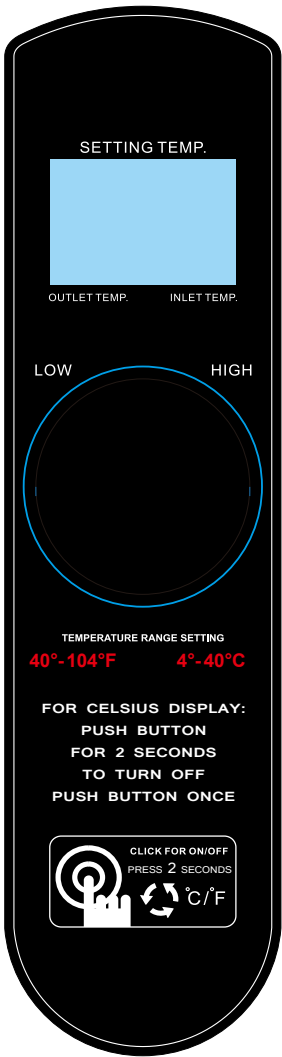


Figure 4. Digital Control for Models ELS 0018 and 0027

| Code             | Description                                                         | Action                                                       |
|------------------|---------------------------------------------------------------------|--------------------------------------------------------------|
| E1               | Inlet sensor has a short.                                           | Buttons do not function, no heat. Need to replace sensor.    |
| E2               | Outlet sensor has a short.                                          | Buttons do not function, no heat. Need to replace sensor.    |
| E3 (ELS 27 only) | Chamber #1 sensor short.                                            | The heater will continue to operate, continues to heat.      |
| E4 (ELS 27 only) | Chamber #2 sensor short.                                            | The heater will continue to operate, continues to heat.      |
| E5               | Remote wiring is in use. The master external controller is not CFH. | The heater will not heat until the master control has a CFH. |

Table D. Fault Codes  
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## 12. REMOTE OPERATION

The heaters are equipped to work with external remote controls. The unit can be connected to either a toggle switch or the switch contacts of a third party remote. The remote works by either making or breaking the circuit created by the remote wiring.

Typically, a remote does not supply power to the heater, it only provides a switching function to turn on/off the heater. If your remote is supplying its own voltage to the heater, it will not work with this heater and may damage the digital circuit board.

### Remote Control Wiring

Important installation notes for remote or external wiring configuration.

- Remote wiring must be run in a separate conduit.
- Remote wiring must not be run parallel to high voltage lines.
- For runs of under 30 ft. (9.1 m), remote wiring should have stranded conductors with a minimum of 22 AWG, 600V, cable twisting 1.5" to 2.5" (3.8 cm to 6.4 cm) lay and jacketed.
- For runs over 30 ft. (9.1 m), the conductors should be a minimum of 20 AWG, 600V, cable twisting 1.5" to 2.5" (3.8 cm to 6.4 cm) lay that is shielded and jacketed.
- Maximum cable length is 200 ft. (61 m).

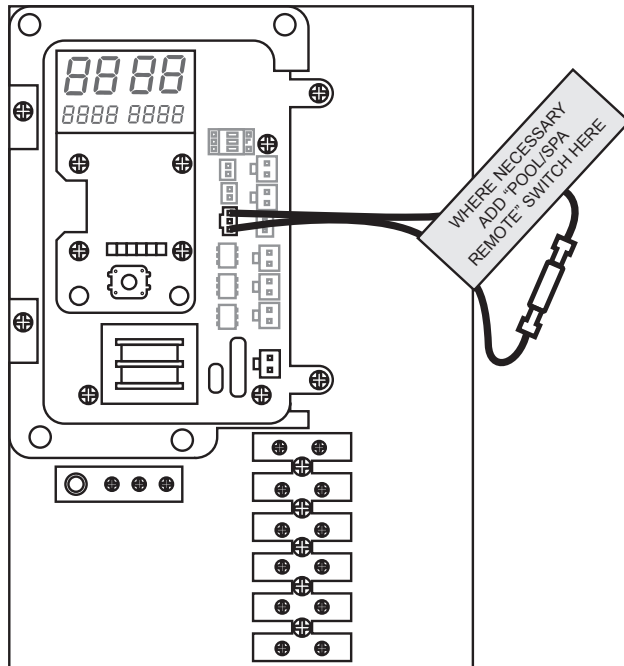


Figure 5. Supplied Wires for the Remote Interface Harness

### Remote Control (On-Off)

1. Turn on power to the heater.
2. For a remote control **without its own sensor**, set the desired set point, for example 102°F (39°C).
3. For a remote control **with its own sensor**, set the temperature to the highest setting available on the control on the heater. The actual set point will be controlled by the remote control.
4. Turn off and remove power from the heater.
5. On the "Remote Interface Harness", the supplied two wires provide power out to either a toggle switch or the switch contacts of a third party remote. See Figure 5.

**NOTE:** Code E5 is displayed on the heater digital display when remote wiring is in use and the master external controller is not calling for heat (CFH). The heater will not heat until the master control is CFH.

| GPM<br>(lpm) | Pressure Drop<br>in PSI | Pressure Drop<br>in ft. of Head |
|--------------|-------------------------|---------------------------------|
| 15 (57)      | 1.6                     | 3.6                             |
| 20 (76)      | 2.4                     | 5.6                             |
| 25 (95)      | 3.6                     | 8.2                             |
| 30 (114)     | 5.2                     | 11.9                            |
| 35 (132)     | 7.5                     | 17.3                            |
| 40 (151)     | 8.8                     | 20.3                            |
| 45 (170)     | 19.2                    | 44.4                            |
| 50 (189)     | 22.6                    | 52.2                            |
| 60 (227)     | 23.2                    | 53.7                            |

Table E. Pressure Drop for Models ELS 0005 and 0011

| GPM<br>(lpm) | Pressure Drop<br>in PSI | Pressure drop<br>in ft. of Head |
|--------------|-------------------------|---------------------------------|
| 15 (57)      | 2.1                     | 4.8                             |
| 20 (76)      | 2.8                     | 6.6                             |
| 25 (95)      | 3.4                     | 8                               |
| 30 (114)     | 5.6                     | 12.8                            |
| 35 (132)     | 7.2                     | 16.5                            |
| 40 (151)     | 8.9                     | 20.5                            |
| 45 (170)     | 14.1                    | 32.7                            |
| 50 (189)     | 17.4                    | 40.3                            |
| 60 (227)     | 21.4                    | 49.5                            |

Table F. Pressure Drop for Models ELS 0018 and 0027

**IN REVIEW**

| <b>150K Inlet/Outlet Sensor, All Models</b> |              |
|---------------------------------------------|--------------|
| Temp °F/°C                                  | Resistance Ω |
| 32 (0)                                      | 491399.3     |
| 41 (5)                                      | 384009.2     |
| 50 (10)                                     | 303720       |
| 59 (15)                                     | 242375.9     |
| 68 (20)                                     | 191172       |
| 77 (25)                                     | 150000       |
| 86 (30)                                     | 122049       |
| 95 (35)                                     | 97403.8      |
| 104 (40)                                    | 77394        |
| 113 (45)                                    | 61780.2      |
| 122 (50)                                    | 49539.7      |

| <b>10K Sensor for Model 0027 Element 3 Only</b> |              |
|-------------------------------------------------|--------------|
| Temp °F/°C                                      | Resistance Ω |
| 32 (0)                                          | 31537        |
| 41 (5)                                          | 24783        |
| 50 (10)                                         | 19587        |
| 59 (15)                                         | 15568        |
| 68 (20)                                         | 12443        |
| 77 (25)                                         | 10000        |
| 86 (30)                                         | 8080         |
| 95 (35)                                         | 6563         |
| 104 (40)                                        | 5359         |
| 113 (45)                                        | 4398         |
| 122 (50)                                        | 3628         |

**Table G. Sensor Resistance**

| <b>Models ELS 0005 and 0011</b>                                                                                  |                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Heater Features                                                                                                  | Standard Values                                                                                                                              |
| Element resistance (check with at least one wire lead disconnected from each element).                           | 9.97 to 11.6 Ω                                                                                                                               |
| Delay in energizing elements (heater starts heating 1-minute after powering up and sufficient flow is recorded). | 1-minute ± 30 secs.                                                                                                                          |
| Turn on flow rate.                                                                                               | 15 gpm ± 2 gpm (57 lpm ± 8 lpm)                                                                                                              |
| Individual element current at max temp and max flow.                                                             | 20.5 to 29.06 A                                                                                                                              |
| ECO trip point.                                                                                                  | 140°F (60°C)                                                                                                                                 |
| To change temperature setting from Fahrenheit to Celsius.                                                        | Press and hold the knob for 3-secs.                                                                                                          |
| To display GPM.                                                                                                  | Press and hold the knob for 5-secs.                                                                                                          |
| To display inlet and outlet water temperatures.                                                                  | On the display GPM screen, turning knob to the left shows inlet water temperature and turning it to the left shows outlet water temperature. |

| <b>Models ELS 0018 and 0027</b>                                                                                  |                                                               |
|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| Heater Features                                                                                                  | Standard Values                                               |
| Element resistance (check with at least one wire lead disconnected from each element).                           | 6.10 to 7.11 Ω                                                |
| Delay in energizing elements (heater starts heating 1-minute after powering up and sufficient flow is recorded). | 1-minute± 30-secs.                                            |
| Turn on flow rate.                                                                                               | 15 gpm ± 2 gpm (57 lpm ± 8 lpm)                               |
| Individual element current at max temp and max flow.                                                             | 31.7 to 40.2 A                                                |
| ECO trip point.                                                                                                  | 140°F (60°C)                                                  |
| To change temperature setting from Fahrenheit to Celsius.                                                        | Press and hold the knob for 3-secs.                           |
| To display GPM.                                                                                                  | Press and hold the knob for 5-secs.                           |
| Inlet and outlet water temperatures.                                                                             | The inlet and outlet temperatures are displayed at all times. |

**Table H. E3T Electric Heater Features**

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## 13. TROUBLESHOOTING

| Problem                                           | Cause                                                        | Solution                                                                                                                                                                                                          |
|---------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nothing happens when the thermostat is turned on. | Low flow                                                     | 1. Check filter, skimmer basket, pump.<br>2. If a 2-speed pump is used, turn to high speed.<br>3. Press and hold the knob for 5-seconds. Make sure the flow rate displayed on screen is at least 15 gpm (57 lpm). |
|                                                   | High limit has tripped                                       | Push the reset button on the limit.                                                                                                                                                                               |
|                                                   | Thermostat not calling for heat                              | Turn thermostat to higher temperature.                                                                                                                                                                            |
| It takes a long time to heat the spa.             | Low input voltage                                            | Call the electric company.                                                                                                                                                                                        |
|                                                   | Undersized heater                                            | Calculate temperature in heat rise<br>°/hr. = Heater input (kw) x 410 divided by spa<br>gallorage (This does not take into account heat loss<br>due to weather).                                                  |
|                                                   | Heat loss from poor weather<br>conditions (cold, high winds) | Use an spa cover.                                                                                                                                                                                                 |
|                                                   | Defective heating element                                    | Call an electrician.                                                                                                                                                                                              |
| Spa does not reach temperature.                   | Low flow                                                     | Check filter, skimmer basket, pump.                                                                                                                                                                               |
| Heating element continuously<br>burning out.      | High input voltage                                           | Call the electric company.                                                                                                                                                                                        |
|                                                   | Poor water chemistry                                         | See "WATER CHEMISTRY" on page 4.                                                                                                                                                                                  |
|                                                   | Heating element split open                                   | Over-acid condition. Watch pH, add acid slowly.                                                                                                                                                                   |
| Fuses blow or circuit breaker opens.              | Shorted heating elements                                     | Replace element.                                                                                                                                                                                                  |
|                                                   | Undersized wire                                              | Replace field wiring.                                                                                                                                                                                             |

# 14. WIRING DIAGRAMS

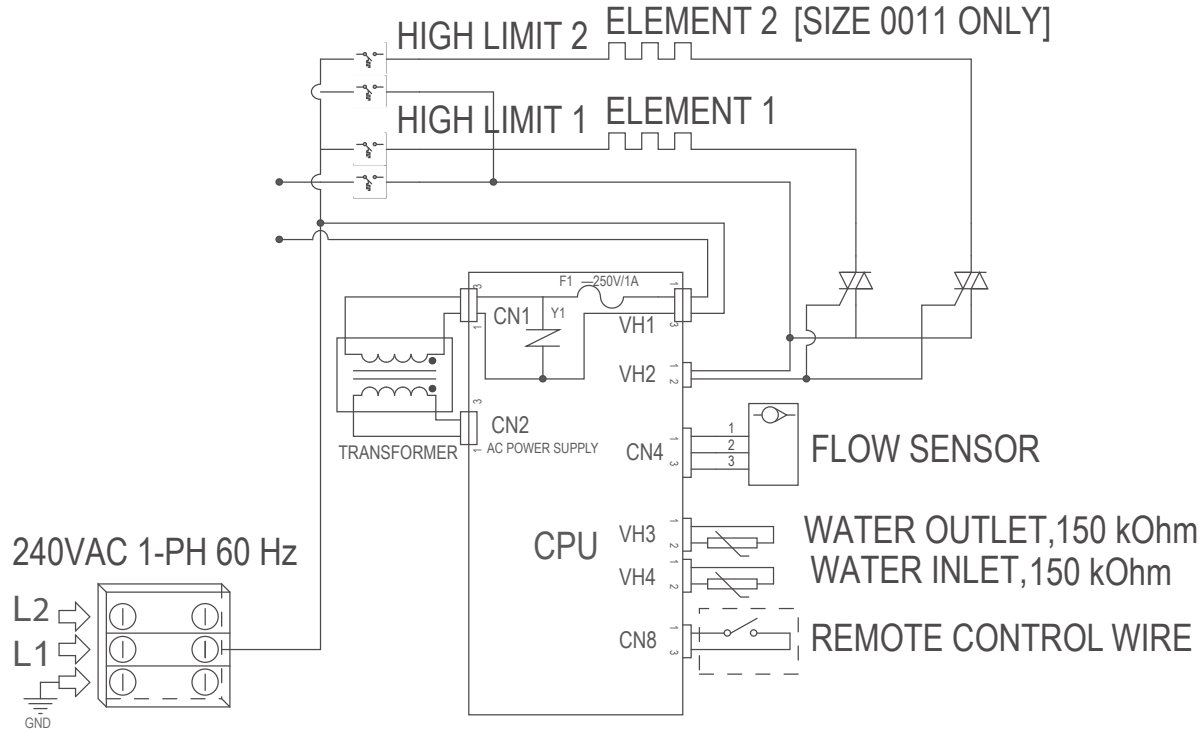


Figure 6. Wiring Diagram for Models ELS 0005 and 0011

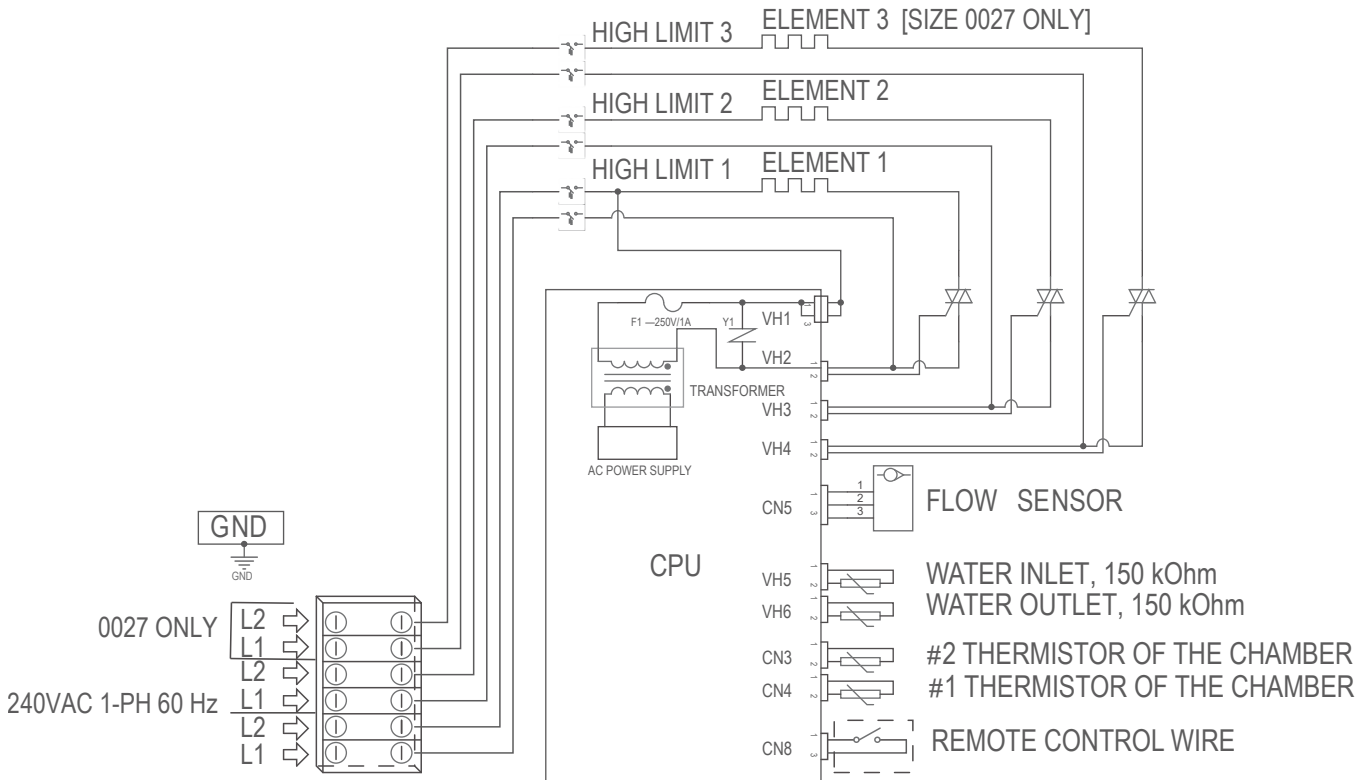


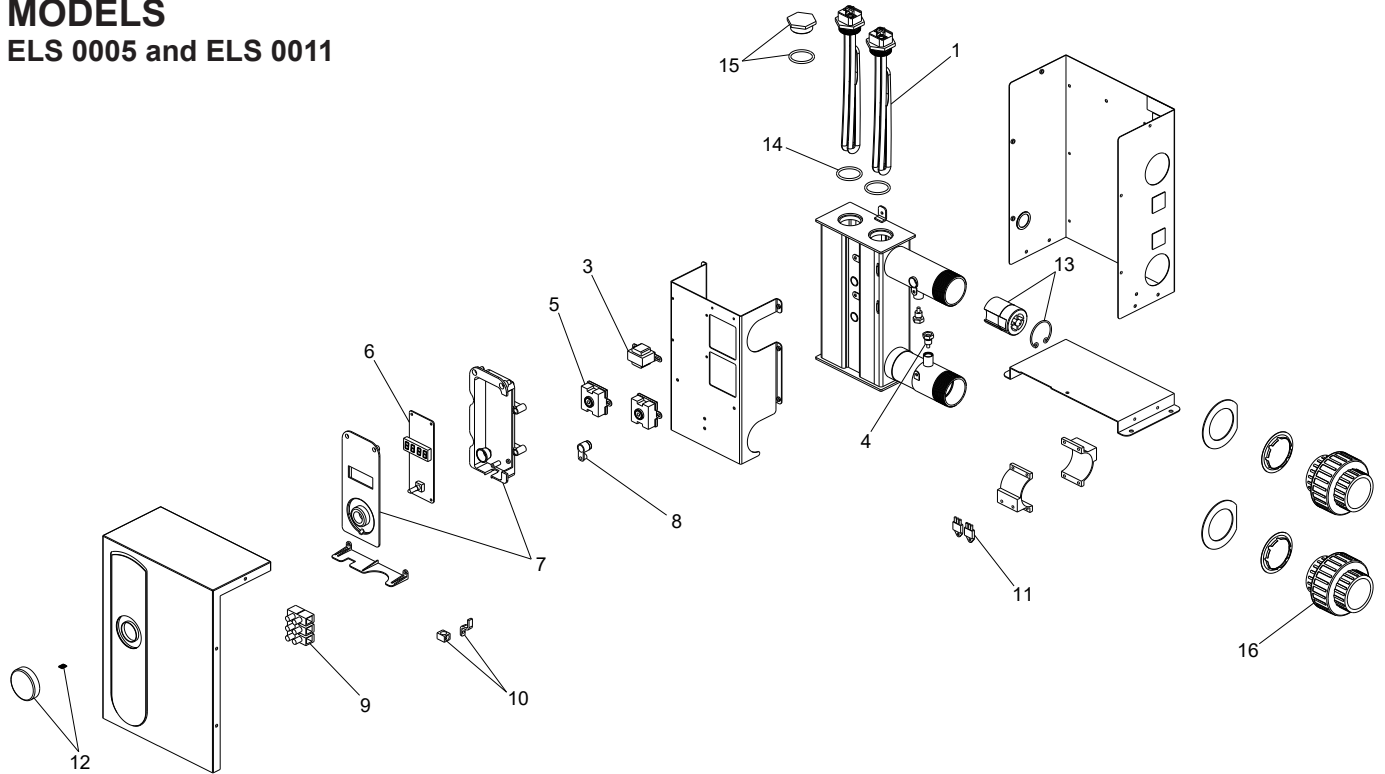
Figure 7. Wiring Diagram for Models ELS 0018 and 0027

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# 15. ILLUSTRATED PARTS LIST

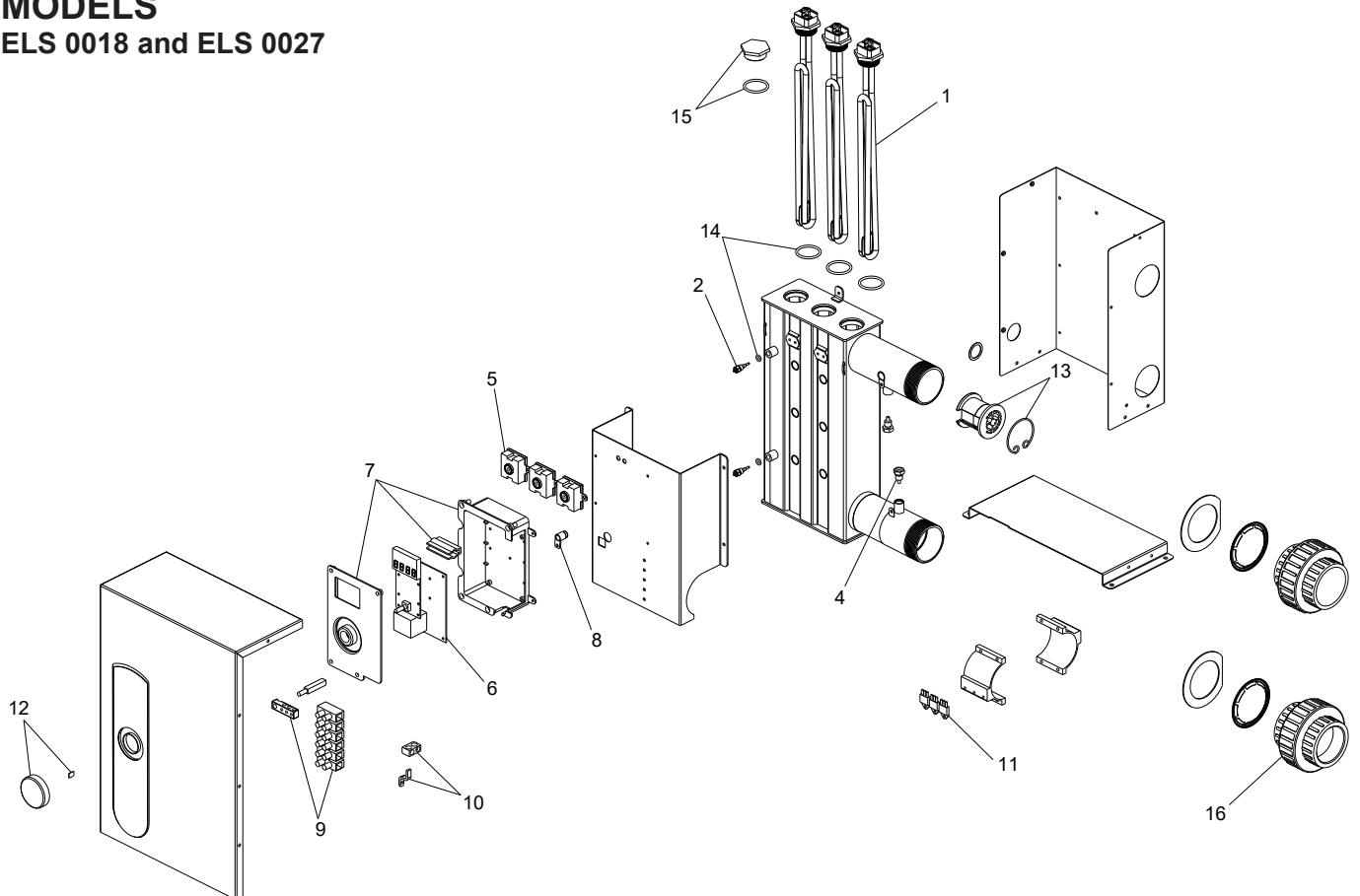
## MODELS

ELS 0005 and ELS 0011



## MODELS

ELS 0018 and ELS 0027



**IN REVIEW**

| <b>PART DESCRIPTION</b> |                                    | <b>ELS 0005</b> | <b>ELS 0011</b> | <b>ELS 0018</b> | <b>ELS 0027</b> |
|-------------------------|------------------------------------|-----------------|-----------------|-----------------|-----------------|
| 1                       | Heating Element (Includes O-Ring)  | 017139F         | 017139F         | 017140F         | 017140F         |
| 2                       | Inlet Thermistor (Includes O-Ring) | N/A             | N/A             | N/A             | 017141F         |
| 3                       | Transformer 240V 60hZ              | 017178F         | 017178F         | N/A             | N/A             |
| 4                       | Water Sensor (Inlet & Outlet)      | 017161F         | 017161F         | 017161F         | 017161F         |
| 5                       | High Limit Manual Reset            | 017143F         | 017143F         | 017144F(2)      | 017144F(3)      |
| 6                       | Circuit Board with LED Display     | 017145F         | 017145F         | 017146F         | 017146F         |
| 7                       | Enclosure                          | 017147F         | 017147F         | 017159F         | 017159F         |
| 8                       | Hall Effect Sensor                 | 017150F         | 017150F         | 017151F         | 017151F         |
| 9                       | Terminal Block                     | 017152F         | 017152F         | 017160F         | 017160F         |
| 10                      | Grounding Terminal                 | 017148F         | 017148F         | 017149F         | 017149F         |
| 11                      | Triac 3-Wire                       | 017153F         | 017153F         | 017177F         | 017177F         |
| 12                      | Knob                               | 017154F         | 017154F         | 017154F         | 017154F         |
| 13                      | Flow Sensor                        | 017155F         | 017155F         | 017156F         | 017156F         |
| 14                      | O-Rings (5)                        | 017157F         | 017157F         | 017157F         | 017157F         |
| 15                      | Pipe Plug (Includes O-Ring)        | 017158F         | N/A             | 017158F         | N/A             |
| 16                      | Union (Set of 2)                   | 017179F         | 017179F         | 017180F         | 017180F         |

# 16. WARRANTY

## IN REVIEW LIMITED WARRANTY

### SCOPE OF WARRANTY

Raypak, Inc. (Raypak) warrants to the original owner that the above model gas pool and spa heater (the "Heater") when installed in the contiguous 48 states of the United States of America with a pool or spa by a properly licensed installer will be free from defects in materials and workmanship under normal use and service for the Applicable Warranty Period. Under this Limited Warranty, Raypak will, at its option, repair or furnish a replacement for any defective part of the HEATER. The repair or replacement will be warranted for only the unexpired portion of the original Applicable Warranty Period, or the Extended Warranty Period, as the case may be.

### EFFECTIVE DATE

The Effective Date of Warranty coverage is the date of original installation if properly documented; otherwise it is thirty (30) days after date of purchase, not to exceed one (1) year after date of manufacture. All Applicable Warranty Periods specified in this Limited Warranty are measured from the Effective Date.

### APPLICABLE WARRANTY PERIOD – UNREGISTERED

If the HEATER is installed with a pool or spa, the Applicable Warranty Period is ninety (90) days from the Effective Date, parts and labor, for the HEATER and component parts.

### EXTENDED WARRANTY PERIOD – SERVICE PROFESSIONAL

If, within 90 days of the Effective Date, (i) the HEATER is installed in a pool or spa at a single family residential dwelling by a properly licensed installer (in accordance with applicable state and local laws and regulations), and (ii) registered with Raypak ([www.raypak.com](http://www.raypak.com)) with an installation receipt attached to such registration, then the Applicable Warranty Period is one (1) year from the Effective Date for the HEATER and component parts, but specifically excluding the electrical heating element. The electrical heating element will be warranted for a period of 90 days from the Effective Date. The HEATER will not be eligible for the Extended Warranty Period if installed in a commercial application (hotel, condominium or apartment common areas, etc.)

### LABOR AND SHIPPING COSTS

This Limited Warranty covers the reasonable cost of labor for repairs or replacements covered by this Limited Warranty, provided that said repairs or replacements are performed by a Raypak designated service provider during the Applicable Warranty Period and Raypak has pre-authorized said repair or replacement. This Limited Warranty does not cover any travel time or other labor costs. Furthermore, unless applicable state law provides otherwise, this Limited Warranty does not cover any shipping costs to and from the service provider or to or from the installation site. All of the foregoing costs and expenses are your responsibility, unless applicable state law provides otherwise.

### WARRANTY EXCLUSIONS

This Limited Warranty does **NOT** apply:

1. if the Heater has been moved from its original place of installation, or if the original owner no longer owns the property where the original installation was made;
2. if the Heater is not properly installed with a pool or spa by a qualified licensed installer in accordance with applicable local codes and ordinances, good trade practices, and the manufacturer's installation instructions;
3. if the rating plate(s) or serial number(s) are altered or removed;
4. if the Heater is modified in any way, or non-factory authorized accessories or other components are used in conjunction with the Heater;
5. to damage, malfunctions or failures resulting from failure to properly install, operate or maintain the Heater in accordance with the manufacturer's instructions;
6. to damage, malfunctions or failures resulting from abuse, act of nature, accident, fire, flood, freeze, lightning or the like;
7. to damage, malfunctions or failures resulting from connected system control devices;
8. to performance problems caused by improper sizing of the Heater or electric service voltage, wiring or fusing;

## IN REVIEW

9. to use of any attachment, including without limitation, any energy saving device not authorized by the manufacturer;
10. to damage, malfunctions or failures resulting from misuse or neglect, including but not limited to, freeze-ups, operating the Heater with the cabinet door off, having flow restrictions or obstructions between the Heater outlet and the pool/spa, electrolysis due to an improperly installed salt chlorine generator, or not maintaining a proper chemical balance (PH level must be between 7.4 and 7.8 and total alkalinity between 100 and 150 PPM. Total dissolved solids (TDS) must be no greater than 3000 PPM. In salt water chlorinated pools, TDS must be no greater than 6000 PPM).

## HOW TO MAKE A WARRANTY CLAIM

You should immediately notify your dealer and provide proof of purchase model number serial number and date of installation. Your dealer will contact Raypak for instructions regarding the claim and to determine the location of the nearest authorized service center. If the dealer is not available, please contact Raypak warranty service at 805-278-5300. When making a claim please be ready to supply the model number, serial number, date of original installation and a description of the problem. **Proper authorization MUST be obtained PRIOR to any repairs for the Limited Warranty to apply. This Limited Warranty is VOID if the Heater is repaired or altered in any way by ANY persons or agencies other than those authorized by Raypak.** Raypak reserves the right at all times to inspect, or require the return of, the defective Heater or component part and to verify warranty coverage at its factory.

## EXCLUSIVE WARRANTY-LIMITATION OF LIABILITY

THE LIMITED WARRANTY IS THE ONLY WARRANTY GIVEN BY RAYPAK IN CONNECTION WITH THE HEATER AND ITS COMPONENT PARTS. NO ONE IS AUTHORIZED TO MAKE ANY OTHER WARRANTIES ON RAYPAK'S BEHALF. ANY IMPLIED WARRANTIES, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL NOT EXTEND BEYOND THE APPLICABLE WARRANTY PERIOD SPECIFIED ABOVE.

**RAYPAK'S SOLE LIABILITY WITH RESPECT TO ANY DEFECT SHALL BE AS SET FORTH IN THIS LIMITED WARRANTY. IT IS AGREED THAT RAYPAK SHALL HAVE NO LIABILITY WHETHER UNDER THIS LIMITED WARRANTY OR IN CONTRACT, TORT OR NEGLIGENCE OR OTHERWISE FOR CLAIMS FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING NO LIABILITY FOR DAMAGE FROM WATER LEAKAGE), ALL OF WHICH ARE EXPRESSLY EXCLUDED. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, OR FOR THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.**

We suggest you immediately record the model, serial number, date of original installation, receipt of purchase and proof of installation by a qualified technician and retain this Limited Warranty Certificate in the event warranty service is needed.

**DO NOT RETURN THIS DOCUMENT TO RAYPAK. KEEP IT WITH YOUR POOL HEATER OR BUSINESS RECORDS.**

**Register your product online at [www.raypak.com/warranty](http://www.raypak.com/warranty)**

RAYPAK, INC., 2151 Eastman Avenue, Oxnard, CA 93030 • (805) 278-5300 FAX (800) 872-9725  
Rheem Canada Ltd/Ltée. 125 Edgeware Road, Unit 1, Brampton, Ontario L6Y 0P5 CANADA

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**[www.raypak.com](http://www.raypak.com)**

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Litho in U.S.A.

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