

Absolute Pools and Hot Tubs Customer Registration Form

All warranty coverage requires that you email your completed registration form within 10 days of delivery to [Absolute Pools and Hot Tubs](#):

Order name: _____

Installation address (street, city, state, zip code): _____

Current email address: _____

1st daytime phone number: _____

2nd daytime phone number: _____

Date paid for (this will be on the order emailed to you): _____

Date received: _____

Hot tub brand and model: _____

Hot tub acrylic color: _____

Hot tub cabinet color: _____

Spa serial number: _____

Thank you for your business!

Absolute Pools and Hot Tubs

Hot Tub Need-to-Know Information

(Please keep this document with your spa paperwork)

Shipping Policy

Contact Information

Email Absolute Pools and Hot Tubs

800-992-8296

Business Hours: 9 am –6 pm EST, Monday –Friday

When you order one of our products, you are agreeing that you have read, understand, and agree to our Shipping & Delivery policy.



Hot tubs are delivered by freight carriers. Your delivery address must be accessible by a tractor-trailer. All deliveries are curbside only.

Hot tubs are custom-manufactured products.

No refunds are allowed.

No returns are allowed.

Guidelines for Technical Service

Please contact us during normal business hours at [Absolute Pools and Hot Tubs](#) with any service issues and we will ensure that a technician contacts you as soon as possible.

Guidelines to Follow for All Hot Tub Deliveries

If you are unsure whether to accept your hot tub at delivery because of damage, please contact us immediately at 800-992-8296 (M-F, 9 am –6 pm EST) or via email at [Absolute Pools and Hot Tubs](#). If delivery occurs during our non-business hours, and the damage is extensive, refuse the spa and contact us via email immediately to let us know that you have refused it and we will rush a new spa through production and have it shipped to you.

NOTE: Freight carriers are subcontracted by the manufacturer. They are not employees of our company nor do they have any authority over your acceptance or refusal of a spa. They cannot make the decision as to whether you should accept delivery of the spa if there is extensive damage. It is your responsibility to make that decision following the guidelines outlined here and, if delivery is during our business hours, we will be happy to assist you with that decision if you have any questions or concerns.

If you have shipping damage that is covered within this policy, please be sure to take clear digital photos of the damage and email them to [Absolute Pools and Hot Tubs](#) as soon after delivery as possible.

Please be aware that Absolute Pools and Hot Tubs will not be available to assist you during non-business hours. We will answer all calls and emails within 1 business day of receiving them (so, for example, if you request assistance or information on Friday evening at 7 pm EST, you will receive an answer by the following Monday at 6 pm EST).

Customer Responsibility at Delivery

You are responsible for **completely unwrapping the spa and thoroughly inspecting it at the time of delivery for visible damage or problems and identifying them on the delivery receipt the driver gives you to sign**. If it appears that you got the wrong spa (wrong color acrylic, wrong color cabinets, not the options/upgrades you purchased, you need to refuse the spa and let us know via email that you refused it –include shipper information with this email). The driver must remain there until you've thoroughly inspected the shipment. If he/she does not want to, refuse to sign the delivery receipt and contact us immediately and we will ensure that he/she stays until you've completed your visual inspection.

All shipping damages must be reported within 10 days of delivery. Even if you note damage on the delivery receipt and don't report it to us within the first 10 days of receipt, you will be responsible for replacement costs and shipping.

If you request replacement parts that were damaged during shipping and could have been seen upon a thorough inspection at delivery, we will ask you to fax us a copy of your signed delivery receipt, which we will verify with the driver's delivery receipt. If you failed to note the damage on the delivery receipt, you will need to pay for replacement parts plus shipping and file a claim with the freight carrier for reimbursement.

Shipping insurance covers CONCEALED (i.e., damage that could not be seen during the visual inspection you are required to do when the item is delivered) damage ONLY.

A signed delivery receipt with no exceptions, is called a "clear delivery." Clear deliveries mean that there were no shortages or nor was there visible damage at the time of delivery.

In the rare instance that accessories you order with your spa are not delivered with the spa, please contact your sales representative immediately to get the accessories shipped. If your sales representative is not notified within a maximum of ten (10) days of receipt of the spa, the accessories will not be shipped.

It is very important that the buyer follows the delivery procedure described above. If the buyer determines that all or a portion of the merchandise has been damaged, the buyer must refuse to accept the shipment or note the exact damages on the freight bill and replacement parts will be sent. Any damaged parts that are not noted at the time of receipt by the buyer will be replaced at the buyer's cost (including shipping costs).

We offer concealed damage (hidden damage that could only have occurred during shipping and which was not visible during delivery inspection) shipping insurance at a nominal cost on our spas.

Shipping insurance covers the replacement of damaged parts only, not the entire item. If the buyer chooses not to purchase shipping insurance at the time of purchase, all replacement items and associated shipping costs will be paid for by the buyer. Shipping insurance cannot be purchased after the item has been delivered.

Any items that are incorrect or missing from your shipment must be reported within 10 calendar days of delivery. It is the buyer's responsibility to inspect any product to ensure nothing is incorrect or missing before beginning installation. Missing or incorrect parts reported within the timeframe stated above will be shipped by UPS ground or freight carrier (whichever applies). If the buyer wants the missing or incorrect parts that can be sent via UPS overnighted or 2-day aired, the customer will have to pay the applicable costs for those services.

- Our spas are custom-built to your specifications and are NON-RETURNABLE!
- Our spa covers are NON-RETURNABLE!

If you have any questions about shipping costs and policy, please call us at 800-992-8296, Monday through Friday, 9 am –6 pm EST or email us at [Absolute Pools and Hot Tubs](#).

Balboa Pack Frequently Asked Questions

- Q. Why does the soldered-in fuse located on the circuit board blow?
1. Make sure the system has the proper incoming voltage.
 2. Check for proper wiring inside the system box and look for any loose connections or cut wires.
 3. Plug in a new transformer
- Q. Why does the panel display "FLO" constantly and nothing works?
1. This is an indication of a pressure switch stuck in the closed position.
 2. Check the slice valves and verify that they are open.
 3. Make sure the pressure switch wire is connected to the proper circuit board connector.
 4. Disconnect the pressure switch wire from the circuit board
 5. If the hot tub operates normally, then recalibrate the pressure switch.
 6. If the pressure switch cannot be recalibrated then replace it.
 7. If the problem continues after disconnecting the pressure switch wire from the circuit board, replace the board.
- Q. Why does the panel display "FLO" alternating with current temperature?
1. This is an indication of an open pressure switch.
 2. Check the water level.
 3. Check for blockage in the filter cartridge, skimmer basket and pump intake fittings.
 4. Check the slice valves and verify that they are open.
 5. Make sure the pump is primed and pumping properly.
 6. Make sure the pressure switch wire is connected to the proper circuit board connector.
 7. Check the pressure switch for cuts.
 8. Recalibrate the pressure switch.
 9. If the pressure switch cannot be recalibrated, replace it.
- Q. Why does the system power input fuse (20A, 25A or 30A) keep blowing?
1. Chances are it is a bad pump or blower.
 2. Make sure to replace any blown fuse with a fuse of the exact same type and rating.
 3. Unplug all the pumps blower.
 4. If the fuse blows again, verify proper internal system wiring and check wires and connectors for cuts and burns.
 5. If the fuse does not blow, then plug in each device one at a time to determine which device is defective.
 6. Replace the device that blows the fuse.
- Q. Why does the panel display "SN3"?
1. Make sure the system has proper incoming voltage.
 2. If an ozonator is present, disconnect it.
 3. Replace the temperature sensor.
 4. If it still displays "SN3" then replace the board.

Q. Why does the panel display "SN1"?

1. Make sure the system has proper incoming voltage.
2. If an ozonator is present, disconnect it.
3. Replace the hi-limit sensor.
4. If it still displays "SN1" then replace the board.

Q. Why does the control panel display "OH"?

1. Overheat protection may occur if the pump is set to operate for extended periods.
2. In extremely hot weather, check for proper cabinet ventilation.
3. When the hot tub is in a filter cycle, make sure P1 low-speed is on.
4. Check slice valves/make sure that they are open.
5. Check for blockage in the filter cartridge, skimmer basket and pump intake fittings.
6. Check the alignment of the heater element in the heater housing to make sure it is straight and not contacting the sides.
7. Make sure the temperature sensor is installed properly.

Q. Why isn't the system maintaining the set temperature of the water?

1. Make sure that the water temperature displayed on the topside panel is at least 1 degree below the heater set temperature and set the control to standard mode.
2. Check voltage across the two connections to the heater. Your meter should read either 120 or 240 volts depending on your installation.
3. If voltage to the heater is good, replace the heater.
4. If your meter reads low or zero voltage, verify proper pressure switch operation.
5. Keep in mind that the heat indicator will not light if the pressure switch is not closed.

Q. The system is receiving proper voltage, why doesn't anything function?

1. Check for blown fuses, burn marks or signs of tampering in the box.
2. Power down the hot tub, plug in a test transformer and test panel and return power to the hot tub.
3. Replace the board.

Q. Why does the GFCI trip immediately upon power up?

1. If this is a new installation, make sure that the GFCI is wired correctly.
2. Disconnect all the components (i.e. pumps, blower, ozonator heater) and plug them back in one at a time to verify which component is causing the GFCI to trip.
3. Check for any loose connections or cut wires in the box.
4. Plug in a new transformer.

Spa and Hot Tub Electricity Primer

We always recommend that you hire a licensed electrician to do all electrical work with your hot tub to ensure that it is done correctly.

We use a four-wire system (many options such as an ozone system, stereo, and fiber optic surround lighting are 120V) and require a four-wire hookup. All of these will require a proper amperage GFCI and should only be wired by a licensed electrician. One hint when looking for an electrician is to ask if they have ever wired your particular type of spa. Many good electricians have not wired a four-wire spa and can easily mis-wire the GFCI causing it to trip when power is first applied. It is a good idea to see if the spa dealer you are purchasing from has anyone on staff that knows how a four wire GFCI should be wired, so if the electrician has problems, they can speak with someone on staff to clarify the procedure for them. Many spa manufacturers that use this type of electrical hookup will have someone on staff that the electrician can speak with directly, if problems occur. Always consult local electrical code, before wiring a 240V tub, this will keep confusion down to a minimum over issues like size of wire to be used, etc. When in doubt, put in heavier wire!

Always use all copper conductors. The money saved by going to aluminum or copper coated aluminum, will be lost in increased power bills, and, in some cases, the cheaper wire can be a fire hazard, and/or will void portions of your warranty.

GFCI Installation on Four Wire 240V Systems;

In new spa / hot tub installations it is a common problem to have a miss-wired GFCI.

NOTE that there are different models of GFCI used in the market, the following description is generic.

To properly wire a GFCI on a four wire 240V installation, when using a sub-panel box, all four wires should be brought out from the main box. The two hot legs should be attached to the GFCI breaker at the proper locations, then come out of the GFCI breaker and be run to the spa. The neutral leg from the main box should come out and be attached to the neutral bus located on the side of the breaker. The neutral pigtail on the breaker should then be attached to the other side of the neutral bus. There is a location for another neutral lead that goes out to the spa from the breaker, this neutral wire should be run out to the spa. The ground wire from the house and ground from the spa should be bonded together in the sub-box. If the neutral and ground are not kept separate in this fashion the spa will instantly trip the GFCI breaker.

Electricity is responsible for running pumps and motors, ignites gas heaters, and operates controls. When major renovation or installation of electrical circuits is required, call a professional electrician and subcontract the job. When troubleshooting short circuits or other specialized electrical problems, an electrician will solve and repair it faster than you can, so again, call a professional and let him do his job.

Water technician and electrician is required to make basic electrical connections, troubleshoot underwater lights that won't work, switch appliances from 110 volt to 220 volt, and so on. Understanding the basic concepts of how electricity works, is controlled, and is conducted, will keep you both safe and profitable.

Electrical Terms definitions are as below

- Amperage (amps) is the term used to describe the actual strength of the electric current. It represents the volume of current passing through a conductor in a given time. Amps = watts @ volts.
- Arc or arcing is the passage of electric current between two points without benefit of a conductor. For example, when a wire with current is located near a metal object, the electricity might arc (pass) between the two.
- Circuit is the path through which electricity flows.
- Conductor is any substance that carries electric current, such as a wire, metal, or the human body.
- Current refers to the rate of flow between two points.
- Cycle is a complete turn of alternating current (ac) from negative to positive and back again.
- Gauge refers to the size of an electric wire. Heavier loads can be carried on heavier gauge wires,; however the numbering system of wire gauges works in reverse. A 10-gauge wire, for example, is thicker than a 14-gauge wire.
- Line refers to a wire conducting electricity.
- Load is an appliance that uses electricity.
- Volts are a basic unit of electric current measurement expressing the potential or pressure of the current. Volts = watts @ amps.
- Watt is a measurement of the power consumption of an appliance. One watt is equal to the volume of one amp delivered at the pressure of one volt. Watts = amps x volts.

Electrical Testing Equipment and Miscellaneous Terminology

| Item | Description |
|-------------------|---|
| Multi-meters : | In order for you to service any spa equipment, you absolutely must have and know how to use a multi-meter capable of measuring 120 and 240 single phase voltage, ohms, and amperage. Without this equipment, any repairs made to the electrical parts of this equipment will be strictly by trial and error or guessing which usually results in parts replaced that weren't actually bad. If you do not have a meter capable of each of these functions, either buy one at a local electrical supply house or borrow one. Either way, you must have one to work competently. Your meter instructions will explain how to hook up the test leads for each of the tests that follow. |
| Voltage Testing : | Voltage tests of any circuit inside the equipment can be done using much the same principle as testing for good line service (covered in LINE SERVICE CHECK section of this guide). Simply decide what voltage you expect to find at a test point, set your meter (if not |

preset) for the scale showing this voltage, and apply your leads to the circuit in question. It is always best to put your test probes on the leads supplying the actual circuit, rather than in locations you would assume are of the same polarity.

When most people test, they conveniently apply one lead to the ground, and look for voltage with the other lead. The results of this method will easily mislead you because even a neutral wire carries electricity when a component is running. There's no reason not to expect to see voltage when tested in this fashion. If it is a 120 volt circuit, one lead must go to a neutral connection point, and the other to the point at which there should be 120 volts. A 240 volt test must include two separate points where individual 120 volt supply leads are providing power.

Amperage Testing : An amperage test can only be conducted when a component is actually running. The components that you might test with your ampmeter are the heater (120v should read 12.5 amps, 240 volt should read 25 amps), the blower (1 Hp will read 5-6 amps, 1-1/2 to 2 Hp will read 7-9 amps), and the pumps low and high speeds (look at the plates on the motor for the amperages you should see and your actual reading should be within 10% of that). If your voltage supply to the pack is lower than the 120 volts or 240 volts as mentioned, then your amperage draw will be somewhat lower as well, (especially noticeable on heaters).

On 120 volt tests, an amperage reading should only be taken on the lead actually supplying the voltage to a component (not on the neutral). For 240 volt components, either wire supplying power will give you a good reading.

WARNING: A reading several amps higher than the component is rated for will ultimately result in a premature failure of the equipment or worse, an electrical hazard.

Ohms Test : Using the ohms scale on your meter, you can determine whether or not you have continuity in a circuit. Continuity is the ability for electricity to pass unrestricted between two ends of a wire or circuit. Ohms is the unit of measure of that restriction or resistance. The more resistance you have, the weaker the circuit is. Therefore, when testing a switch for continuity, your meter needle should read 0 ohms if the circuit is closed or "on" (unless the battery in your meter is weak in which case the needle will move but not all the way to 0). There should be infinite resistance such that the needle does not move at all if the circuit is open or 'off.

WARNING: NEVER CONDUCT A CONTINUITY TEST ON A LIVE CIRCUIT
It is recommended that you disconnect any switch or part being

tested for continuity before conducting the test.

Line Service Check : Many installations have faulty line service. Before assuming that your problem is with the equipment, always check for the proper voltage coming into the equipment.

If after testing, you find an improper line service voltage, shut the power off at the circuit breaker and contact a licensed, qualified electrician to make the necessary corrections.

Ground Fault Circuit Interruption Protection (GFCI) : GFCI protection is necessary in case anything electrical should allow electricity to leak to grounded metal in connection with the spa. This is especially possible if after years of use a heater element should rupture and the ground wire (that may or may not have been originally connected) should happen to become disconnected. A GFCI will sense this leakage and shut the voltage to the power pack off.

As of January 1, 1994, all equipment packs used with a spa or hot tub must be protected by a Class A ground fault circuit interrupter. This is called for in the N.E.C. code book in paragraph 680-42. If the equipment has a GFCI built into it, that GFCI may only protect certain components such as the blower, light ozonator, and sometimes the pump. The GFCI may not provide full protection, especially if the unit is wired for 240V service. To be sure, have a qualified electrician study the wiring diagram that came with your unit (or the manufacturer of the unit you are working on) for verification.

Keep in mind that when buying a 240 GFCI for an installation, be sure to get one that has neutral protection. The 60A Square D GFCI does not have neutral protection and therefore cannot be used on a hybrid equipment system. (Hybrid means the unit contains both 240V and 120V components.)

NOTE: Any GFCI protecting a circuit should be tested periodically to insure proper operating protection. If it fails to operate properly, it must be replaced.

240V Circuit Breaker Installation : There are two easily installed properly rated 240 volt GFCI breakers on the market today (as of the time this page was written). They are the Square D model QO 250GFI and the ITE Siemens model QF250, each rated for up to 50 amps. The square D 60 Amp GFCI can not be used with our equipment because it does not have load neutral protection.

Most people who install the Square D GFCI breaker do not follow the instructions accompanying it. A common mistake is made by connecting their load neutral (from the equipment), the large white pigtail on the GFCI, and the power supply neutral to the

connection block on the mounting bracket. The instructions show where the load neutral is supposed to attach to the GFCI. Before suspecting a pack malfunction, check the installation of this device (when used) and make sure it was installed correctly.

The connection points for the pack on the Siemens GFCI are more obvious, but again, make sure that only the load neutral is connected where indicated and that the white pigtail is only connected to the line service neutral.

- Pumps :** The pump is probably the hardest-working piece of equipment on your pool or spa. Its job? To keep water moving throughout the entire circulation system. The pump draws the water from the pool or spa, through the plumbing and on to the filter. It then pulls it through the heating process and pushes it back into the pool or spa. The pump also acts as a secondary sieve. Pumps of all varieties have a strainer pot or hair and lint trap that catches any small debris that made it through the skimmer, main drain or gutter. By trapping this debris, the pump helps ease the burden placed on the filter, leaving it free to catch the smaller pollutants in the water. This is just one part of a multi-step process to rid the water of impurities before it's sent back into the pool or spa. Indeed, keeping the water circulating is one of the best ways to help keep your pool or spa clean. It also requires very little attention from you. You need only program the system to automatically kick the pump on for a certain amount of time each day so all of the water moves through the filter at least once a day. Generally speaking, a pool pump should run at least six hours a day and a spa pump -- which in portable spas is part-and-parcel of the spa pack -- should run for at least two hours a day when the spa's not in use.
- Motors :** In the context of a pool or spa, the motor's function is to drive the circulation system. More specifically, the motor converts electrical energy into mechanical energy which is then used to operate the pump. Unless you are a mechanic, you should not get involved in any hands-on maintenance of the motor. However, it is a good idea to familiarize yourself with when it's set to run, and to watch for any symptoms -- such as grinding or other unusual noises -- that may indicate trouble. If the motor fails to operate properly -- or at all -- contact your retailer or a professional service technician for more information and assistance. As with any complicated piece of electrical equipment, troubleshooting and repairs are best handled by an expert.
- Filters :** In effect, we've now traveled through the pump and are on our way to the filter, which serves to remove dirt and other impurities from the water. There are three different types of filters available on the market today, each of which has its own unique advantages. • Diatomaceous Earth Filters are made of grids of extremely fine mesh that are coated with diatomaceous earth. The DE acts as an

adhesive, trapping any small or microscopic dirt particles in the water. FYI: DE is made from crushed petrified bones that, if you were to look at it under a microscope, would look like a sponge with thousands of tiny pores. One of the advantages of DE is that it's organic and non-polluting. In other words, it's environmentally inert. Do note, however, that some municipalities or other environmental authorities have strict regulations regarding the disposal of DE. This becomes a concern when it's time to clean the filter by backwashing it. For more information on what to do with the water that has been flushed through a DE filter, contact your local health department, pool/spa retailer or service technician. • Sand filters use -- you guessed it -- sand as a filter medium. Inside a sand filter is a certain amount of sand and gravel, which mix with water passing through, pulling out dirt and impurities. Small microscopic particles can escape capture in a sand filter. To prevent this, you can use a flocculant to coagulate the particles into larger particles the filter can catch before the water is sent back into the pool. Every several years, you may also need to add new sand to the filter. But do note: These filters require a very specific type of grain. For more information on when and how to replace the sand, contact your pool/spa retailer or service technician. • Cartridge filters, like DE filters, have a grid-like interior to catch pollutants. These types of filters can contain a number of grid cartridges. Spas usually require only one large cartridge while pools generally need either three large cartridges or up to 12 small ones. These cartridges are made with a fine, pleated mesh material -- and the pleats are the key to the filter's operation. The tight pleats, or folds, allow a large amount of material to be used in a small container. The more material used, the larger the surface area available to capture unwanted dirt or debris in the water.

Heaters : We won't go into great detail here about heaters, but you should know that the filtered water passes over the heater before re-entering the pool or spa. As is the case with motors, heaters don't need a lot of maintenance. You should, however, learn to recognize any unusual noises or other clues that may call for professional attention. The best thing you can do for your heater -- and indeed all of your equipment -- is to keep the water properly balanced. Imbalanced water will dissolve metals from the equipment or cause a calcium build-up that can eventually cause heater failure. For more information on water maintenance, check out Splashzone's section on Chemicals.

Warning - Please read this section completely!

This section is presented for the do-it-yourselfer who needs some help either troubleshooting or repairing his/her own hot tub spa. Here we are assuming that if you have chosen to work on your own unit, you have a basic knowledge of electricity. Please remember that water and

electricity DO NOT MIX. If you are not capable of performing a repair yourself, please contact a local spa professional or a licensed electrician in your area.

Also realize that the wiring and equipment described herein represents the "average" spa equipment pack. Your unit may vary significantly from the components described below. If you are in doubt as to how to properly troubleshoot or repair your specific unit, please contact a local spa professional or a licensed electrician in your area Use any of the information contained herein AT YOUR OWN RISK. We will not be held liable for any injuries that may result from the troubleshooting or installation of any electrical components in your hot tub spa unit.

Electrical Theory

A detailed description of electrical theory would take a separate volume, so this section only outlines the basic concepts that make the specific applications a bit easier to understand.

Electricity is much easier to comprehend if you picture it as water flowing through pipes. For electric current to flow from one place to another there must be a difference in pressure, called potential. A wire, for example, with no current flowing through it has zero potential- there is no current there yet. When the wire comes in contact with something that has electrical potential, it will accept the current until the potentials are equal in both places. Electricity works the same way, flowing from the place of greater electrical charge to the place of lesser or no charge.

The earth has no electrical charge, it has zero potential. Therefore, electrical panels and appliances are grounded, so that if current takes an unexpected path it is attracted to the earth. Electric service to a home, for example, includes a copper stake or rebar driven into the soil that is attached to a connection bar in the electrical panel with a heavy gauge wire. Similarly, an appliance that is grounded includes a wire attached to the appliance, run back to the electrical panel, and attached to this grounding bar. In this way, if a wire inside a motor were to touch the metal case of the motor, for example, the current would be conducted harmlessly through the ground wire to the grounding bar and into the earth.

Electricity, like water, takes the path of least resistance. Therefore, in the preceding example if you were to touch that motor case, the electricity would travel through you to the earth, unless that path were broken in some way, by rubber soled shoes for example.

This unintentional route to the ground without first returning to the electrical panel is called a ground fault. As noted, if you are part of the path to the ground, you will be shocked. Another way to be shocked is to become part of the circuit. If you touch a metal casing that is electrified, then touch another conductive surface, the electricity will pass through you as if you were a wire. In other words, you become part of the circuit. This can also occur if you touch a hot line and a neutral or ground line, again becoming part of the circuit. These examples are called short circuits.

The human body is operated by electricity-very small electrical impulses that stimulate muscles or transmit information as energy in the brain. Therefore, the body is designed to be

an excellent conductor of electricity. As with any appliance, however, too much electric current delivered to the appliance can destroy it, especially the heart and brain. An electric current of 30 milliamps (1 milliamp = 0.001 amp) will cause muscles to contract uncontrollably, meaning if you grab a hot line of more than that you probably won't be able to let go. In a short time, the current disrupts the normal heartbeat and breathing, causing death. Children can be killed in this manner with as little as 10 milliamps. To put that in perspective, a 40-watt lightbulb at 110 volts uses about 0.3 amp, or ten times the 30 milliamps that can kill you. Taking that further, a typical pool motor drawing 10 amps is using enough current to kill you 300 times.

Conductors are any substance that allows the free movement of electric current. Insulators, on the other hand, are substances that do not conduct. Examples of each are;

| Conductors | Insulators |
|-----------------|------------|
| Silver | Dry air |
| Copper | Glass |
| Aluminum | Rubber |
| Brass or bronze | Plastic |
| Iron or steel | Ceramic |

Every conductor offers some resistance to the movement of electric current, like friction inside a water pipe. Some conductors conduct better than others because they offer less resistance. Although there is variations in resistance, it is important to know the concept and terminology. Ohms are the units used in measuring resistance. The better the conductor, the lower the ohms reading. The shorter the length of a conductor, the lower the ohms.

Alternating current (ac) travels in one direction then the other (alternating), so the appliance does not have to be connected to the power source in any special order. Unlike direct current (dc) voltage, ac can be stepped up or down with a transformer, permitting the transmission of high voltage along municipal power lines that is transformed to lower voltages at each home or business. Because of this inherent versatility, ac is used in virtually all residential and commercial applications.

Alternating current is delivered to the home for consumption by appliances designed to accept it at either 110 volts or 220 volts (there are larger voltages in heavy-duty commercial applications, but those are best left to the electricians). Both designations are averages, since current supply varies slightly and operates most appliances in a range of 108 to 127 volts and 215 to 250 volts. Thus, you will sometimes see voltages expressed for appliances as 110, 115, 120 or 220, 230, 240.

Alternating current is also delivered at a certain rate. As noted, the alternating of the current one way, then the other, creates one complete cycle each time it reverses direction. The speed of that reversal can be controlled and makes a difference to appliances such as CD players or tape recorders that depend on a certain rate. In the United States, power is delivered at 60 cycles per second (60 hertz). in Europe and much of the rest of the world, it is delivered at 50 hertz. That is why you can take a voltage converter on vacation to step the

voltage down from 220 to 110, but you can't operate appliances that require a certain cycle timing.

Electrical Panel

The home power supply enters as two or three if there is heavy equipment use lines (phases) of 110-volts ac and one neutral line in a protected metal box called the electrical panel.

The power supply enters the panel and is connected to bars. Circuit breakers are attached to the bars. If the breaker is attached to one phase, it delivers 110 volts (single phase) to anything that is connected to it. If the breaker is designed to be connected across both phases, it delivers 220 volts (dual phase). All neutral lines returning to the panel are connected to the neutral bar, which is in turn connected to a ground. In this way, both 110- and 220-volt ac breakers are found in the same panel.

Circuit Breakers

The supply lines are generally designed to carry 100 amps for the typical residential user. Each circuit breaker is designed to carry a specific load and break the circuit open when the load exceeds that value. Typical circuit breakers are 15, 20, 25, 30, and 50 amps, depending on the requirements of the appliances. Wiring attached to the breaker leading to the appliances is sized in accordance with the amperage of the breaker.

When electrical volume exceeds the rating of the breaker, it opens the circuit and disconnects the power supply to the appliance or circuit in question. Such overload might occur as the result of an unintentional ground or short circuit at the appliance (or wiring to it).

Depending on the design of the breaker, resetting is accomplished in one of several ways. Sometimes it is not obvious which breaker has tripped. One style of breaker looks as if it is still on. You need to push the switch fully to off, then back to on to reset it. Another style pops halfway between on and off, again requiring a hard push to off before going back to on. Another has a small window displaying a red flag when the breaker is off. Some of these require waiting up to 30 seconds before the breaker can be reset. Another type is off when a tab pops out and is reset by pushing the tab back in. In short, be aware that a tripped breaker might require some detective work.

Troubleshooting and replacement

When a breaker will not reset, it might mean that the breaker is faulty or the circuit is overloaded (demanding too much current). An overloaded circuit can be the result of an appliance that is faulty, an unintentional ground, or a short circuit in the wiring, or it might be that there are too many appliances on the same circuit (or one that is too large for the circuit.)

Troubleshooting is simple. First, check the appliances on the circuit. Does their total amperage exceed the rating of the breaker? If so, remove the extra appliances or wire them to a circuit that can handle the load.

If that is not the problem, disconnect each appliance from the circuit one at a time, resetting

the breaker after each disconnection. Be sure the disconnected wires are taped off and no bare wires are touching each other. When you have removed the faulty appliance, the breaker will stay on. You now know which appliance to repair.

If the breaker is still tripping, the problem might be in the wiring between the breaker and the appliance. Make a visual inspection (with the breaker off) of all the wiring that is accessible. If you don't find a frayed or broken wire or two bare wires touching each other, disconnect the wiring from the breaker. To do that, turn off the main service breaker that feeds the entire panel. Remove the faceplate from the breaker panel. Make sure the breaker in question is off (an added safety in case the main breaker is still on for any reason). Unscrew the wire lug screw at the base of the breaker and pull the load wires from the breaker. Turn the main service back on and reset the breaker in question. If it still pops off under this no load condition, then the breaker itself is faulty and must be replaced.

Never try to repair a breaker. If you are unable to locate a replacement and need to get the equipment operating again, look at the remainder of the breakers in the panel. Often there are spare breakers in the panel that can be used for replacement. Sometimes a breaker of a comparable amperage is servicing a circuit that is not needed as much as the pool equipment and you can make a temporary switch. Always replace a breaker with one of the same amperage.

To replace a breaker, turn off the main service breaker. Place your flat-blade screwdriver on the front, top edge of the breaker and pry it out of the panel. Some breakers fit tightly, so apply firm, even pressure. If you have not disconnected the load wires, do so as described earlier. Look at the back of the breaker and the design of the hook connection that fits into the electric bar of the panel. When you have your replacement, reconnect the load wires to the new breaker, and return it to the panel reversing the steps taken to remove it. Put the panel faceplate back on and turn on the main service breaker.

If the breaker did not trip when you disconnected the load, the reason for the breaker tripping off must be in the wiring between the breaker and the appliance. Since you were unable to find a problem with the wiring during your visual inspection, you might need to replace the wiring. Here it is advisable to call an electrician.

Sometimes electrical problems at the appliance or the tripping of a breaker is caused by a loose breaker. If you find that the breaker is loose when you first try to remove it, try pushing it back into the panel, and try your appliance again. If it won't seat firmly, replace the breaker.

Older homes might still have fuses. Fuses perform the same function as circuit breakers, but fuses must be replaced each time the overload breaks the circuit (blows the fuse). Fuses either clip or screw in place. As with breakers, always replace a fuse with one of the same amperage.

If you are planning to work on a panel, it's best to have a helper around to get help in case of electric shock. Whenever you approach a breaker panel, do so with great respect. Water, frayed wiring, or a poor previous service work might have created problems at the panel that you cannot anticipate. Other safety measures include wearing rubber gloves and boots, standing on a piece of dry wood to further insulate you from the ground, and leaving one hand in your pocket, so you can't inadvertently touch one hand to a live wire or panel and the other

to a ground.

Wiring

Pulling new wires in a circuit or adding a circuit is a job best left to a professional electrician, but it is advisable to know a few things about requirements.

Gauge and type

The gauge of the wire refers to its thickness and is designed to operate under high temperatures and also its ability to handle volume and pressure of current (amps and volts).

Whenever you run wire for any reason, make sure you use the correct type. Remember you can always use wire that is heavier (lower AWG number) than the breaker and appliance require, but never use wire that is thinner (higher AWG number) than required.

Wire is stranded or solid. There is less resistance in solid wire than stranded, so this should be your first choice. Wire is generally available in copper. If aluminum was used for wiring homes, it should be replaced whenever possible.

Wires are sold in various colors. The standard are that Green wire is always ground, Black and Red are used for hot lines, White for neutral. If you must use a wire color not in keeping with this code, tape the correct color tape over the wire or clearly label it. Never assume that the previous technician used the correct colored wire. Check everything as you go and try to leave wiring better than you found it.

Always encase the wires in conduit. Be aware that wires of different voltage should not be run in the same conduit. You can run numerous circuits of the same voltage in a conduit, but you need to run a separate conduit for every group of circuits of different voltage. Never run anything else in an electrical conduit, such as air hoses or water lines. Use flexible, waterproof conduit and connectors for outdoor installations, such as wires from heaters or motors to J-boxes or time clocks. Often a sub panel (a small breaker panel supplied from the main household panel with one large circuit) is located in the pool equipment area.

When terminating wires to be attached to connections in appliances or at other terminal posts, use crimp connectors rather than simply wrapping the bare end of the wire around the post. Wrapping can come loose or be squeezed off the post. Bend the wire in the same direction as you will tighten the screw, so when you tighten the screw it also tightens the wrap. The connectors are available in various sizes and with various connection ends (called the tongue). The insulation is stripped off to accommodate the barrel of the connector. Using a crimping tool, secure the wire to the connector.

Since most pool and spa applications are wired directly between appliances and switches, you won't be dealing with too many outlets. With portable spas, however, you might encounter a few. It is important to recognize the appearance of outlets so you don't try to plug 110-volt appliances into 220-volt outlets. These outlets are designed so that the plug can be inserted only one way to prevent reverse polarity. With ac, polarity is important with some appliances.

Bonding and grounding

A bonding wire is an important safety component of any pool or spa equipment area since the bonding wire is a path of less resistance than the human body, so any stray current is conducted along it instead of you becoming part of the circuit.

A bonding wire is a solid 8-gauge wire that is connected to a lug on the exterior of each appliance in the equipment package. No conduit is needed because current is not normally carried by this wire. The gauge of the ground wire of any appliance must be as large as the hot wire(s) so it is capable of efficiently conducting electricity away from the appliance in the event of a short circuit or stray current. Similarly, at the breaker panel, the main ground wire must be as large as the largest hot wire in use.

All pool and spa equipment must be grounded.

Ground Fault Circuit Interrupter (GFCI)

When equipment or wiring fails it might draw more current than the appliance can use, burning out the appliance. The circuit breaker is designed to break the circuit when demand exceeds the rating of the breaker. Thus circuit breakers are designed to protect equipment, not humans.

The GFCI is designed to protect humans. It is a circuit breaker that detects problems at a low enough level to protect you before lethal doses are delivered. It breaks a circuit when it detects a ground fault. The GFCI constantly measures the current going out of the appliance and coming back into it. If by chance any grounding takes place, such as if the metal case of an appliance were electrified, and you touch it, completing a pathway for current to the ground, the GFCI detects the drop in the current it is receiving and breaks the circuit. The GFCI detects variations as low as 0.005 amp. The GFCI cuts the circuit within one-fortieth of one second, so it is not only sensitive, it's quick.

There are three basic styles of GFCI that you will likely encounter in pool and spa work. The first looks like a standard circuit breaker in the electrical panel, with a test button in the face of the breaker in addition to the on/off breaker switch. By pressing the test button, you simulate an unbalanced current condition inside the breaker and thereby testing the efficiency of the GFCI. The GFCI breaker resets the same way a normal panel breaker does.

The second type of GFCI is built into a wall outlet, containing a test button and a switch to reset the GFCI as you might install for plugging in a portable spa.

The third type is a portable GFCI, a unit that plugs into a wall outlet. The appliance is then plugged into the GFCI, making the outlet a GFCI outlet.

All types of GFCIs, like any other mechanical device, are subject to failure and should be tested from time to time.

Though GFCI provide so much safety, why aren't all breakers and outlets GFCIs? The first answer is probably cost, for they cost two to four times as much as a standard one. Practical

reason is that some appliances or circuits operate normally with slight variations in current, so the GFCI would constantly be breaking circuits for the wrong reason. In fact, slight variations might occur in the pool or spa equipment, causing the GFCI to trip even though everything is functioning properly. For this reason, it is best to locate the GFCI as close to the appliances as possible.

If a GFCI keeps breaking the circuit, you troubleshoot the problem in the same manner as any other breaker. As described earlier, start by disconnecting the appliance and resetting the breaker, check the wiring, disconnect the load at the breaker. If you have a GFCI serving a skid pack, the problem can exist in any single piece of equipment, so these must be disconnected one at a time and the GFCI reset after each to detect the appliance with the problem. Start with the light, then proceed to the blower, electric heater, pump motor, control devices for, the problem might exist in the control panel.

The National Electric Code (NEC) specifies that electrical outlets located within 15 feet of the water's edge must be protected by a GFCI and that circuits for all underwater lighting be so equipped. Underwriter's Laboratory (UL) requires all portable spas be wired with a GFCI.

Switches

To control the operation of each appliance circuits are interrupted at some point by switches. A breaker should never be used as the on/off switch for an appliance because repeated switching will weaken the breaker.

Air switches, time clocks, and other control devices all these are switches, turning appliances on or off by completing or breaking an electrical circuit. An understanding of the basic concept of switches will help you troubleshoot electrical problems.

A basic switch, which is a break in the hot line of a circuit. This is the most basic on/off switch, called a single pole, single throw (SPST) switch. This switch handles one circuit (single pole) each time the switch is thrown. The SPDT second drawing depicts a single pole, double throw (SPDT) switch. In this case, there is still only one circuit of electric current, but when this switch is thrown one direction, it electrifies one appliance, and when it is thrown the other way, it electrifies another appliance. Depending on the appliance(s), you might use several variations of poles (circuits) and throws (destinations for the current). By understanding these basic concepts, you will recognize whatever type of switch you encounter.

The other concept regarding switches that you will encounter with pools and spas is multiple switching. There is often more than one control or switch on each appliance. For example, there might be a wall switch and a time clock, either of which can turn on a pool light. There are often air switches and time clocks controlling spa equipment and a simple on/off switch attached to each appliance so you can shut it off easily for service work.

There are two kinds of circuits and so two kinds of switching. First, switches wired in series are those which operate together. The electric current cannot pass along the line unless each switch is closed. An example of a series circuit and series switches is the control circuit in a heater, where each control switch must be closed before the entire circuit is completed and the ignition of the heater is fired.

The other type of circuit and switching is parallel. A parallel circuit, where there is more than one way for the circuit to be completed, each independent of the other. The drawing shows that the current will reach the appliance if either switch is closed. But closing both is not necessary, and if they are it does not deliver any more or less current to the appliance because both switches depend on the same source of current. An example of parallel circuits and switches is the pool light that is controlled by a switch in the home and by a time clock in the equipment area. By understanding these concepts, you will be able to detect why an appliance is not operating or why it is operating after you turned the switch off.

Relays

A relay is a switching device on a circuit that controls current flow in another circuit. When the relay circuit is electrified, it energizes an electromagnet that pulls the two halves of the relay together. In doing so, the contacts of the controlled circuit are brought in contact, completing the circuit. Relays are normally used as safety devices. The purpose of this type of control is to use a low-voltage circuit (the relay circuit) to turn on or off a higher voltage circuit (controlled circuit). For example, a safe 12-volt circuit can be used near a pool or spa to control a dangerous 220-volt circuit that operates a pump motor or blower.

Relays can also be used to control low-voltage situations, like a millivolt control on a heater cannot be located more than 20 feet from the heater. If you want a heater switch inside your home, for example, you might run a standard 110-volt switch that activates a relay in the equipment area, which in turn controls the low-voltage millivolt circuit of the heater. Relays allow you to run thinner, less expensive wires over long distance. Since the small electromagnet of the relay uses a small amount of current, you can run much smaller, cheaper wires along to control the relay, which can be located near the appliance. The heavier wiring for the appliance only needs to travel to the nearby relay and back.

Relays are just switches so some control and time clock makers include relays in their designs. Instead of requiring you to flip a switch however, the relay turns on or off when powered by electric current, thus turning on or off the appliance.

Testing

Testing for the presence of current at a connection or appliance is simple for you need a multimeter and set the tester on the range of voltage you expect to find and the type of current, ac or dc. The multimeter has multiple functions, testing circuit voltages, continuity, and resistance. It has a positive and a negative test lead and a switching device to set the meter for reading dc or ac (reading various ranges of each), resistance, or continuity. The meter is battery powered for continuity and resistance testing because you must send current into a line to test if it is continuous (unbroken) or broken and to test the amount of resistance in a conductor.

When testing the control circuit of a millivolt-controlled heater, for example, you would set the meter for dc current in a voltage range of 0 to 1 volt (since you will be testing a circuit with up to 750 millivolts, which is equal to 0.75 volt). In the same manner, if you are looking for the presence of current at your motor, you set the meter for ac in the voltage range of either 0 to 110 or 0 to 220 volts. Electronically controlled heater circuits operate on 25-volts

ac, so you would set the meter for ac in a range of 0 to 50 volts. Generally you can't harm the meter by feeding it less current than the range you have chosen, but you can destroy it by feeding it more. So, if you are uncertain about the voltage being tested, start with the 220-volt range and work down.

When testing dc circuits, remember that polarity (positive and negative) makes a difference. You must touch the positive meter lead to the positive contact of the appliance or switch and the negative lead to the negative contact. If you reverse these, you will see the meter register negative voltage. When testing ac voltage, the polarity doesn't matter, and you can touch either lead to either side of the circuit.

When testing 110-volts ac, touch one lead to the suspected hot line and one to a neutral line or to ground. When testing 220-volts ac, perform the same test on each of the two hot lines, then touch one lead to each hot line at the same time. If each line individually reads 110 volts, but when tested together it does not read 220 volts, it means the two hot lines are being supplied by the same phase of the power supply and therefore will not deliver 220 volts. This usually denotes a faulty breaker.

When buying a multi-meter, make sure it can test millivoltage for working on millivolt heaters. Some meters won't accurately read less than 10 volts, and therefore are useless with millivoltage. Most electronic meters are pocket-size and can self-range, which is to say you need only dial in ac or dc and the meter will detect the voltage and adjust accordingly.

When you suspect a broken connection, continuity testing is useful. To test continuity of a line, first be sure all the current is turned off, then set your meter for continuity testing and touch one lead to each end of the suspect circuit. If the meter reads positive or beeps, it means there is continuity. Before conducting such tests, make sure your meter is working properly, and that the battery which electrifies the circuit is working, by touching the two test leads together. This should represent a good connection and a complete circuit, and you should get a positive reading.

Since most of the wiring and installation you do uses good conductors, you will probably not use the resistance measuring function of the multi-meter much. If the continuity tester on your meter is not working for some reason, you can use the resistance test to check for continuity. Resistance is measured in units called ohms. The higher the ohms, the more resistance exists in the circuit. If there is no resistance, however, it means there is not a complete circuit, thereby also verifying continuity.

When appliances are operating poorly, there might be a drop in voltage between the panel and the appliance. Check the voltage at the appliance, then at the breaker, while the appliance is operating. There will be a slight difference because of some voltage drop as a result of heat loss and resistance along the length of wire, but it should be no more than 2 to 5 volts. If it is greater, follow the troubleshooting procedures outlined previously to determine where the loss is being created. Like water that is not flowing in a pipe (pressure is the same everywhere in the pipe), when the appliance is not operating, the voltage (pressure) should be the same everywhere along the line.

To test amperage you need an amp probe. The amp probe is a meter with a large, open clip on

the end. The clip is looped over the wire and the amperage in the wire is detected by the probe without actual contact with the current.

Electrical work must be perfect and in accordance with local and state codes. So make sure the job is done right.

Electrical Wiring Information

GFCI Installation on Four Wire 240V Systems (Our spas require either a 50-AMP or 60-AMP GFCI circuit breaker –PLEASE REFER TO THE SPECIFICATIONS PAGE FOR YOUR HOT TUB MODEL FOR DETAILS ON WHETHER YOUR HOT TUB REQUIRES A 50-AMP GFCI OR A 60-AMP GFCI)

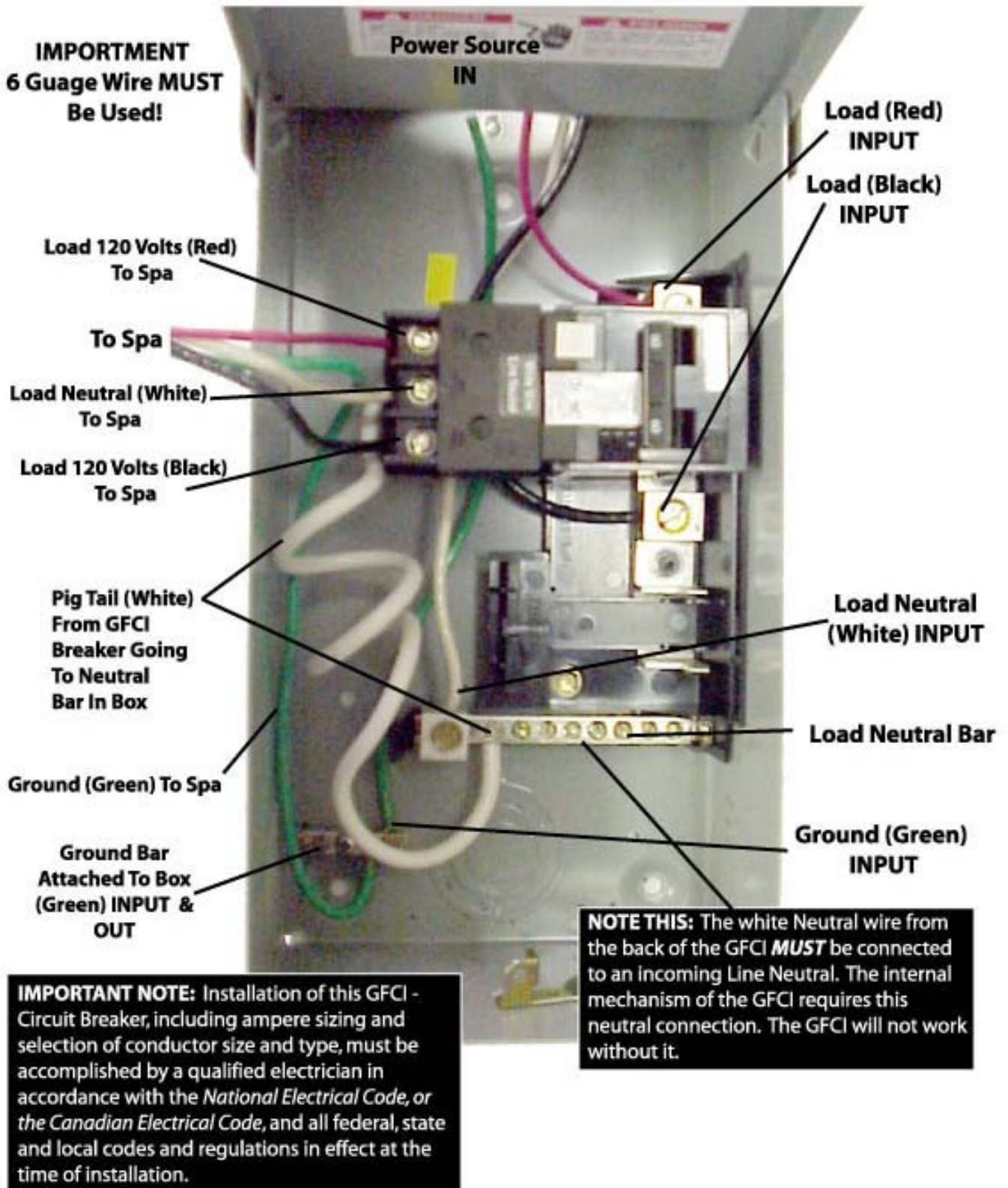
In new spa / hot tub installations it is a common problem to have a mis-wired GFCI.

NOTE that there are different models of GFCI used in the market, the following description is generic.

To properly wire a GFCI on a four wire 240V installation, when using a sub-panel box, all four wires should be brought out from the main box. The two hot legs should be attached to the GFCI breaker at the proper locations, then come out of the GFCI breaker and be run to the spa. The neutral leg from the main box should come out and be attached to the neutral bus located on the side of the breaker. The neutral pigtail on the breaker should then be attached to the other side of the neutral bus. There is a location for another neutral lead that goes out to the spa from the breaker, this neutral wire should be run out to the spa. The ground wire from the house and ground from the spa should be bonded together in the sub-box. If the neutral and ground are not kept separate in this fashion the spa will instantly trip the GFCI breaker.

See the instructions that come with the GFCI for additional information.

Diagram on next page.



Clearing an Airlock

The one side of the jets not working is because of an airlock.

To clear the airlock you need to bleed the pump on the side where the jets aren't working. To do this, turn the spa off.

Locate the bleed screw (wing nut) on the front of the pump closest to the side where the jets aren't working. Open it until you hear air and water come out.

Close it and tighten it.

Turn the spa on again and let it run for a few minutes. Turn all the jets on high and let them run for about five minutes.

You may have to repeat this two or three times to remove the air lock.

Recommended Chemicals for All Hot Tubs Without Chemical-Alternative or Pure Water Management Systems

Initial Setup and After Draining

1. Fill tub up.
2. Add 2 ounces of Di-chlor Shock.
3. Insert Nature 2 cartridge inside filter area.

Every 2 Weeks

Add 2 ounces of Non-Chlorine Shock

Every 4 weeks

Check pH levels and alkalinity levels by using test strips and add proper chemicals as needed (pH Up, pH Down, Alkalinity, Calcium Hardner).

Every 4 months

Insert new Nature 2 cartridge

Every 6 months

Drain spa and start over (can still use Nature 2 if its only been in 2 months)

Every 12 months

Change filters in spa

All hot tub accessories and chemicals listed here can be purchased from:

www.infinityspasupplies.com

Full Feature Keypad Operation

To change between these modes press the temp button then the light button:

EC- Economy mode- only heats at filter cycle

SL- Sleep mode- keeps low heat for freeze protection

ST- Standard Mode- keeps full temp all the time

To change these press the Temp button then the Jets button closest to the display screen.

F2-F8: Filtration Cycles- how many times the spa filters per 12 hour cycle.

FC: Constant Filtration Mode- filters all the time, will not shut off

Note: A single filtration cycle can last up to 2 hours.

Pre-Installation

- Test the ground fault circuit interrupter.
- Turn on the pump to check for good water flow from the jets. Open all jet diverters.
- Turn off the pump and set the timer.
- Set the thermostat, turn on the spa, and allow the spa to run in standard mode for 24 hours to preheat.
- After 24 hours, you can run the spa in economy mode when you're not in it, which will maintain the minimum temperature you set and will run on the filtering cycle you choose (default is F2, which filters twice a day for two hours during each filtering cycle).

Spa Maintenance

Spas are made to be durable even in an outdoor environment. Most spas are made of cast acrylic with fiberglass reinforcement and foam insulation. They should be cleaned by wiping with a sponge and alcohol.

Every spa should be equipped with a rigid, lockable protective cover which attaches securely. These are necessary for several reasons, the most important of which is safety. Such a cover can prevent a child or pet from falling into the spa and drowning. Spa covers are also insulated, keeping the heat in while keeping foreign material out. Always remove the cover completely before getting into the spa to eliminate the possibility of becoming trapped beneath it. Periodically (every 1 to 3 months) the chemicals may be difficult to balance. When this happens, drain the spa and refill with fresh water.

- Turn off the thermostat and electric circuit to the spa.

- Siphon out the water with a length of garden hose
- After draining and cleaning per the manufacturer's instructions, the unit will be ready to be filled and started.

INSTALLATION & SET UP - BEFORE YOUR SPA ARRIVES

You will need a little preparation in advance which should work out well since most individuals will have a 6-7 week waiting period before the spa arrives at your curbside. You will also want to make sure to read the owner's manual prior to installation as this will have specific details regarding your specific spa items.

Selecting a location

Choosing a site for your spa is a personal decision based on your intended use and the existing features of your home and property. When choosing an outdoor location, consider that the closer to the home the spa is located, the easier it will be to go back and forth when it's used. Also, think about how you plan to use your spa. Is it strictly an adults-only relaxation environment, or will you also use it for family gatherings and social entertainment?

You'll want to consider things like accessibility—is it convenient to get to? Privacy—will you have to screen your neighbors? And general aesthetics—will the spa look good in the location you are considering? Also, where will users change? How is the location of your spa in relation to the entertainment area of your home? If your home has a scenic view or a secluded grove of trees, you may want to create a special area so that your spa makes the most of this environment.

When choosing a location for your spa you don't have to place it on a concrete surface, although this is highly recommended to keep it solid and level for proper filtering and use. If a concrete slab isn't available or not appropriate for your needs, verify that the floor structure beneath the spa is strong enough to support the full weight of your spa when it is filled along with the maximum number of adults inside the tub. The number of gallons the spa can hold can be multiplied by 8.3 pounds (weight of one gallon of water) plus 175 pounds per adult. (If you have a question on this weight, please call us and we'll be glad to help) Your local contractor or building inspector can help you with this determination for your placement.

You will need to have a level surface firm enough to support your spa when full. It is recommended that a concrete slab be used for both support and to keep the spa from excess moisture on the ground. This will maintain the wood and other components for a longer period of time. You will also find that if you place your spa on dirt, grass or small gravel, you will track in excess debris into your spa causing more frequent cleaning. Make sure if you do place your spa in these types of areas that you provide pavers or a brick or other type of walkway to reduce this problem.

NOTE - IF YOU USE YOUR SPA INDOORS

If you choose to place the spa inside some special considerations need to be taken into account.

Because spas are heated, more water will emanate from the tub requiring ventilation especially in smaller rooms. The room should contain a ventilation fan or vent to allow the extra heat and moisture to escape. A bathroom fan is often used for this purpose.

Getting your location ready:

Unless you are placing your spa on a patio or other concrete surface, it is time to prepare your location. Here are a few tips on preparation that should make life a little easier for you.

We will discuss several foundations that you can choose from to place your spa on. There are no "best" ways of doing this. . .just preferences and how much you want to spend will most likely determine your choice.

First you will need a firm level surface. It does not have to be perfectly level, but get it as close as possible. If you are laying the spa on a grassy surface, you will need to first remove the sod to get down to the soil. Check the dimensions of your spa and call us if you have any questions.

Remember measure twice, dig once.

Foundation Options:

Gravel: Gravel is commonly used as a foundation because it is cheap, easy to find, effective, and good for keeping water away from the outside of your spa. The easiest way to prepare a gravel surface is to shovel the gravel into place and use a 2x4 and a level to obtain a good surface

Pressure Treated Wood: This is another method of preparing your foundation. This provides a nice clean installation with very little effort. Pressure treated wood is rot-resistant and extremely durable. Cutting the wood to the right size and making sure it's level is about all you will need to do. It is not important what kind of lumber or wood you use for this (2x4, 4x4, or railroad ties) as long as it's pressure treated. Your local home center store can help you with this.

Concrete Stepping Stones or Bricks: Another foundation choice is pre-cast concrete stepping stones and/or bricks. Available inexpensively at any home center, they are simple to set up. Depending on the size of your spa and the stones, two rows of four (8) or three rows of three (9) is usually enough, if evenly spaced. Make sure they are well seated and level.

Cement Foundation: Although more expensive, a poured concrete slab is good choice for a permanent installation, and can be made a little wider than the spa to provide for a clean walkway and storage area

Other points to consider

- If installing your spa below grade, ensure that there is sufficient drainage for rainwater runoff.
- Check the location and setup of your spa for conformity to local building and electrical codes.
- If planned location is to be on a deck, consult your local building department, licensed contractor, or structural engineer for advice or assistance on load requirements.

Delivery Access: Clear the way...

Prior to the arrival of your new spa, you should ensure that there is clear access for moving the spa from the truck to the setup location. It may be necessary to remove a section of fence, trim tree branches or shrubs, move a doghouse, firewood stack or any other protrusions that might be in the way. Check also for overhead clearance

INSTALLATION & SET UP - AFTER YOUR SPA ARRIVES

Receiving your Delivery:

If you are receiving your spa factory-direct, it will be shipped by freight truck. Normally the freight company will contact you by phone in advance of the delivery, to let you know the expected arrival window. You will need to be on hand for the delivery.

Curbside delivery, what does that mean?

Please note that your residence or business must be accessible by a tractor-trailer truck.

All spas are delivered curbside. All spa companies deal with this same issue of delivery and setting up the spa. Freight companies can usually get the spa delivered to the curb, but you will need to ensure that you have enough people on hand to help you lift the spa and get it on a dolly to move it to its final location. This seems awkward, but this piece is worth saving over \$1,000 in costs that you would pay a local retailer for purchasing a spa and having it delivered.

You can arrange to have some men from a local moving company at an additional cost.

Positioning the Spa:

With the spa is off the truck, it's usually not difficult to move it to the designated location with a simple furniture dolly. Nothing more than a wheeled wood frame with carpeted pads, they're available at rental shops for about \$5 - \$10 a day.

A dolly with bigger wheels will be less likely to get hung-up in sidewalk cracks or other obstructions.

Moving your spa on sidewalks and other hard flat surfaces should be easy on the dolly. If the distance is short, some people carry the spa, but we recommend a dolly.

Lawns or uneven surfaces

If you anticipate any difficulty in moving the spa over uneven ground or lawn areas, you can prepare a smooth runway from a sheet of 5/8" plywood, cut in half to 2 ft. x 4 ft. planks.

Electrical Connection:

It is important to note that for the warranty to be in effect, the electrical connections must be wired in accordance with all applicable local electrical codes, by a licensed electrician. You can save some expense by doing any necessary trenching required for buried cabling yourself, if you so desire.

Drilling of spa cabinetry is usually not necessary for a clean electrical installation. Some models may require some cabinet drilling, or restrict the connection to one location. Consult your owner's manual.

Electrical considerations:

The National Electrical Code requires that a manual disconnect device for your hot tub be installed at least 5 ft. away, and within 15 ft. (line of sight) of the spa for safety.

We recommend you use a licensed electrician or contractor to set this up for you. They are

trained in this type of work and usually do not charge a lot to set this electrical piece up for you.

The warranty also specifies that the electrical must be connected by a licensed electrician to be valid.

Electrical service must be a dedicated GFCI protected circuit.

Proper grounding and bonding must be provided.

Circuit must be rated at appropriate amperage per spa power requirements and electrical codes.

All electrical connections to be provided by a licensed electrician in accordance with local codes.

Consult with your building department for local electrical code requirements.

Startup: Filling your spa for the first time...

With your spa in its final location and wired correctly, you can begin with startup. Make sure you have read your owner's manual before proceeding:

- Turn off all electrical power to the equipment at the circuit breaker.
- Make sure that the spa's gate valves are open (consult owner's manual).
- Check to see that drain valve is closed.
- Clean interior of spa with suitable mild, non-foaming, non-abrasive cleaner. Check to see that the filter(s) are properly seated.
- Using garden hose, fill spa with clean cold water to approximately 3-4 inches BELOW the handrail waterfall. Low water levels can cause damage to the pump and heater element.
- Open equipment door and observe for any leaks around union fittings. Tighten if necessary.
- Turn on power at the circuit breaker.
- Operate your spa's controls per owner's manual instructions.
- Balance your water chemistry and use a sanitizer system.

Heating

Do not expect to immediately feel hot water from the jets. Initially, the hot tub may take approximately 7-8 hours to heat, depending upon its size and other factors.

Winterizing Your Hot Tub or Spa

or

Protecting Spa During Winter Power Outage or Spa Equipment Malfunction

Winterizing a portable spa or hot tub is not recommended since these spas are manufactured to run year-round and have built-in controls to maintain water temperature at a minimal cost to prevent freezing.

The biggest risk of winterizing is not getting all the water removed from hoses and pipes, which will cause them to expand and burst or break. The resulting damage and leaks will not

be covered by the manufacturer's warranty, so you will bear the cost and hassle of fixing it and them.

However, if you still feel that you need to winterize, you'll need to super sanitize the spa (if you have an equipment failure and are unable to perform this step, please proceed to winterization section):

Super Sanitation

Normal sanitation does not eliminate Chloramines (trapped Chlorine), Bromamines (trapped Bromine), along with other non-filterable wastes, such as perspiration, oils, hair sprays, etc. that can build up in the water. These substances make the water unattractive in appearance and odor, and can interfere with sanitizer effectiveness. Super Sanitizing (or "shocking" or "Super Chlorinating") the spa water is achieved when the sanitizer level reaches or exceeds 10.0 PPM with granular Chlorine (Dichlor), or 22.0 PPM with granular Bromine (Bromine concentrate). Super Sanitation can also be achieved with a non-Chlorine shock (Potassium Peroxymonosulfate or equivalent).

Winterization

WARNING: Prior to winterizing your spa, it will be necessary to Super Sanitize the spa water following the instructions above. This procedure will help prevent the growth of bacteria, algae and fungi in any areas of plumbing that may not be fully free of water after you drain your spa for its period of winterization.

Step 1: Drain the water.

Step 2: Remove the drain plug from the pump(s), loosen all PVC pipe unions, and pump air-bleed valves in the equipment compartment. Do not replace the plugs, tighten the unions or close the air-bleed valves until the spa is de-winterized.

Step 3: Clean the entire spa.

Step 4: Remove filter cartridge(s) and clean. Allow filter to dry fully and store in a dry place.

Step 5: Secure the cover to the spa utilizing the tie downs and locking system. In areas where heavy snow is anticipated, place a large piece of plywood (or its equivalent) on top of the spa cover to assist in supporting the cover with the added weight of the snow. Remove snow off the cover following each snow storm.

WARNING: To avoid water from becoming trapped between the floor suction fitting and the filter pipe close the slice valve in front of the pump leading to the filter. Use a wet/dry vacuum to remove the remaining water out of pipe by placing the vacuum end over the filter hole. In a two-pump spa, first plug off one filter then vacuum out the water. Or pour 1-2 gallons (4.55-9.09l) of RV antifreeze into the filter hole. NOTE: RV antifreeze is nontoxic and does not require evacuation at start up.

Spa De-Winterization

To de-winterize the spa, reverse the Winterization procedure. Refill to the water level mark.

WARNING: Whenever refilling the spa, it will be necessary to Super Sanitize the new spa water. Instructions are found above.

Warranty Information

Six Month Limited Manufacturer's Labor Warranty Spa Warranty Policies and Procedures

Important Notice: The following are not actual warranties, but detailed descriptions of our warranty policies and procedures. Certain exclusions and disclaimers may apply to these descriptions. Always read the warranty that comes with each spa. These policies and procedures are subject to change at any time and without notice. Each spa warranty is given to the original consumer only and terminates upon any transfer of ownership. Commercial applications are excluded from all warranty.

LABOR WARRANTY

Labor is described as the work completed by a technician. MANUFACTURER will be responsible for the costs associated for labor for all warranty repairs for six (6) months from the original date of purchase. THIS WARRANTY IS GIVEN TO THE ORIGINAL CONSUMER AND TERMINATES UPON TRANSFER OF OWNERSHIP. COMMERCIAL APPLICATIONS ARE EXCLUDED FROM THIS WARRANTY. It is the responsibility of the spa owner to ensure that the spa is accessible for repairs. MANUFACTURER is not responsible for any cost associated with making spa accessible for repairs. If parts are required for repair, MANUFACTURER is not responsible for the cost of shipping of parts under the terms of this warranty agreement.

SURFACE WARRANTY

The spa surface is defined as the exposed material finish. The MANUFACTURER warrants the spa surface to be free from defects in material and workmanship, such as blistering, cracking, or delamination, under normal use and maintenance for a period of fifteen (15) years from the original date of purchase. This is a full warranty for the first 5 years, and shall be pro rated for the remaining ten years with the original owner responsible for the following percentages of the replacement or repair: 40% for years 6 & 7, 60% for years 8 –11, and 80% for years 12 –15. THIS WARRANTY IS GIVEN TO THE ORIGINAL CONSUMER AND TERMINATES UPON TRANSFER OF OWNERSHIP. COMMERCIAL APPLICATIONS ARE EXCLUDED FROM THIS WARRANTY.

The spa must be set on a level cement slab and/or a level deck surface that is sufficient to support the entire length and width of the spa. Standard building practices must be followed. Damage caused by failure to have a properly leveled and supported foundation under the spa is not covered under warranty. The MANUFACTURER does not warrant against problems associated with prolonged standing water, prolonged exposure to sunlight and/or use of any sanitation or ozone system not approved by the MANUFACTURER. Damage to the spa surface caused by leaving the spa uncovered and empty of water with direct exposure to sunlight will terminate this warranty. Any alteration to any system, including but not limited to electrical, plumbing, or mechanical, or over-use of chemicals, or any other problems caused by an external source are not covered under warranty. Other exclusions may apply. Please read the warranty thoroughly.

Normally, problems associated with material and workmanship can and will be repaired. If the spa surface is repaired, the repair is limited to the affected area only, and there is no guarantee against discoloration or fading. The decision to repair will be made by the MANUFACTURER and its field representative after review of the facts, pictures, or any other data presented by the dealer or the customer. In all cases, pictures of the effected area and foundation of the spa must be provided before any decisions to repair or replace are made. In the unlikely event of a spa replacement, all warranties (including but not limited to shell, acrylic, equipment and plumbing) date back to the original date of sale. If it is determined that the shell is to be replaced, the same conditions and terms as outlined in the shell warranty section apply.

It is the responsibility of the spa owner to ensure that the spa is accessible for repairs. MANUFACTURER is not responsible for any cost associated with making spa accessible for repairs. If parts are required for repair, MANUFACTURER is not responsible for the cost of shipping of parts under the terms of this warranty agreement.

STRUCTURE (SHELL)/SURFACE (ACRYLIC) REPAIR WARRANTY PROCEDURES

THE MANUFACTURER'S CUSTOMER CARE DEPT. WILL WORK WITH YOU TO MAKE THE PROCESS AS SIMPLE AND EASY AS POSSIBLE. TO ENSURE THE EFFICIENT PROCESSING OF STRUCTURE/SURFACE CLAIMS, PLEASE

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FOLLOW THESE STEPS:

1. The MANUFACTURER relies upon the consumer and service technician to assist in warranty claims and how best to work toward the consumer's satisfaction. If you have any questions concerning a claim, you should contact the Customer Care Department (also referred to as the Customer Service Center –number provided elsewhere in this document) for assistance.

2. If the claim is determined to be valid you will need to submit to the MANUFACTURER Customer Care Department the proof to purchase and photographs of the damaged spa and the surrounding area where the spa is supported. Customer Care will determine the proper solution for repairing the spa. Photographs of the damaged spa should have the following information attached:

- * Spa Model * Address of Customer
- * Spa Serial Number * Phone number of Customer
- * Spa Color * Date of Delivery
- * Date of Purchase * Thorough Description of
- * Name of Customer Problem

NOTE: MOST OF THE ABOVE INFORMATION IS PROVIDED ON THE ORIGINAL INVOICE OF SPA.

3. Upon receiving the above information, Customer Care will evaluate it and make a decision on how the damage will be repaired. In all situations, a repair is considered the appropriate course of action unless it is deemed irreparable. If the spa cannot be repaired in the field and must be returned to the factory, approval must be obtained from Customer Care Manager. Cost for removal of the defective spa and delivery and installation of the replacement spa are the responsibility of the consumer and will not under any circumstances be covered by the MANUFACTURER.

It is the responsibility of the spa owner to ensure that the spa is accessible for repairs.

MANUFACTURER is not responsible for any cost associated with making spa accessible for repairs. If parts are required for repair, MANUFACTURER is not responsible for the cost of shipping of parts under the terms of this warranty agreement.

COMPONENTS WARRANTY

The components may be defined as the electrical items (i.e., pumps, equipment packs, heaters, topside, etc.) The MANUFACTURER warrants all components to be free from defect in material and workmanship for five (5) years. This is a full warranty for the first two (2) years, and shall be pro rated for the remaining years with the original owner responsible for the following percentages of the replacement or repair: 40% for year 3, 60% for year 4, and 80% for years 5. THIS WARRANTY IS GIVEN TO THE ORIGINAL CONSUMER AND TERMINATES UPON TRANSFER OF OWNERSHIP. COMMERCIAL APPLICATIONS ARE EXCLUDED FROM THIS WARRANTY. OWNERHIP. COMMERCIAL APPLICATIONS ARE EXCLUDED FROM THIS WARRANTY.

Some components including, but limited to, the spa cover, ozonator, stereo components, speakers and related parts, and fiber optics are not included in this warranty, but are covered under separate warranty from the original manufacturer. Some items, including, but not limited to pump seals are a maintenance item and are covered for manufacturer defects only. Damage caused by weather, poor water chemistry, standing water and/or improper maintenance will not be covered under this warranty. Alterations or replacement of components installed in the spa that are not purchased and/or approved by the MANUFACTURER will terminate the spa warranty.

It is the responsibility of the spa owner to ensure that the spa is accessible for repairs. MANUFACTURER is not responsible for any cost associated with making spa accessible for repairs. If parts are required for repair, MANUFACTURER is not responsible for the cost of shipping of parts under the terms of this warranty agreement.

PLUMBING WARRANTY

The plumbing may include all piping, jets and valves. The MANUFACTURER warrants all plumbing parts for a period of 10 years from the original date of purchase. This is a full warranty for the first (5)

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years, and shall be pro rated for the remaining five years with the original owner responsible for the following percentages of the replacement or repair: 60% for years 6 - 8, and 80% for years 9 & 10. THIS WARRANTY IS GIVEN TO THE ORIGINAL CONSUMER ONLY AND TERMINATES UPON TRANSFER OF OWNERSHIP. COMMERCIAL APPLICATIONS ARE EXCLUDED FROM THIS WARRANTY.

Jet internals and diverter handles are not covered under this warranty. Damage caused by weather, poor water chemistry, standing water, and/or improper maintenance will not be covered under this warranty. It is the responsibility of the spa owner to ensure that the spa is accessible for repairs. MANUFACTURER is not responsible for any cost associated with making spa accessible for repairs. If parts are required for repair, MANUFACTURER is not responsible for the cost of shipping of parts under the terms of this warranty agreement.

COMPONENTS AND PLUMBING WARRANTY PROCEDURES

THE CUSTOMER CARE DEPT WILL WORK WITH YOU TO MAKE SURE THAT PROCESS AS SIMPLE AND EASY AS POSSIBLE. TO ENSURE THE EFFICIENT PROCESSING OF COMPONENTS AND PLUMBING CLAIMS, PLEASE FOLLOW THESE STEPS:

1. The technician assigned to service your spa and the Customer Care Dept. must determine whether damage is due to a chemical imbalance or manufacturer's defect. If the damage is due to manufacturer's defect, the MANUFACTURER will warrant the defective part and labor during the warranty period. This does not include any travel or trip charges, troubleshooting or diagnostic charges. Customers living outside the technician's travel area need to be aware that trip charges are their responsibility.
2. Customer Care Dept. will supply necessary parts for service or repair. The technician should troubleshoot and repair the problem. If the technician has a problem with a service call, the technician should call the Customer Care Department for assistance. Upon completion of a warranty job, a Warranty Service Claim (WSC) form should be completely filled out by the service technician.

NOTE: THE SPA SERIAL NUMBER SHOULD BE TAKEN DIRECTLY OFF THE SPA TO ENSURE THAT THE CORRECT WARRANTY IS APPLIED.

3. The warranty service claim form must be sent to Customer Care Dept. within 45 days of the date of service. The defective parts must be sent in along with the claim form. An RGA form must be filled out and faxed to Customer Care, who will process the warranty claim(s) within fifteen (15) working days (if claim is received in the proper time frame and the required information is submitted). Claims turned in late or without the proper information will be delayed.

It is the responsibility of the spa owner to ensure that the spa is accessible for repairs. MANUFACTURER is not responsible for any cost associated with making spa accessible for repairs. If parts are required for repair, MANUFACTURER is not responsible for the cost of shipping of parts under the terms of this warranty agreement.

ITEMS NOT COVERED UNDER WARRANTY

The following is a general overview of non-warranty items and work. This is NOT an all inclusive list.

- * Diagnosis of spa problems
- * Jet inserts
- * Fuses
- * Valve Handles
- * Light bulbs of all kinds
- * Pump Seals
- * Removing spa from structure
- * Draining and filling a tub
- * Pillows
- * Acts of Nature
- * Filters
- * Travel Charges
- * Chemical misuse
- * any part not purchased from MANUFACTURER'S

The spa cover, light bulbs, light lenses, fuses, headrests, cabinet finish, and filters are warranted to be free of defects in workmanship and materials at the time of delivery. Any alterations of the spa that have not been PRE-APPROVED by the MANUFACTURER will void all warranties. If an alteration is approved by the MANUFACTURER, verify that this alteration is covered under warranty. Not all

alterations are considered a warranty call. For example, moving the tub to access the problem is not considered a warranty call.

The MANUFACTURER understands that some problems take longer than the allowed time to correct the problem. An authorization number will be required for warranty coverage of extra time. If you are unable to get an authorization from the MANUFACTURER, a detailed description must be included with the warranty claim to get approval for the overtime.

LIMITATIONS

The MANUFACTURER'S warranty is terminated if the spa has been subject to alteration, misuse, or abuse. Misuse or abuse is defined as but not limited to: use of spa in non-residential situation, water temperatures outside the range of 32 to 110 degrees, damage caused by clogged or dirty filters, damage of spa caused by the absence of a hard cover, damage of components from improper pH, use of any type of acid, water left standing, or water chemical imbalance. This warranty is terminated if any repairs have been attempted or made by anyone other than an authorized agent of MANUFACTURER'S. This warranty is terminated if any extra components area installed after the manufacturer date.

DISCLAIMER

No one has the authorization to add, take away, or make any promise of performance or representation not included in MANUFACTURER's spa warranties that accompany each MANUFACTURER Spa. MANUFACTURER would not be taken upon to go by any other warranty. There are no additional warranties, express or implied, which extend beyond the terms of the warranty.

Disclaimer:

The liability of the Manufacturer under this limited warranty, of any, shall not exceed the original amount paid for the original product. Spa owner is required to provide adequate access to the spa for any repair or inspection. MANUFACTURER'S will not be liable for loss of use of the spa or other incidental or consequential costs, expenses or damages, which may include but are not limited to water damage, or the removal of a permanent deck or other custom fixture. Under no circumstances shall we or any of our representatives be held liable for injury to any person or damage to any property, however arising. This warranty gives you specific legal rights and you may have no other rights. No agent, dealer, Service Company, or other parts representative is authorized to change, modify, or extend the terms of this warranty in any manner what so ever.