



# ELECTRICIANS GUIDE

**To ensure that the system is installed properly, provide your electrician with these instructions.**

# ELECTRICAL INSTALLATION

A qualified and licensed electrician in accordance with the National Electric Code (NEC) Article 680, Canadian Electric Code, and with any local codes must accomplish the electrical installation.

All connections must be made according to the electrical installation label on the outside of the control box (see page 9). Follow the instructions from the label if they are different than the instructions in this manual. If your electrician is not absolutely sure how to connect your system correctly, call your local dealer. Any mistake may be costly and void your equipment warranty.

The GFCI (Ground Fault Circuit Interrupter) is a mandatory electrical safety device required for all portable spas and hot tubs as specified in the National Electrical Code Article 680-42. The GFCI in your particular installation may be installed at the electrical service panel, a separate sub-panel or built into your System.

Your spa equipment requires a DEDICATED CIRCUIT. No other appliances or lights can be on this circuit. Refer to equipment data label for power supply requirements of your spa equipment.

Use copper conductors ONLY. The ground must be sized following the National Electric Code, Table 250-122.

For Power conductor size, refer to the National Electric Code Table 310-16.

NOTE: Due to the electrical requirements of some models, it may be required to SPLIT the incoming electrical service to accommodate the GFCI Circuit Breaker limits. Contact your electrician if you need additional information on this topic.

Circuit & Breaker Rating	15A	20A	30A	40A	50A	60A	70A	80A
Maximum Amps	12A	16A	24A	32A	40A	48A	56A	64A
Minimum Wire Size	14	12	10	8	6	4	4	4

Universal Systems require a Neutral wire therefore the service required is as follows: 120-volt systems require a three-wire electrical service including ground, consisting of Line 1 (Black), Neutral (White) and Ground (Green). 240-volt systems require a four wire electrical service including ground, consisting of Line 1 (Black), Line 2 (Red), Neutral (White) and Ground (Green).

# SPECIAL CONSIDERATIONS

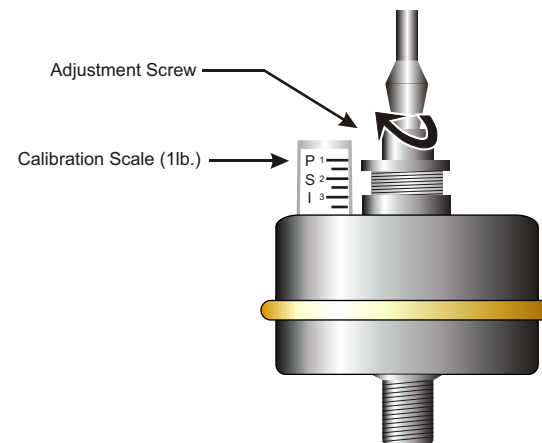
If your system is equipped with a pressure switch, the function of the pressure switch is to turn the heater off if the pump stops operating or if there is a restricted water flow (dirty filter, obstruction in the spa plumbing etc.).

The pressure switch has been preset at the factory to operate properly with your spas specific plumbing. Adjustment or other service may be required if you observe a flow related problem (3 flashing dots on spaside display on solid-state product and/or non-operation of heater). If adjustment is required, follow the next steps carefully.

**IMPORTANT: After any pressure switch adjustment, it is important to test the control by turning on the pump low speed and heater. While operating, unplug the pump, the heater must turn off. If the heater stays on, plug the pump back in and readjust the pressure switch to achieve proper operation.**

## Adjustment

- 1) With power to system turned OFF, remove the wires from the pressure switch terminals (secure wires safely to prevent any chance of electrical shock).
- 2) Turn the thermostat counter-clockwise to the OFF position (use temperature adjustment key on solid-state systems to move "set point" temperature to its lowest setting).
- 4) Turn power to the system ON and activate the low-speed pump.
- 3) Place an Ohmmeter across the pressure switch terminals to verify an OPEN circuit.
- 4) Rotate the pressure switch adjustment screw counter-clockwise until the Ohmmeter indicates a CLOSED circuit.
- 5) Turn pump OFF and verify that the pressure switch circuit is once again OPEN.
- 6) Turn power to the system OFF and reconnect pressure switch wires. Reapply power to the system and operate the spa or hot tub as normal.



## GFCI TRIPS IMMEDIATELY

For correct GFCI breaker wiring, refer to page 5 for details.

## SYSTEM DATA LABEL

The system data label is located on the control box. This label is very important and contains information you will need to establish your electrical service. The voltage and amperage ratings are shown on the bottom of the label. Product, Model, Serial and Code numbers are also shown on the label.

**Note:** This information will be necessary if you should ever have to request warranty or any other type of service.

ORDER CODE: \_\_\_\_\_

MODEL: \_\_\_\_\_

SERIAL: \_\_\_\_\_

CODE: \_\_\_\_\_

VOLTS: \_\_\_\_\_

AMPS: \_\_\_\_\_

PRODUCT: \_\_\_\_\_

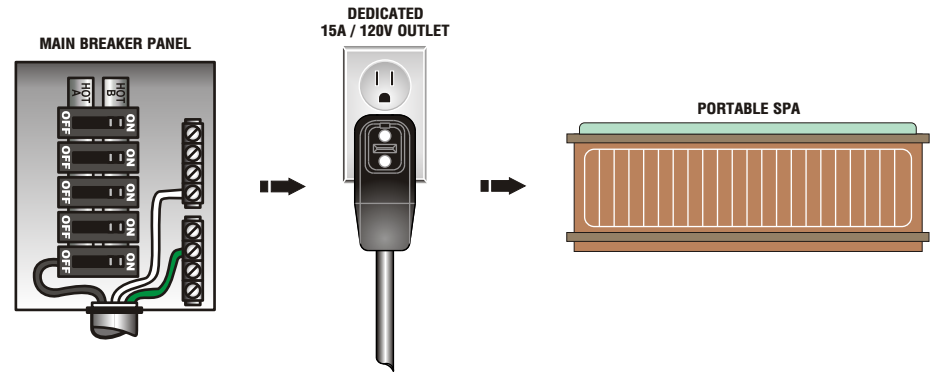
REFER TO NEC FOR  
BREAKER SIZING

## ELECTRICAL CONNECTIONS

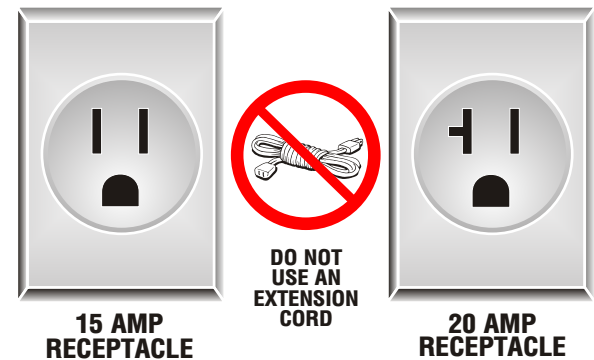
If your system was configured to include a 120VAC power cord, ensure that the proper receptacle has been installed (a dedicated circuit is required). DO NOT under any circumstances modify a 20 Amp plug to fit into a 15 Amp receptacle or use an extension cord. Doing so will create hazardous conditions and/or invalidate the warranty.

### OPTION 1 Units with 15A GFCI Plug Connection

20AMP CORDEND GFCI



This illustration depicts a typical 15 AMP, cord-end GFCI installation. (The spa must be installed on a dedicated circuit.)

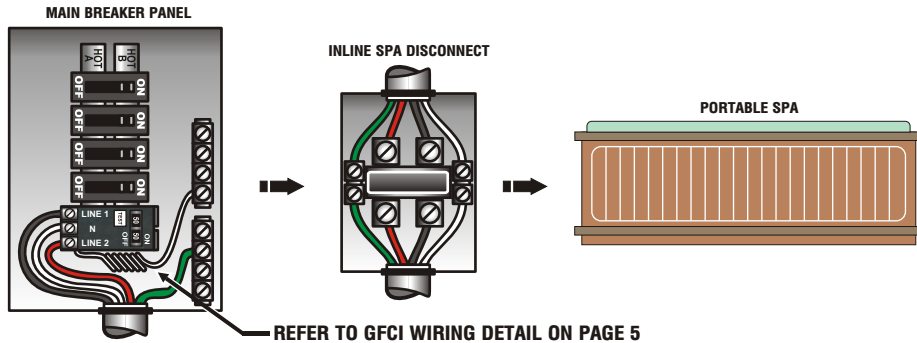


# ELECTRICAL CONNECTIONS

## OPTION 2 GFCI Installed in Main Service Panel

20-60AMP  
HARDWIRED

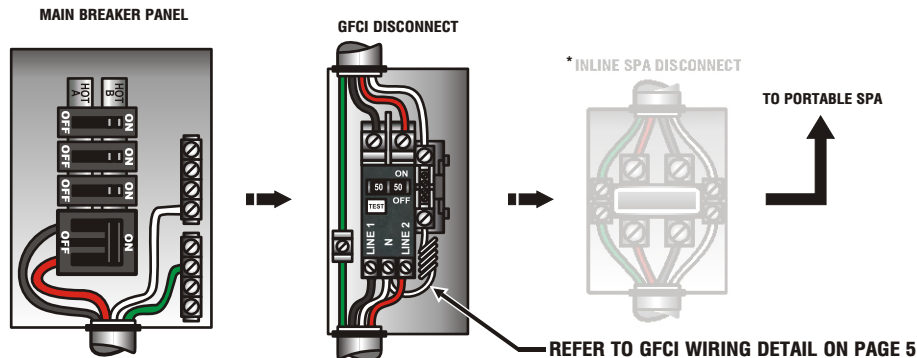
If the manufacturer of your homes main breaker panel makes a GFCI breaker, you may be able to add it to an open slot in the panel.



Power from GFCI breaker installed into main service panel to a service disconnect within line-of-site of the spa.

## OPTION 2a Subpanel GFCI Installed

20-60AMP HARDWIRED



Power from main service panel to a GFCI subpanel within line-of-site of the spa. \* (Note: Most local codes will allow a GFCI subpanel to be a disconnect. If this is not the case in your installation, a disconnect must be provided.)

## NO THERAPY JET OPERATION

- Water Shut-Off Valves are Closed - Open Shut-Off valves.
- Jets Not Properly Adjusted - Adjust Jets properly.
- Diverter Valve Not Properly Adjusted - Adjust diverter valve properly.
- Thermal Overload Tripping - Check for restricted flow of water.

## NO LIGHT OPERATION

- Light Bulb Defective - Replace bulb or contact your local dealer.
- Reflector has Fallen Off - Replace deflector or contact your local dealer.
- Light Not Plugged-In - Plug in the Light.

## WATER LEAKS

- Spa Overfilled - Adjust water level.
- Drain-Valve Left Open - Close drain valve.
- Couplings or Unions Loose - Tighten or contact your local dealer.
- Pump Seal Leaking - Contact your local dealer.
- Plumbing / Connections Leaking - Contact your local dealer.
- Water Leaking from Spaside Control - Contact your local dealer.
- Water in Air Blower Plumbing - Contact your local dealer.

## NO HEAT

- Temperature Not Set Correctly - Adjust "Set Point" Temperature.
- System Power Restriction - Depending on available power, the spa may have interlocks in place to shut off the heater when the pumps are switched to high speed.

## HIGH HEAT

- Temperature Sensor Not in Dry-Well - Place sensor in dry-well.
- Temperature Set Too High - Adjust "Set Point" Temperature.
- High Ambient Temperature - Remove spa cover.

# TROUBLESHOOTING

The following describes situations and possible solutions to common problems you may encounter as a spa owner. **Note: your system may not include all components listed.**

## NOTHING OPERATES

Main Breaker is OFF - Set to On.  
Sub-Panel Breaker Off - Set to On.  
System GFCI Off - Set to On.  
Power switch in Off position - Set to On.  
Components not plugged in - Plug in components.  
Power cord not plugged in - Plug in power cord.

## NO, LOW OR SURGING WATER FLOW

Air Lock in Plumbing System - "Bleed" the system.  
Restricted Flow - Insure that the water shut-off valves are open and that suction fittings are not blocked by debris.  
Low Water Level - Increase water level to recommended level.

## NO LOW SPEED PUMP OPERATION

Pump 1 Not Plugged-In - Plug in Pump 1.  
Pump 1 Fuse Blown - Contact your local dealer.  
Pump 2 Not Plugged-In - Plug in Pump 2.  
Pump 2 Fuse Blown - Contact your local dealer.

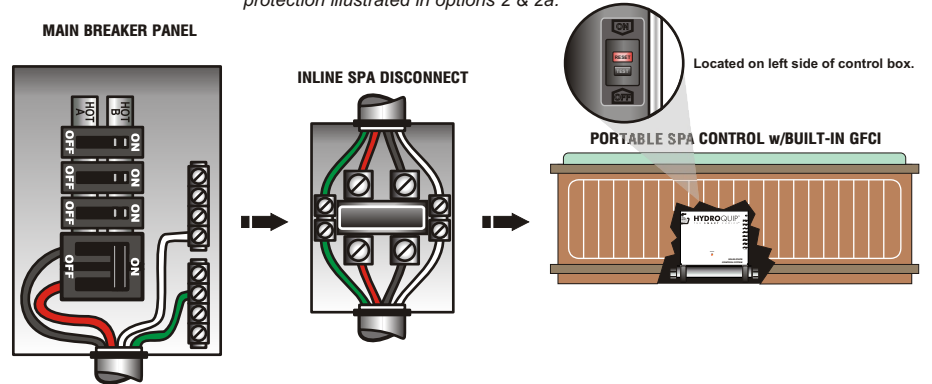
## NO JETS OR BLOWER OPERATION

Blower or Pump Not Plugged-In - Plug in the Blower or Pump.  
Pump or Blower Fuse Blown - Contact your local dealer.

# ELECTRICAL CONNECTIONS

## OPTION 3 Systems with GFCI Included

**BUILT-IN SYSTEM GFCI** Your system may have an integrated GFCI located on the left side of the control box as shown below. If a GFCI is present there is NO need for additional GFCI protection illustrated in options 2 & 2a.



Power from main breaker panel to service disconnect within line-of-site of the spa to portable spa control equipped with built-in GFCI.



**IMPORTANT - The NEC and most local codes require that a "disconnect" be installed within "line-of-site" of the spa.**

## ELECTRICAL INSTALLATION DETAILS

Refer to the System Data Label for equipment voltage and maximum amperage draws.

Install proper size Ground Fault Circuit Interrupter (GFCI) or circuit breaker, then proper sized wiring and bonding wire. For Power conductor size, refer to the National Electric Code Table 310-16. For Ground conductor size, refer to the National Electric Code Table 250-122.

A bonding lug has been provided on the control box to allow connection to local ground points. To reduce the risk of electrical shock, a solid copper bonding wire should be connected from this lug to any metal ladders, water pipes or other metal object within 5 feet of the spa.

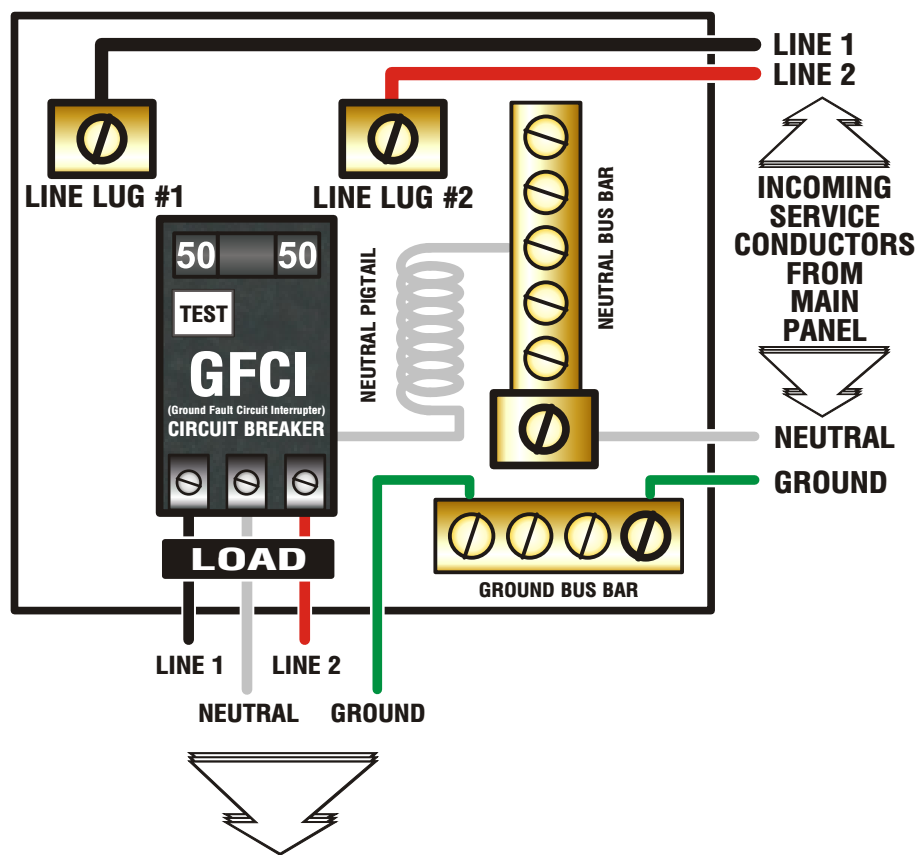
**! WARNING - BE SURE THAT YOUR POWER SUPPLY CIRCUIT CAN ADEQUATELY HANDLE THE AMPERAGE YOU SELECT.**

The control input power wiring may have been provided. Following NEC and local codes in effect at the time of installation, connect (refer to wiring diagram located on the inside of control hinged cover) the Black wire to input Line 1, Blue wire to input Line 2 (if applicable), White wire to Neutral and the Green wire to ground.

# GFCI WIRING DETAIL

When a GFCI circuit breaker is used in the installation of your spa, it is important that it has been properly installed. Often this component has been improperly installed causing the breaker to trip the instant the system is turned on. Below is an illustration of a typical GFCI breaker installation.

**WARNING: Refer to Circuit Breaker Manufacturers installation instructions. This illustration is meant to be a guide for Field Technicians and is not intended to override or substitute the instructions supplied with the circuit breaker.**



**LOAD NEUTRAL MUST BE CONNECTED DIRECTLY TO GFCI AS SHOWN**

# SYSTEM STARTUP

## System Startup Procedures:

Using the "System Operation Manual" provided with the unit, complete the following procedures:

- 1) Read and familiarize yourself with the system Operation manual.
- 2) Unplug the power cord (120-volt system only) or turn the electrical power "OFF" at the service or breaker panel (120 or 240 volt permanently connected units.)
- 3) Open all **WATER** shut-off valves.
- 4) For spas equipped with a hose bib or drain valve, make sure that it has been closed.
- 5) For spas equipped with in-line or pressure water filters, make sure that the filter nut, housing drain plug, and air relief valve are closed and tight.
- 6) Using a standard water hose, fill the spa with fresh tap water to the level recommended by the spa manufacturer.
- 7) Inspect all plumbing connections and lines for any sign of water leaks.
- 8) Close all **AIR** control valves. **WARNING: Do not confuse with WATER shut-off valves.**
- 9) Adjust temperature to the lowest setting. **Note: if you system includes a "Mode Selector Switch", set to program mode 2.**
- 10) Plug the unit into the proper outlet (120-volt system) or turn on the breaker at the electrical service panel (240-volt system).
- 11) On units with a Ground Fault Circuit Interrupter (GFCI), check the GFCI by pressing the "Test" button on the face of the device. The "Reset" button should pop out. **The equipment should not operate.**
- 12) Activate the equipment by pressing the "Reset" button on the GFCI. (If the jet pump(s) or blower is operating, switch them off).
- 13) Press the "JET PUMP" switch to run on high speed. Allow to run until you achieve a strong, steady water flow (free of air bubbles).
- 14) On systems with a pressure filter, bleed off the trapped air by opening the Air-Relief valve. You will notice a steady flow of water when the air has been bled completely.
- 15) Switch the "JET PUMP" off.
- 16) If equipped, switch the "AIR BLOWER" on to verify that it is working, then switch it off.
- 17) If equipped, switch the "LIGHT" on to verify that it is working, then switch it off.
- 18) If equipped, switch the "AUXILIARY PUMP" on to verify that it is working, allow to run until all air is evacuated from the plumbing system, then switch it off.
- 19) Adjust temperature to the desired set point for comfortable use of the spa. The pump low speed and heater will activate until the set point has been reached.

**It is now time to turn over operation of the spa to the homeowner. See next section for basic troubleshooting tips.**