

UHS, UHH, UHP, HU1 & PU1 Spa Owner's Manual

Version française au verso

PN 378100 Rev D

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Important Safety Instructions

When installing and using this electrical equipment, basic safety precautions should always be followed, including the following:

READ AND FOLLOW ALL INSTRUCTIONS

1. **WARNING:** To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.
2. **WARNING:** A wire connector is provided on this unit to connect a minimum 4.11 mm (No. 6 AWG) solid copper conductor between this unit and any metal equipment, metal enclosures of electrical equipment, metal water pipe, or conduit within 1.5m (5 feet) of the unit.
3. **DANGER RISK OF INJURY:** (For cord and plug connected units):
 - a. Replace damaged cord immediately
 - b. Do not bury cord
 - c. Connect to a grounded, grounding type receptacle only.
4. **WARNING:** (For units with a Ground Fault Circuit Interrupter (G.F.C.I.): This product is provided with a Ground Fault Circuit Interrupter "G.F.C.I." on the end of the spa's power cord. This G.F.C.I. must be tested before each use. With the product operating depress the "test" button on the G.F.C.I. The spa should not operate. Depress the "Reset" button on the G.F.C.I. The product should now operate normally. If the spa fails to operate in this manner, there is a ground current flowing indicating a possible electric shock. Disconnect the power until the fault has been identified and corrected by a certified licensed electrician.
5. **WARNING:** (For permanently installed units):

The electrical supply for this product must include a suitably rated switch or circuit breaker to open all ungrounded supply conductors to comply with Section 442-20 of the National Electric Code. ANSI / NFPA 70-1987. In addition, all 230 volt installations must be protected by a 230 volt Ground Fault Circuit Interrupter "G.F.C.I.". Any G.F.C.I. circuit breaker used in the house panel must read current returning through the neutral conductor. 230 volt 2 conductor G.F.C.I. circuit breakers will not operate correctly for your application.
6. **DANGER RISK OF ACCIDENTAL DROWNING:** Extreme caution must be exercised to prevent unauthorized access by children. To avoid accidents, ensure that children cannot use this spa unless they are supervised at all times. For additional protection, select a cover which is classified by the Underwriters Laboratories Meeting ASTM F1346-91 requirements.
7. **DANGER RISK OF INJURY:** The suction fittings in this spa are sized to match the specific water flow created by the pump. Should the need arise to replace the suction fittings or the pump, be sure that the flow rates are compatible.

Never operate spa if suction fittings are broken or missing. Never replace a suction fitting with one less than the flow rate marked on the original suction fitting.
8. **DANGER RISK OF ELECTRIC SHOCK:** Install at least 1.5m (5 feet) from all metal surfaces. As an alternative, a spa may be installed within 1.5m (5 feet) of metal surfaces if each metal surface is permanently connected by a minimum No. 4.11 mm (No. 6 AWG) solid copper conductor to the wire connector on the terminal box that is provided for this purpose.
9. **DANGER RISK OF ELECTRIC SHOCK:** Do not permit any electric appliance, such as light, telephone, radio, or television, within 1.5m (5 feet) of a spa.
10. **WARNING TO REDUCE THE RISK OF INJURY:**
 - a. The water in a spa should never exceed 40°C (104°F). Water temperatures between 38°C (100°F) and 40°C (104°F) are considered safe for a healthy adult. Lower water temperatures are recommended for your children and when spa use exceeds 10 minutes.
 - b. Since excessive water temperatures have high potential for fetal damage during the early months of pregnancy, pregnant or possibly pregnant women should limit spa water temperatures to 38°C (100°F).
 - c. Before entering spa, the user should measure the water temperature with an accurate thermometer since the tolerances of water temperature-regulating devices vary.

(Safety instructions continued on next page)

- d. The use of alcohol, drugs, or medication before or during spa use may lead to unconsciousness with the possibility of drowning.
 - e. Persons suffering from obesity or with a medical history of heart disease, low or high blood pressure, circulatory system problems, or diabetes should consult a physician before using a spa.
 - f. Persons using medication should consult a physician before using a spa since some medication may induce drowsiness while other medication may affect heart rate, blood pressure, and circulation.
11. **WARNING:**
- a. People with infectious diseases should not use a spa or hot tub.
 - b. To avoid injury, exercise care when entering or exiting a spa or hot tub.
 - c. Do not use a spa or hot tub immediately following strenuous exercise.
 - d. Prolonged immersion in a spa or hot tub may be injurious to your health.
12. **Caution:** Maintain water chemistry in accordance to manufacturer's instructions.

Additional Important Safety Precautions

Your spa can be a source of great pleasure. It offers healthful stimulating recreation and is a delightful fun center for you, your family and friends. However, it contains large quantities of water and is deep enough to present inherent dangers to life and health unless the following safety rules are strictly observed.

13. **Never permit the spa to be used unless it is attended by at least one person other than the bather.**
Someone should be present to lend assistance if the bather should be in trouble due to injuries, cramps, drowning especially in case of children, etc.
14. **Always use care in and around your spa.**
The spa has many rigid, unyielding parts and many areas that become wet and slippery; these are all potentially dangerous when rough play is permitted or if care is not used particularly when entering or leaving the spa.

(Safety instructions continued on next page)

15. **Keep the water sanitary and healthful at all times.**
Your filter system will remove suspended particles from the water. Regular application of spa chemicals in proper quantities will destroy harmful bacteria and prevent formation of algae. Your surface skimmer will remove insects, leaves, and other debris from the water surface. Unsanitary water is a serious health hazard.
16. **The water in your spa should NOT be warmer than 38°-40°C (100° - 104° F).**
Always keep an accurate thermometer in the water because your spa's thermostat may be in error. Use a high quality, shatterproof thermometer with increments of one degree or less.
The National Spa and Pool Institute consider a temperature of 38°C (100°F) safe and comfortable for a healthy adult. Most healthy adults can enjoy this water temperature for as long as desired, although it may raise the body temperature to the water temperature and eventually become uncomfortable (like a fever). At higher water temperatures the soaking time should be shorter; never soak for more than 20 minutes when the water temperature is 39°C (102°F) or higher. If you are planning a long rest in the spa, lower the water temperature closer to normal body temperature, about 37.2°C (99°F). Some people find even lower water temperatures relaxing and pleasing. Try different water temperatures in the 36.6°-39°C (98°-102°F) range until you find what temperatures suit you best.
17. **Hot water can raise the body temperature high enough to cause heat stroke.**
This can be fatal even to healthy adults. If you have any questions about your own fitness or whether you should soak in the spa, check with your physician.
18. **Prolonged immersion in hot water may induce hyperthermia.**
Hyperthermia occurs when internal body temperature reaches a level several degrees above the normal body temperature of 36.6°C (98.6°F). The symptoms of hyperthermia include: (1) dizziness, (2) fainting, (3) drowsiness, (4) lethargy, (5) increases in the internal body temperature. The effects of hyperthermia include: (1) unawareness of impending hazard, (2) failure to perceive heat, (3) failure to recognize the need to exit spa, (4) physical inability to exit spa, (5) unconsciousness resulting in danger of drowning.

19. **WARNING: The use of alcohol, drugs, or medication can greatly increase the risk of fatal hyperthermia in hot tubs or spas.**

Despite the popular image of people in spas drinking wine or other alcoholic beverages, DO NOT use alcoholic beverages before or during spa use. Alcohol is a depressant which causes slowed reflexes and drowsiness, especially in conjunction with the relaxed soaking in hot water. This can lead to sleep or unconsciousness and possibly result in drowning. Using your spa with other people who are also drinking is not a preventative measure since they are likely to become similarly affected by the combinations of alcohol and hot water soaking.

Soaking in hot water causes changes in the circulatory system, such as enlargement of blood vessels near the skin. Therefore, people with a medical history of heart disease, circulatory problems, diabetes, high or low blood pressure should check with their physician before using spas. Additionally, people taking medications causing drowsiness, such as tranquilizers, narcotics, antihistamines, or anticoagulants should not use spas without asking their physician.

20. **Broken or missing drain covers should be replaced immediately.**

Accidents can occur when long hair or a body part is trapped by suction from a drain or outlet whose cover is broken or removed. Children are particularly vulnerable, and they should be warned against danger.

21. **WARNING:** Do not use electrical appliances in or around your spa. Do not use glass or other breakable items in or around your spa. Do not remove spa cabinet panels and attempt to make repairs. Do not attempt electrical repairs. Retain a certified licensed electrician.

22. **This spa is for residential use only.** It is not intended for commercial use.

SAVE THESE INSTRUCTIONS

Select a Location

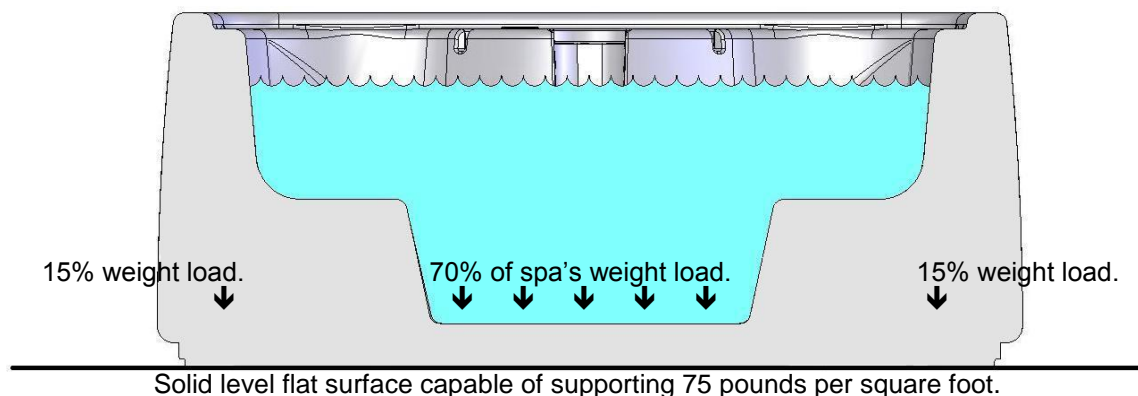
Site Selection

Your new spa will provide you and yours with hour upon hour of healthy, relaxing enjoyment. The following suggestions and recommendations will help you select a safe and compatible site for your spa, maximizing your enjoyment.

Before proceeding, please read the “Important Safety Instruction” at the beginning of this manual.

1. **Certified Licensed Electrician Required.** Electrical installation, (approval of and connection to power source) must be completed by a qualified certified licensed electrician in compliance with all codes.
2. **No Overhead Power Lines.** Do not locate your spa under overhead power lines or in near proximity to existing buried or exposed electrical circuits. See your electrician.
3. **Childproof Your Spa.** Plan for limiting access of children. Precautions such as self closing and locking gates or access doors, fencing and other child barriers, as dictated by the site.
4. **UL Safety Cover Required.** In addition to its insulating factors, a good cover also provides a measure of additional protection from unwanted access. Select a cover which is classified by the Underwriters Laboratories meeting ASTM F1346-91 requirements.

CAUTION: Your spa must be installed on a level, flat, solid load-bearing surface. Do not locate the spa on a surface that can be damaged or altered by water.



Provide a solid load-bearing site:

The site must provide a solid foundation with a minimum load bearing capacity of 34 kg per 929 sq. cm (75 pounds per square foot). Concrete slabs and decks must be designed to support this weight. Do not select a site composed of individual unsupported bricks, blocks, or other materials which will shift unevenly and cause damage to your spas internal frame.

Provide a level, flat site:

A level site is critical to both the performance and enjoyment of your spa. Water is unforgiving and will always settle level. A flat and level site provides the surface necessary to properly dispense weight between the foot well (which bears most of the spa's weight) and the structural frame which primarily provides stabilization and secondary support. The importance of proper support for the foot well in conjunction with the spa cabinet can not be overstressed.

Filling Your Spa

Make sure that the electrical cord has been routed properly. (See page 8). Do not supply electrical power at this point.

Check to be sure that the drain valve is closed and that the drain safety cap is securely in place. (See page 8)

Remove filter cartridge and place garden hose end through opening (inside filter area), fill the spa with cold (never warm or hot) water 150 to 200 mm (6" to 8") below the top edge of the spa. Do not overfill, as the spa's water level will rise as each person enters the spa.

Always keep the spa water level above the jet openings.

WARNING: DO NOT SUPPLY POWER TO AN EMPTY SPA!

Location of Electrical Cord & Drain

The spa equipment requires a 15 amp outlet, dedicated to the spa. **The use of any extension cord will void your warranty.** Carefully read all of the safety requirements before plugging in the spa.



Find G.F.C.I. power plug located below the right corner of the equipment access door and cut the white tie.



Pull G.F.C.I. along with power cord and inspect the full length of the cord for any damage before each use. If cord get's tangled, remove equipment access door. (see next picture)



Remove & save access panel screws. Use caution when reinstalling the screws. Do not overtighten.



Figure 1

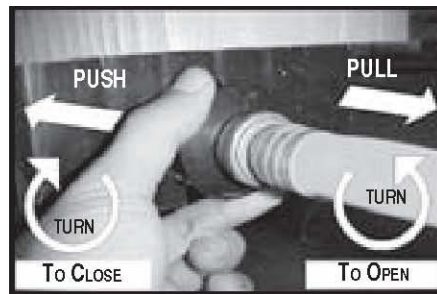


Figure 2



Figure 3

The spa drain valve assembly consists of a garden hose connector with a twist on/off valve and a safety drain cap. It is located outside at the bottom of the spa.

EACH TIME BEFORE FILLING THE SPA

1. Make sure the drain valve is closed. Turn handle clockwise until it stops.
2. Make sure the safety cap is secure. Turn handle clockwise until it stops.
3. If the drain valve is facing a wall, leave enough space between the drain valve and wall 15.4 cm (6" minimum) to allow enough room to connect a garden hose.

TO DRAIN THE SPA

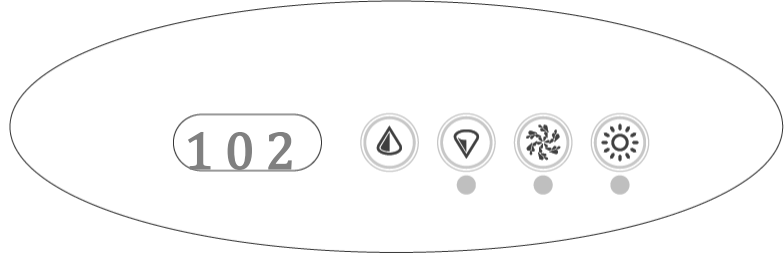
Drain every three months. Draining your spa on a regular basis rids the spa of dissolved solids and protects your spa equipment from the effects of residual calcium hardness and total alkalinity problems

1. Turn Power Off. Turn power off at the spa consoles and deactivate any disconnect switches at the G.F.C.I. plug or load center.
2. Locate Spa Drain Valve. The drain valve is located outside, at the bottom of the spa. See figures 1, 2 and 3 for reference.
3. Remove Drain Valve Safety Cap. Remove the safety drain cap (see figure 1) and store for use when refilling your spa. Attach a standard garden hose to the drain valve.

- Select Safe Suitable Drain. Route the hose to a sewer drain capable of safely assimilating 300 plus gallons of water which may contain both unsanitary contaminants and chemical residue. To open the drain valve twist counter clockwise, then pull outward (see figure 2).

CAUTION: Drain waste water may contain chemical residue and unsanitary contaminants which could be a hazard to health or the environment. Drain to specified sanitary sewer only.

UHS System Operation



If not UHS see next pages.

Initial Start-Up

From the moment your spa is plug in, it is automatically pre-set to operate until it reaches 38°C (100°F). This process could take up to 20 hours depending on the initial water temperature. The spa is also preset to filter the water for 1 hour per day (30) and the clock starts the second you plug it in.

Temperature Adjustment 15.5°C-40°C (60°F-104°F)

When either of the Accu-temp pads are pressed once, the LCD will display the temperature which has been set. Each time either one of these pads are pressed again, the temperature will change by 0.556°C (1°F). After 5 seconds, the LCD will automatically display the current spa temperature.

Jets. Press the pad to run the pump on and off. If left running, the pump will automatically turn off after 15 minutes.

Light. Press the pad to turn the spa light on and off. If left on, the light will automatically turn off after 4 hours.

Spa Water Maintenance. This function enables you to program the amount of water filtration time.

Press or and then to enter the programming mode. Once in the programming mode press or to select the filtration time.

00 In this mode there is no additional filtration.

30 In this mode the water will be filtered for 1 hour every day.

60 In this mode the water will be filtered for 2 hours every day.

To exit press .

Standby Mode

This function allows you to disable the equipment when the filter needs to be serviced without disturbing the already programmed filtration time. Press or and then to enter the standby mode. All spa functions are disabled except for freeze control. To exit from standby press any button.

Display Messages:

OH "Overheat" (spa is deactivated)

DO NOT ENTER THE WATER. If the spa water has reached 44°C (108°F), remove the spa cover to cool the water. The spa will remain shut down until the water and the heater sensor cools to 40°C (104°F). At that point press any button to

reset the spa. If the spa will not reset, shut off the power to the spa and call your dealer or service organization.

SN “Non Functional High Temp Sensor” (heater is deactivated)

Open sensor. Call your dealer or service center.

UHH & UHP System Operation





If not UHH or UHP see previous or next pages.

Initial Start-Up


When your Spa is first activated, it will perform a self diagnostics test showing a series of numbers followed by Pr, then by --along with the low speed pump for approximately 7 minutes. Also the internal clock that keeps track of the filtration cycles every 12 hours will start at that point. The system is preset to heat up to 37.7° C (100° F) and it is also preset to run on low speed for two hours (F2).

Temperature Adjustment


21°C-40° C (70° F-104° F)

When either of the temperature pads  or  are pressed once, the LCD will display the temperature witch has been set. Each time either one of this pads are pressed again, the temperature will change by .556°C(1°F), After 5 seconds, the LCD will automatically display the current spa temperature.

Jets




Press the  pad to run the pump on and off. If left running, the high speed pump will automatically turn off after 15 minutes or low speed in four hours.

Light

Press the  pad to turn the spa light on. To switch color modes, press the pad again immediately after turning it off. If left on, the light will automatically turns off after four hours.

Spa Water Maintenance

This function enables you to program the amount of water filtration time.

Press  or  and  to enter the programming mode.

Once in the programming mode press  or  to select the filtration time.

F2 In this mode the water will be filtered for 2 hours every 12 hours.

F4 In this mode the water will be filtered for 4 hours every 12 hours.

F6 In this mode the water will be filtered for 6 hours every 12 hours.


F8 In this mode the water will be filtered for 8 hours every 12 hours.

FC In this mode the water will be filtered continuously.

To exit press  .

Standby Mode (SY)

This function allows you to disable the equipment when the filter requires service without disturbing programmed filtration time.




Press  repeatedly (or hold it down) until it gets to 21° C (70° F) then press it one more time (within a couple of seconds) to enter the stand by mode. All spa functions are disabled except for freeze control. To exit from standby press any button and re-enter desire set temperature.

For additional features and display messages, see next pages.

WARNING: SHOCK HAZARD! NO USER SERVICEABLE PARTS. Do not attempt to service this control. Contact your dealer or service center for assistance. Follow all owner's manual power connection instructions. Installation must be performed by a certified licensed electrician and all grounding connections must be properly installed.

UHH & UHP Additional Functions

Spa heating modes

The Heating Mode offers the ability to control your heater in special circumstances. Your spa is preset at the factory to Standard Mode. However, the Standard Heating Mode can be changed to Economy or Sleep by pressing the  or  then  button. With each press of the buttons, the display will cycle through the three different modes described below.

Standard Mode (ST): Your spa is preset to this mode. This mode operates the heater whenever needed to maintain the programmed spa water temperature. (See Temperature Adjustment page 10).

Economy Mode (EC): This mode operates the heater only during programmed Filtering Cycles (See Spa Water Maintenance page 10). This mode is ideal for areas that charge a premium for electricity during peak hours. This mode will maintain the thermostat setting. If it does not reach the thermostat setting, you may have to allow for more heating time by increasing the Filtration Cycles.

Sleep Mode (SL): This mode works in the same manner as the Economy Mode except the thermostat setting is automatically lowered by 20 degrees. This mode is best suited for extended leaves from home when it is not important to maintain constant water temperature, such as vacations or business trips.

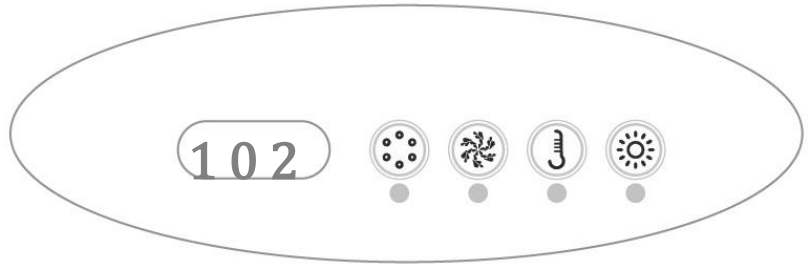
Summer Set Temperature

In hot weather, it is possible for water temperature to exceed the temperature setting. This is especially common when your temperature setting is lower than air temperature. If the water temperature exceeds the temperature setting more than 3°, an automatic safety circuit will turn off all of the electrical systems. The systems will remain off until either the water temperature cools to below the setting, or the setting is increased above the water temperature.

UHH & UHP Display Messages

MESSAGE	MEANING	ACTION REQUIRED
	No message on display. Power has been cut off to the spa.	The control panel will be disabled until power returns. Spa settings will be preserved until next power up.
--	Temperature unknown.	After the pump has been running for 2 minutes, the temperature will be displayed.
HH	Overheat -The spa has shut down. One of the sensors has detected 47°C (118°F) at the heater.	DO NOT ENTER THE WATER. Remove the spa cover and allow water to cool. Once the heater has cooled, reset by pushing any button. If spa does not reset, shut off the power to the spa and call your dealer or service organization.
OH	Overheat" -The spa has shut down. One of the sensors has detected that the spa water is 43°C (110°F).	DO NOT ENTER THE WATER. Remove the spa cover and allow water to cool. At 41°C (107°F), the spa should automatically reset. If spa does not reset, shut off the power to the spa and call your dealer or service organization
1C	Ice -Potential freeze condition detected.	No action required. The pump will automatically activate regardless of spa status.
SA	Spa is shut down. The sensor that is plugged into the "A" jack is not working.	If the problem persists, contact your dealer or service organization. (May appear temporarily in an overheat situation and disappear when the heater cools.)
Sy	Spa is shut down. The sensor that is plugged into the "B" jack is not working.	If the problem persists, contact your dealer or service organization. (May appear temporarily in an overheat situation and disappear when the heater cools.)
SN	Sensors are out of balance. If alternating with spa temperature, it may just be a temporary condition. If flashing by itself, spa is shut down.	If the problem persists, contact your dealer or service organization.
HL	A significant difference between temperature sensors has been detected. This could indicate a flow problem.	Check water level in spa. Refill if necessary. If the water level is okay, make sure the pumps have been primed. If problem persists, contact your dealer or service organization.
LF	Persistent low flow problems. (Displays on the fifth occurrence of "HL" message within 24 hours.) Heater is shut down, but other spa functions continue to run normally.	Follow action required for "HL" message. Heating capability of the spa will not reset automatically; you may press any button to reset.
DR	Possible inadequate water, poor flow, or air bubbles in the heater. Spa is shut down for 15 minutes.	No water level in spa. Refill if necessary. If water level is okay, make sure the pumps have been primed. Press any button to reset, or this message automatically will reset within 15 minutes. If problem persists, contact your dealer or service organization.
DY	No water detected in heater. (Displays on third occurrence of "DR" message.) Spa is shut down.	Follow action required for "dr" message. Spa will not automatically reset. Press any button to reset.

PU1 & HU1 System Operation






If not PU1 or HU1 see previous pages.


Initial Start-Up

When your spa is first activated, it will perform a self diagnostic test showing a series on numbers followed by Pr, then by – along with the low speed pump. Also the internal clock that keeps track of the filtration cycles every 12 hours will start at that point. The system is preset to heat to 38° C (100° F) and is preset to run on low speed for two hours (F2).


Temperature Adjustment 21°-40° C (70°-104° F)

When the temperature button  is pressed once, the LCD display will flash and show temperature set point. While flashing, press the temperature button  again to increase or decrease the temperature set point. To change the direction (increase and decrease), wait until the LCD display stops flashing, then press the temperature button  again. The LCD display will show the actual water temperature five seconds after you have completed setting the temperature.

Jets

Press the jet button  to start and stop the jet pump. If left operating, the jet pump will automatically turn off after thirty minutes. To change this timing to fifteen minutes see page 18, number 2, Pump Time Out.



Light

Press the light button  to turn the light on. Press again to turn the light off. If left on, the light will automatically turn off in approximately four hours.

Freeze Protection





If the high limit sensor detects 6° C (44° F) at the heater, the equipment is automatically activated to provide freeze protection. This is a normal function, not a corrective action. The equipment will continue to operate until the high limit sensor detects 7° C (45° F) at the heater. Freeze protection is always enabled while electrical power is supplied to the spa, regardless of the spa's status.

Standby Mode (S 8)

The spa can be disabled to while servicing the filter. To place the system into the standby mode, press the temperature button , then press the mode button . The display will display S 8. All but the freeze protect functions are disabled. Press any button to resume normal spa operation.

Spa Water Maintenance

This function enables you to program the amount of water filtration and ozone sanitization (optional) timing.

Press the temperature button  then the jet pump button  to enter the filter programming mode. Press the temperature button  cycle through the available settings listed below. Once desired setting is reached, press the jet pump button  to exit the program.

- F2 Water is filtered two out of every twelve hours.
- F4 Water is filtered four out of every twelve hours.
- F6 Water is filtered six out of every twelve hours.
- FC Water is filtered continuously, twenty-four hours per day.

Additional PU1 & HU1 system feature



Spa Heating Modes

Your spa's heating system can be set to one of three operating modes: standard, economy, or sleep mode.

Standard Mode (displayed as ST): Your spa is preset at the factory to this mode. Standard mode operates the heater whenever needed to maintain the programmed spa water temperature. (See Temperature Adjustment page 13).

Economy Mode (displayed as EC): This mode operates the heater only during programmed filtering cycles (See Spa Water Maintenance page 13). This mode may be useful for areas that charge a premium for electricity during peak hours. If the spa water temperature does not reach the thermostat setting, you may have to allow for more heating time by increasing the filtration cycles.

Sleep Mode (displayed as SL): This mode works in the same manner as the economy mode, except the thermostat setting is automatically lowered by 20 degrees. This mode may be useful during extended leaves from home such as vacations, when it is not important to maintain constant water temperature.

To change the heating mode press the temperature button  then the light button . the display will cycle to the next mode. Each time you press this sequence of buttons, the display will cycle to the next mode: EC → SL → ST then back to the beginning. The heating mode will be set to the last displayed.

PU1 & HU1 Display Messages

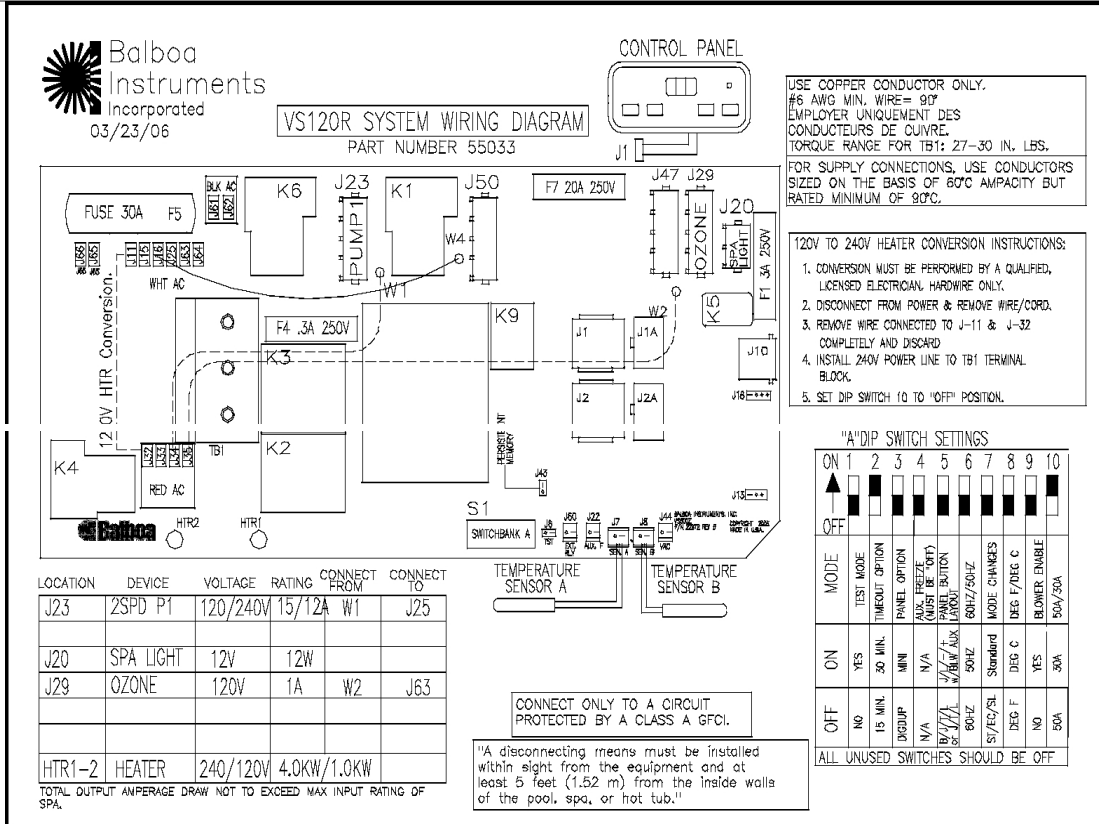
MESSAGE	MEANING	ACTION REQUIRED
	No message on display. Power has been cut off to the spa.	The control panel will be disabled until power returns. Spa settings will be preserved until next power up.
--	Temperature unknown.	After the pump has been running for 2 minutes, the temperature will be displayed.
H H	Overheat -The spa has shut down. One of the sensors has detected 47°C (118°F) at the heater.	DO NOT ENTER THE WATER. Remove the spa cover and allow water to cool. Once the heater has cooled, reset by pushing any button. If spa does not reset, shut off the power to the spa and call your dealer or service organization.
O H	Overheat" -The spa has shut down. One of the sensors has detected that the spa water is 43°C (110°F).	DO NOT ENTER THE WATER. Remove the spa cover and allow water to cool. At 41°C (107°F), the spa should automatically reset. If spa does not reset, shut off the power to the spa and call your dealer or service organization
1 C	Ice -Potential freeze condition detected.	No action required. The pump will automatically activate regardless of spa status.
S A	Spa is shut down. The sensor that is plugged into the "A" jack is not working.	If the problem persists, contact your dealer or service organization. (May appear temporarily in an overheat situation and disappear when the heater cools.)
S b	Spa is shut down. The sensor that is plugged into the "B" jack is not working.	If the problem persists, contact your dealer or service organization. (May appear temporarily in an overheat situation and disappear when the heater cools.)
S N	Sensors are out of balance. If alternating with spa temperature, it may just be a temporary condition. If flashing by itself, spa is shut down.	If the problem persists, contact your dealer or service organization.
H L	A significant difference between temperature sensors has been detected. This could indicate a flow problem.	Check water level in spa. Refill if necessary. If the water level is okay, make sure the pumps have been primed. If problem persists, contact your dealer or service organization.
L F	Persistent low flow problems. (Displays on the fifth occurrence of "HL" message within 24 hours.) Heater is shut down, but other spa functions continue to run normally.	Follow action required for "HL" message. Heating capability of the spa will not reset automatically; you may press any button to reset.
D R	Possible inadequate water, poor flow, or air bubbles in the heater. Spa is shut down for 15 minutes.	water level in spa. Refill if necessary. If water level is okay, make sure the pumps have been primed. Press any button to reset, or this message automatically will reset within 15 minutes. If problem persists, contact your dealer or service organization.
D Y	water detected in heater. (Displays on third occurrence of "DR" message.) Spa is shut down.	Follow action required for "dr" message. Spa will not automatically reset. Press any button to reset.

ELECTRICAL DATA FOR THE USE OF CERTIFIED LICENSED ELECTRICIAN

WARNING: Shock Hazard! Under No Circumstances Should This Spa Be Installed By Anyone Other Than A Certified Licensed Electrician!

All wiring MUST be in accordance with the National Electrical Code and all local codes.

PU1 & HU1 Series 120-240 Volts Hard Wire Conversion



Conversion of the P1 Series Equipment

The conversion of a PU1 or HU1 equipment package from a factory installed 120 volt system to a hardwired 240 volt system must be completed by a certified licensed electrician.

A G.F.C.I. AND A DISCONNECT SWITCH ARE REQUIRED

The National Electrical Code requires that spas connected to 240 volts circuits be equipped with a "G.F.C.I." and Disconnect Switch. See National Electric Code Articles 680-12 and 680-42.

P1 SERIES SPAS ARE NOT EQUIPPED WITH A 240V G.F.C.I. OR A DISCONNECT SWITCH. A G.F.C.I. SHOULD BE INSTALLED BY A CERTIFIED LICENSED ELECTRICIAN

OUTDOOR LOAD CENTER

The addition of an outdoor load center such as a Siemens W0408ML 1125 or equal must be added to the circuit. This type of load center provides both a G.F.C.I. and Disconnect Switch in a convenient configuration as required by the National Electric Code. (See next page for suggested wiring configuration)

ISOLATED, DEDICATED 240 VOLT, 30 OR 50 AMP CIRCUITS ARE REQUIRED

An isolated, dedicated 240 volt, 30 or 50 amp circuit is required to provide the power necessary to properly operate the 240V equipment package.

PERMANENTLY HARD WIRED

All 240 volt operations wiring must be permanently hard wired, installed in grounded conduit and installed in compliance with the National Electrical Code and all local codes.

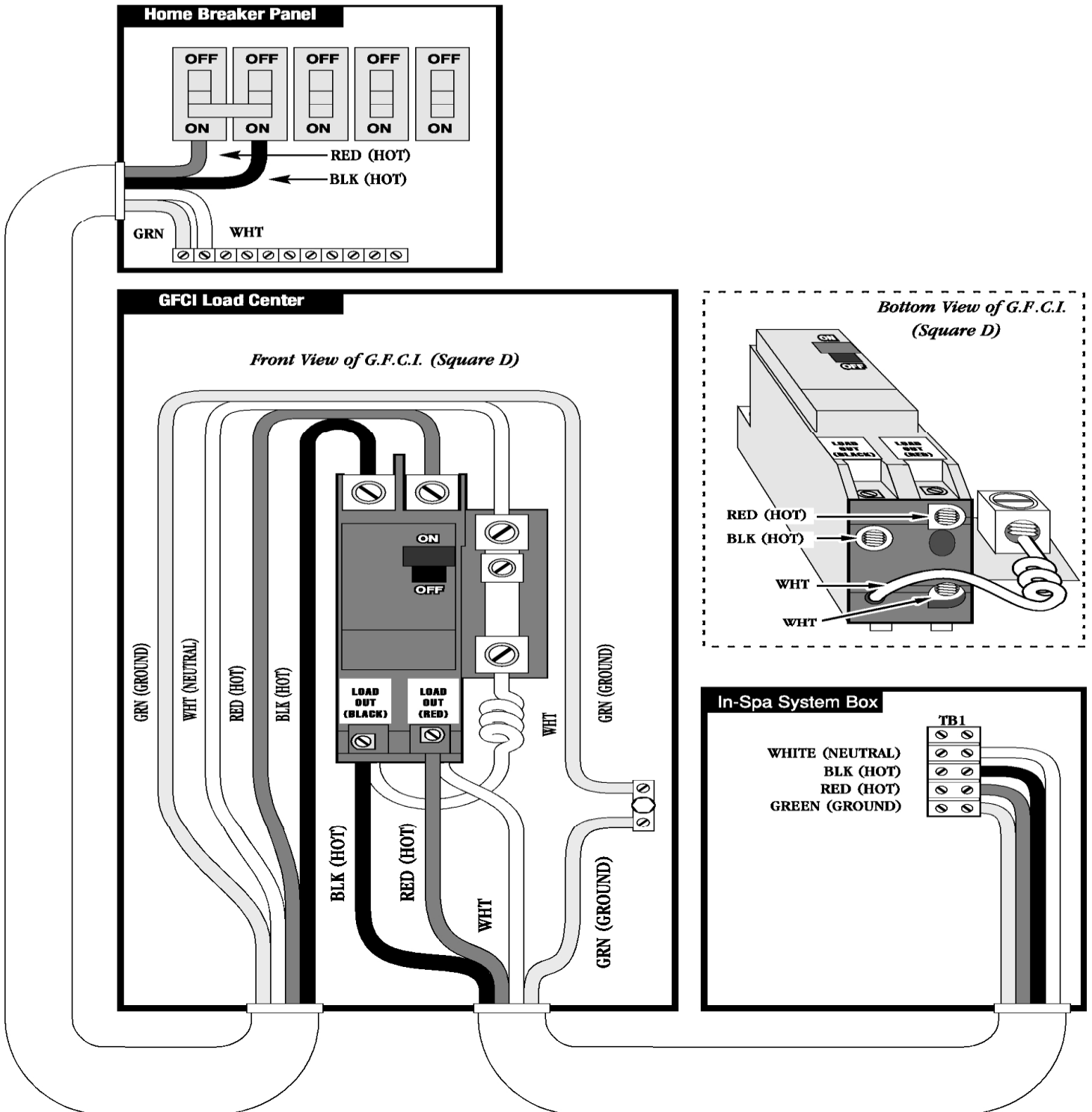
WIRE SIZING MUST MEET ELECTRICAL CODES

All installations are different. Wire sizing must meet the National Electrical Code and all local code specifications.

See next pages for more conversion details.

WARNING: USE COPPER CONDUCTORS ONLY!

REQUIRED WIRING FOR 240 VOLT INSTALLATION



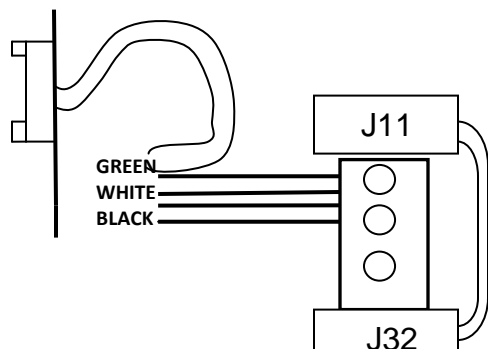
ELECTRICAL DATA FOR THE USE OF CERTIFIED LICENSED ELECTRICIAN

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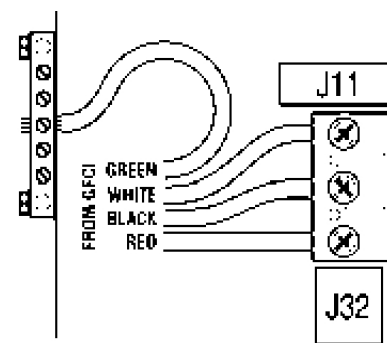
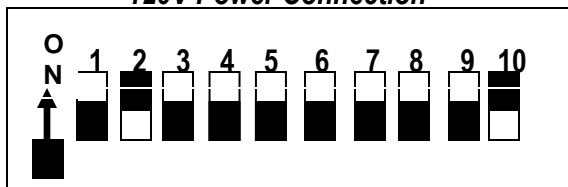
All wiring **MUST** be in accordance with the National Electrical Code and all local codes.

PU1 & HU1 Conversion From 120V to 240V

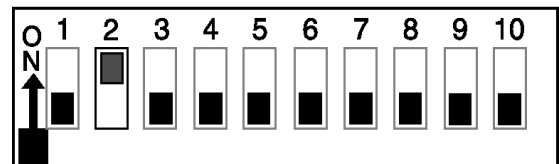
- Terminal Block Torque field connections should be between 21 and 23 inch lbs.
- Readily accessible disconnecting means to be provided at time of installation.
- Connect only to a circuit protected by a Class A Ground Fault Circuit Interrupter "G.F.C.I." mounted at least 6 feet (1.8m) from the inside walls of the spa and in line of sight from the equipment compartment.
- Remove white wire from J1 1 to J32 and move key #10 to off position for 50 amp configuration.



120V Power Connection



240V Power Connection



1 Test Mode (normally off)

2 Pump Time Out. In "ON" position, Pump turns off after 30 minutes In "OFF" position, Pump turns off after 15 minutes

3 Panel Option (must be OFF). In "ON" position, enables mini panel. In "OFF" position, enables current panel

4 Aux Freeze (must be OFF).

5 Panel Button Layout (must be OFF). In "ON" position, enables J/L/-/+/w/BLW/AUX In "OFF" position, enables B/J/T/L or J/T/L

6 Frequency (must be OFF). In "ON" position, 50Hz operation In "OFF" position, 60Hz operation

7 Mode Changes (must be OFF). In "ON" position, standard mode only. In "OFF" position, enables standard/economy/sleep.

8 Temperature Display. In "ON" position, temperature is displayed in degrees Celsius. In "OFF" position, temperature is displayed in degrees Fahrenheit

9 Blower / Pump 2 Enable. In "ON" position, enables pump 2 In "OFF" position, disables pump 2.

10 Amperage Setting. In "ON" position, for 30 Amp service In "OFF" position, for 50 Amp service.

A grounding lug has been provided on the exterior of the pack chassis to allow connection of a ground wire to a local grounding point to be established in compliance with the National Electric Code (NEC) and all local codes.

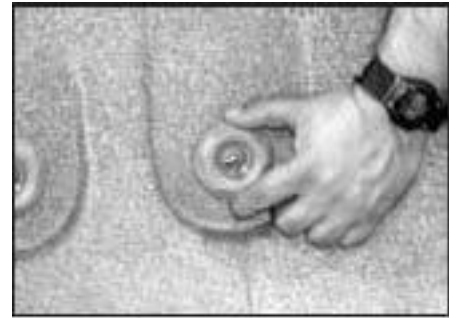
Equipment Operation

The spa is equipped with massage jets, two anti-vortex main drains and an automatic skim filter.

Adjusting Massage Jets

The massage jets may be adjusted for both volume and direction.

To adjust the jet for direction simply rotate the jet's eyeball fitting in the direction desired. To adjust the jet's flow rate, rotate the jet's outer faceplate about 1/4 turn counter-clockwise to increase the flow or clockwise to decrease the flow. (DO NOT FORCE)



Suction Fittings

Keeping the suction fitting covers clean and clear of all obstructions is critical in order to have a safe operation of the spa. See the safety instructions on page 4 for additional for details.



Surface Skim Filter

The spa's automatic surface skim filter is designed to remove floating debris and contaminants such as body lotions by drawing water through a specially formulated filter cartridge element. It is critical that this element be routinely cleaned.



To Clean the Cartridge:

- 1 Place system on Lockout Mode or disconnect power.
- 2 Remove the filter cover.
- 3 Turn cartridge counterclockwise and pull up.
- 4 Remove the cartridge element and thoroughly rinse with a garden hose until element is free from dirt and debris.
- 5 Return the cartridge to the filter well by following steps 1 - 4 in reverse order.



Air Injection Venturi Adjustment

Air injection into the massage jet water flow may be controlled by manipulation of the venturi dials located on either side of the spa. Each dial is independent and controls up to 5 jets respectively.



Water Chemistry

Spa water chemistry (or water balance) affects the safety of your equipment as well as the appearance of your spa water. Water balance has five factors: pH, total alkalinity, calcium hardness, temperature and total dissolved solids. pH is the most critical but total alkalinity and calcium hardness must also be watched closely. Low calcium hardness can lead to corrosion of equipment, while high calcium hardness can lead to scaling, cloudy water and staining. Water temperature should never exceed 40°C (104°F), and total dissolved solids should be kept below 1500 PPM.

Algicidal and sanitizing chemicals are either alkaline or acid. Sodium and calcium hypochlorites are alkaline. Chlorine gas and practically all other dry chlorine spa products are acid. On the market are a number of bromine sanitizers. Bromines are usually preferred since they don't emit a strong chlorine odor.

SEE YOUR SPA WATER EXPERT FOR ADDITIONAL INFORMATION

USE OF CALCIUM HYPOCHLORITES OR TRICHLORS WILL VOID WARRANTY

1. Check and adjust water conditions. You must maintain proper chemical balance to insure safe sanitary conditions and to prevent your spa from becoming a breeding place for bacteria. This is done by:
 - A. Test daily and maintain pH between 7.2 and 7.8. Adjust if necessary, above 7.8 use pH decrease, if below 7.2 use pH Increase. Improper pH can damage spa finish, equipment, cause eye irritation and chemical loss. Use dosage according to manufacturer's label.
 - B. Test alkalinity and maintain at 80 ppm to 140 ppm. Adjust if necessary, above 140 ppm use pH Decrease, if below 80 ppm use Total Alkalinity Control. Use dosage according to manufacturer's label.
 - C. Test daily and maintain proper sanitizer level. It's recommended to use bromine sanitizer and maintain bromine at 3.0
5.0 ppm. Typically two or three bathers relaxing in an average spa with 103°F (39.4°C) temperature will consume all the bromine sanitizer in about twenty minutes. Therefore, prolonged or heavy use may require additional bromine to maintain safe sanitary conditions.
 - D. "Shock" (with a non-chlorine shock) once a week and after each water change. Do not use spa until the bromine residual has dropped to less than 5.0 ppm. NOTE: Improper pH will cause early corrosion to your pump. Corrosion is not handled under any warranty.

SPA MAINTENANCE SCHEDULE

DAILY

Test and maintain pH: Ideal range 7.2 - 7.8b.

Test and maintain bromine: Ideal range 3.0 - 5.0 ppm.

WEEKLY

Test and maintain alkalinity 80 - 140 ppm. Shock with a non-chlorine shock.

Add Spa Clear.

MAINTENANCE

Add defoamer as needed.

Inspect filter cartridge every 2 weeks and clean when needed.

Water Chemistry (Continued)

It is recommended that the spa be drained regularly depending on its size, location and the frequency of use.

1. Clean filter and cartridge periodically according to manufacturer's instructions.
2. Keep the spa covered when not in use to reduce the loss of heat and to keep our leaves, dirt, and other foreign materials from settling in the water.
3. Since the water capacity of your spa is far less than that of a swimming pool, the chemical reaction caused by the presence of one or more persons in the spa is more rapid and pronounced. For these reasons, it is important to frequently check the bromine level, the pH level and total alkalinity of water then add the prescribed chemicals as necessary to maintain the proper chemical balances.
4. If questions or doubts arise regarding quantities and timing or chemical applications to your spa, contact your spa dealer who can assist you in prescribing the correct program for your spa.
5. Store all chemicals in a cool dry place and in such a manner as to prevent contact by children and pets.
6. When adding chemicals to your spa water, add to the center of the spa with the pump operating. Never add chemicals to unheated water as this will affect chemical action.

Freeze Protection

DO NOT ALLOW THE SPA TO FREEZE

If the spa is to be stored or transported in temperatures 0°C (32°F) or lower, it is critical that the unit be fully winterized.

- 1 The spa itself must be completely emptied.
- 2 The main drain valve must be in the open position.
- 3 The drain safety cap must be removed and stored.
- 4 Remove the pump wet end drain plug.
- 5 The filter cartridge element must be removed, dried and stored.
- 6 The massage jet faces must be removed and stored.
- 7 The spa must be inverted for at least five minutes to facilitate draining of the internal plumbing.

CLEANING YOUR SPA

Do not use cleaners or compounds containing harsh abrasives. Also, avoid using heavy-duty rubbing or buffing compounds. Use a soft liquid cleaner.

CARE OF DELUXE VINYL HARDCOVER

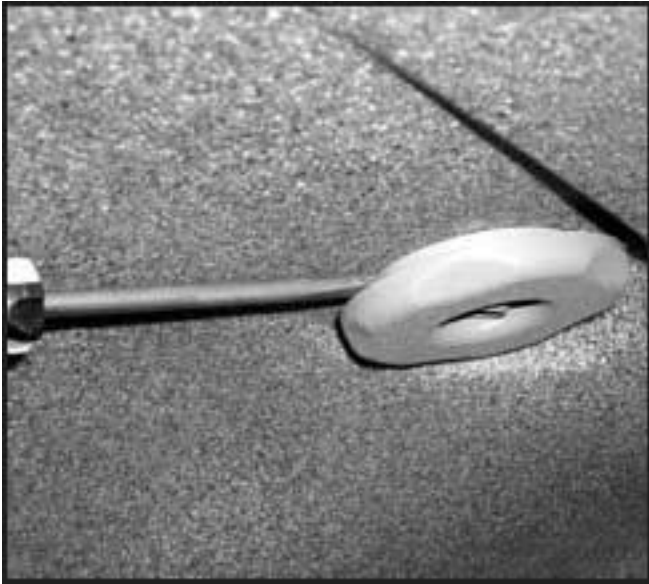
Vinyl coated fabrics are perhaps the most maintenance-free fabrics ever produced and certainly will provide exceptional service life if given the proper care. Almost all vinyl manufacturers now provide information concerning the necessary cleaning procedures for their products. In reality, all care maintenance instructions are the same for all coated fabrics regardless of their manufacturing origin.

Products are now on the market that are manufactured to enhance the beauty and service life of all vinyls. However, by using methods described below with minimal care and attention, you should enjoy years of satisfaction and pride with any vinyl coated fabric.

EVERYDAY SOIL

A gentle mixture of any mild soap and warm water will generally dissipate most common soil from the surface. Using a soft cloth, wash the area to be cleaned and rinse. If stubborn dirt remains, as a stain embedded in the grain of the vinyl, use a soft brush, and if necessary, a touch of cleaning powder. In both situations, rinse and dry with a soft cloth

Jet Wrench Tool Instruction and Recommended Use



1. Insert a flat screwdriver between the jet face and the spa shell. Twist the screwdriver to pop the jet face.



2. Insert the long part of the jet wrench and turn counter clock wise until there is no tension.



3. Remove jet wrench and jet internal nozzle assembly. Inspect condition and lubricate O-rings as needed.



4. It is recommended to check and re-adjust the jet wall fitting using the short end of the jet wrench at least twice per year.

Glossary of Terms

AIR CONTROL VALVE

Mounted on the lip of the spa or at the equipment shroud, to induce air to the jets.

CHECK VALVE

Prevents back flow of water through system.

CONTROL BOX

Basically the brain of the spa. Power is distributed to all functions of the spa, pumps, lights, heat, etc.

DRAIN VALVE

Used in the draining of the spa, looks like an outdoor faucet and fits a standard garden hose.

FILTER

The filter cleans the spa and removes particles and debris and protects the equipment from foreign substances.

FOOTWELL

The bottom of a spa where you place your feet.

G.F.C.I. BREAKER

The electronic switch installed in the power cord to give power to the spa.

HEATER The thermostatically controlled heater raises the temperature of the water to the desired degree. This is located under the control box in the equipment area.

JETS

The fittings on your spa that direct the flow of water for massaging action.

pH Stands for "Potential for Hydrogen" This is the term used to describe the acid (low pH) or alkalinity (high pH) condition of the water. The ideal pH for spa water is 7.5.

SKIMMER The skimmer removes surface debris to the filter. The water level in the spa should be kept at the proper range for optimum skimmer operation.

SUCTION DRAIN

The fitting set into the footwell that drains water from the spa.

TOP CONTROL PANEL

Mounted on the lip of the spa. The digital panel that controls the spas functions.