

# Control Panel Operation

(For additional information, please see the Special Operating Instructions For your specific hot tub)

## TS702 Main Control Panel



### Pump 1

Pump 1 is a 2 speed pump. Pressing once puts the pump into low speed, indicated on the LCD by a slow moving pump icon . Pressing a second time activates Pump 1 to high speed  (icon moves faster). To turn off, press a third time (icon disappears from the LCD). If left running on high speed, Pump 1 will automatically turn off after 30 minutes (2 hours on low speed). Refer to your Special Operating Instructions for a description of which jets Pump 1 activates.

### Pump 2

Pump 2 is a 1 speed pump. Pressing once puts the pump into high speed, indicated on the LCD by a Fast moving pump icon . To turn off, press again (icon disappears from the LCD). If left on, Pump 2 will automatically turn off after 30 minutes. Refer to your Special Operating Instructions for a description of which jets Pump 2 activates.

### Blower

The blower activates all blower jets. Pressing once activates the blower, indicated on the LCD by a pump icon . To turn off, press again (icon disappears from the LCD). If left on, the blower will automatically turn off after 30 minutes.

### Light

The underwater light and grab bar lights (if installed on your spa) are turned on or off by pressing the light button. When turned on, the light icon is  displayed on the LCD. In some cases, the light is turned low, medium, high, off. The light button also controls any optional LED lighting if installed on your spa. By turning the LED lights on and off, you can cycle through the various colors programmed into the LED controller (Blue/Green, Purple, Blue, Green/Red, Green, Red, cycling through the colors, strobe effect).

### Warm & Cool

The warm & cool buttons are used to change the temperature set-point of the spa. When either button is pressed, "Set Temperature" is displayed on the LCD and the temperature can be adjusted. The minimum set point is 80°, while the maximum is 104°.

### Mode/Prog

Repeatedly pressing the mode/prog button will cycle through the available Spa Modes (Standard, Economy, or Sleep - see descriptions below).

### Time

Once the time is set, pressing the time button displays the time of day. To set the time, press 'Time' 'Mode/Prog', then use 'Warm' & 'Cool' to select the hour. Once the hour is selected, press 'Mode/Prog' to select the minutes and adjust using 'Warm' & 'Cool'.

### Indicator Lights: F1, F2, PL, & TL

F1 & F2 lights indicate programmed Filtration cycles (see descriptions below).

PL indicates that the Control Panel is locked. Press 'Time' 'Pump 1' then 'Warm' to lock the panel. To unlock, press 'Time' 'Pump 1' then 'Cool'.

TL indicates that the temperature set-point is locked. Press 'Warm' 'Time' 'Pump 1' then 'Warm' to lock or unlock the temperature set-point.

## Heat Icons

When the temperature bars are alternating between top and bottom, the spa is measuring the water temperature. When the bars progress from top to bottom, the spa water is being heating.

## O<sup>3</sup> Ozone Icon

When displayed, the optional Ozonator (if equipped) is activated. If any Control Panel button is pressed, the Ozone Icon will turn off and the Ozonator deactivated for 30 minutes after any button press. However, if the optional ThermOzone system is installed it is always functioning regardless of the icon status.

## Mode Icons

Either the Standard, Economy, Standard-in-Economy, or Sleep icon will be displayed depending on the mode selected. See the descriptions below.

## Spa Modes

**Standard Mode** constantly maintains the set temperature, assuming too many pumps aren't running (see Electrical Service, below). Heating will occur until the water reaches the next highest degree about the temperature set-point. The Standard icon will be displayed unless the mode is changed.

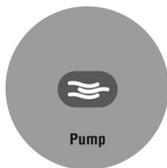
**Economy Mode** allows the spa to heat only during the preset Filtration cycles. In spas with continuous circulation F1 & F2 Economy Cycle times must be set. Heating will occur until the water reaches the next highest degree about the temperature set-point. The Economy icon will be displayed unless the mode is changed. Pressing the 'Pump 1' button will change the mode to Standard and display the Economy-in-Standard icon.

The spa will automatically revert to Economy mode after one hour (or instantly if you press 'Mode/Prog').

**Sleep Mode** heats the spa to within 20° of the temperature set-point, but only during Filtration cycles.

The Sleep icon will be displayed unless the mode is changed.

## Additional Control Panels - supplied on some spa models



### Auxiliary Pump

If equipped on your spa, Auxiliary Pump buttons control additional pumps in your spa. Refer to your Special Operating Instructions for details.



### Wave Lounge Pump & Valve

If your spa is equipped with a Wave Lounge, these buttons control the Wave Lounge Pump and Wave Lounge Valve. The Wave Lounge Pump is a 1 speed pump. Pressing once puts the pump into high speed. To turn off, press again. If left on, the Pump will automatically turn off after 30 minutes. Once the Wave Lounge Pump is activated, press the Wave Lounge Start/Stop button to begin the sequencing Wave Lounge action. Press again to stop the valve and isolate specific jets. Refer to your Special Operating Instructions for a description of which jets are controlled.

## Control Panel Features

### Power-Up Sequence

When power to the spa is turned on, the Main Control Panel will display a series of diagnostic numbers and/or letters. When it displays "Pr", it has finished initiation and enters into Prime Mode. Prime Mode will last for 4-5 minutes before automatically entering Run Mode. Run Mode can be entered earlier by pressing either the 'Warm' or 'Cool' button.

### Circulation Pump Operation

For spas equipped with a circulation pump, Filtration and heating are controlled based on the mode selected and electrical service in conjunction with the circulation pump.

### Circulation Pump

The Circulation Pump will run 24 hours a day, 7 days a week to efficiently and effectively filter your spa water. However, if the spa temperature exceeds the set-point by 3° the circulation pump will automatically turn off. It will only turn back on during the preset Filtration cycles or after the water temperature is within or below 3° of the set-point. Any time the circulation pump is running, your spa will be filtering water (unless your filters are too dirty to permit water to pass through them).

### Filtration Cycles

Filtration Cycles are set at the factory to occur from 8am-10am and 8pm-10pm. To change the Filtration cycle start and end times, press 'Time' 'Mode' 'Mode' 'Mode'. Then use the 'Warm' and 'Cool' buttons to adjust the start and end times for both Filtration cycles. Press 'Mode' to select the chosen time and eventually return to normal operation.

## Electrical Service

The Electrical Service determines how many pumps can run in conjunction with the heater. If the dedicated GFCI circuit was installed with a smaller breaker than the recommended size (typically 60 amps), your heater will automatically shut off to avoid tripping your circuit breaker if too many pumps are activated (including the blower). Heating will automatically turn back on after pumps have been shut off. The heater will also automatically shut off on larger spas when 3 or more pumps (including the blower) are turned on. All of this may occur even though the circulation pump continues to run – when the heater is on, progressing bars will be indicated from the bottom to the top of the heater icon.

## Standby Mode

Use the Standby Mode if you need to temporarily shut off the circulation pump (to aid in removing filters). To enter Standby Mode press 'Cool' 'Pump 2'. To resume normal operation, press any Control Panel button or wait approximately five minutes.

## Clean-up Cycle

The Clean-up Cycle is a feature that automatically turns on a pump (or the blower) 30 minutes after it was last turned off or timed out. The pump will run for approximately 30 seconds to move water through the system to help maintain clear water.

## Purge Cycle

The Purge Cycle is intended to keep the spa as clean as possible by flushing all jet lines every 12 hours. All pumps will turn on for 2-3 minutes. Purge cycles occur at the beginning of each Filter Cycle.

## Freeze Protection

Freeze Protection is activated if the temperature sensors in the heater detect a drop to 44°. All pumps (including the blower) activate automatically and remain on until 4 minutes after the sensors detect that the spa temperature has risen to 45° or higher. During this time "ICE" will be displayed and no button presses will be recognized until the spa water has reached 45°.

## TS500 Control Panel



Press all buttons firmly. In multi-button sequences, if buttons are pressed too quickly or too slowly they may not register and you will need to repeat the sequence.



### Jets

All Jets are powered by a 2 speed pump. Pressing the 'Jets' button once puts the pump into low speed. Pressing a second time activates high speed. To turn off, press a third time. If left running on high speed, the pump will automatically turn off after 30 minutes (4 hours on low speed).



### Light

The underwater light and grab bar lights (if installed on your spa) are turned on or off by pressing the light button. In some cases, the light is turned low, medium, high, off. The light button also controls any optional LED lighting if installed on your spa. By turning the LED lights on and off, you can cycle through the various colors programmed into the LED controller (Blue/Green, Purple, Blue, Green/Red, Green, Red, cycling through the colors, strobe effect).



### Warm &



### Cool

The warm & cool buttons are used to change the temperature set-point of the spa. When either button is pressed, the new set-point is displayed for a few seconds before reverting back to the current water temperature. The minimum set point is 80°, while the maximum is 104°.

**Indicator Lights: Heat** The Heat Light is turned on whenever the heater is activated.

## Control Panel Features

### Power-up Sequence

When power to the spa is turned on, the Main Control Panel will display a series of diagnostic numbers and/or letters. When it displays "Pr", it has finished initiation and enters into Prime Mode. Prime Mode will last for 4-5 minutes before automatically entering Run Mode. Run Mode can be entered earlier by pressing either the 'Warm' or 'Cool' button.

## Heater Operation

The 2 speed main water pump controls all heating and Filtration – neither occurs unless the pump is running. The pump may automatically turn on low speed for approximately 2 minutes every half hour to detect water temperature. If heating is required, the pump will remain on in low speed. During this time, the pump cannot be shut off but can be activated to high speed.

## Filtration Cycles

Designate times when the pump activates on low speed to filter the spa water. The first filter cycle begins 6 minutes after the spa is energized. The second filter cycle begins 12 hours later. Filter Cycle duration is programmable for 2, 4, 6, 8 hours or for continuous filtration (indicated by “FC”). The default filter duration is 2 hours. To change the filter duration, press ‘Cool’, then ‘Jets’ and use the ‘Cool’ button to adjust (F2, F4, F6, F8). Press ‘Jets’ to exit programming.

## 110 Volt Plug-in Spas

110 Volt Plug-in Spas will only heat while the pump is in low speed. If the pump is run on high speed, the heater will automatically shut off. Depending on the spa mode, the heater will not turn back on until the pump is turned to low speed (or off), and the water requires heating.

## Spa Modes

Spa Modes can be changed by pressing ‘Cool’ then ‘Light’. Continue pressing ‘Light’ until the desired mode is seen. The display will automatically revert to the temperature after several seconds.

*Standard Mode* constantly maintains the set temperature. The temperature displayed is current only when the pump has been running for at least 2 minutes. The spa will run for at least 2 minutes every half hour to determine if the spa requires heating. “St” will be displayed momentarily when you switch into Standard Mode.

*Economy Mode* heats the spa to the set temperature only during filtration cycles. “Ec” will be displayed when the temperature is not current (between filtration cycles), and will alternate with the water temperature when the water temperature is current.

*Sleep Mode* heats the spa to within 20° of the temperature set-point, but only during filtration cycles. “SL” will be displayed when the temperature is not current (between filtration cycles), and will alternate with the water temperature when the water temperature is current.

## Freeze Protection

This is activated if the temperature sensors in the heater detect a drop to 44°. All pumps (including the blower) activate automatically and remain on until 4 minutes after the sensors detect that the spa temperature has risen to 45° or higher. During this time “ICE” will be displayed and no button presses will be recognized until the spa water has reached 45°.

## Ozone

Ozone will only run with the pump in low speed during filtration cycles. For hot tubs with filtration cycles, you will want to increase filtration cycles to two, four-hour cycles. Hot tubs with continuous circulation pumps do not need adjustment to their filtration cycles.

## 2000D Control Panel



Press all buttons firmly. In multi-button sequences, if buttons are pressed too quickly or too slowly they may not register and you will need to repeat the sequence.



### Pump 1

Pump 1 is a 2 speed pump. Pressing the ‘Pump 1’ button once puts the pump into low speed. Pressing a second time activates high speed. To turn off, press a third time. If left running on high speed, the pump will automatically turn off after 30 minutes (2 hours on low speed).



### Pump 2

Pump 1 is a 2 speed pump. Pressing the ‘Pump 1’ button once puts the pump into low speed. Pressing a second time activates high speed. To turn off, press a third time. If left running on high speed, the pump will automatically turn off after 30 minutes (2 hours on low speed).



### Blower

The blower is a 1 speed blower that activates all blower jets. Pressing once activates the blower. To turn off, press again. If left on, the blower will automatically turn off after 30 minutes.



### Mode/Prog

Repeatedly pressing the mode/prog button will cycle through the available Spa Modes (Standard or Economy - see descriptions below).



### Light

The underwater light and grab bar lights (if installed on your spa) are turned on or off by pressing the light button. In some cases, the light is turned low, medium, high, off. The light button also controls any optional LED lighting if installed on your spa. By turning the LED lights on and off, you can cycle through the various colors programmed into the LED controller (Blue/Green, Purple, Blue, Green/Red, Green, Red, cycling through the colors, strobe effect).



### Warm &



### Cool

The warm & cool buttons are used to change the temperature set-point of the spa. When either button is pressed, the new set-point is displayed for a few seconds before reverting back to the current water temperature. The minimum set point is 80°, while the maximum is 104°.

### Indicator Lights: Heat

The Heat Light is turned on whenever the heater is activated.

### Power-up Sequence

When power to the spa is turned on, the Main Control Panel will display a series of diagnostic numbers and/or letters. When the diagnostic mode is finished, Pump 1 will activate on low speed to detect the water temperature.

## Control Panel Features

### Panel Lock

To lock the control panel, press 'Cool' then 'Light'. When locked, the display will alternate "LOC" with the spa temperature. To unlock, press 'Cool' then 'Mode'.

### Temperature Lock

To lock or unlock the temperature set-point, press 'Cool' then 'Mode'. When locked, the display will alternate "LOCF" with the spa temperature.

### Heater Operation

The 2 speed main water pump controls all heating and filtration – neither occurs unless the pump is running. The pump may automatically turn on low speed for approximately 2 minutes every half hour to detect water temperature. If heating is required, the pump will remain on in low speed. During this time, the pump cannot be shut off but can be activated to high speed.

### Filtration Cycles

Designate times when the pump activates on low speed to filter the spa water. The first filter cycle begins 6 minutes after the spa is energized. The second filter cycle begins 12 hours later. Filter Cycle duration is programmable for 2, 3, 4, or 5 hours. The default filter duration is 2 hours. To change the filter duration, press 'Cool' then 'Pump 1' and use the 'Cool' button to adjust. Press 'Pump 1' to exit programming. During the first filter cycle of the day, the blower will activate for 30 seconds.

### Spa Modes

Spa Modes can be changed by pressing 'Mode'. The display will automatically revert to the temperature after several seconds.

Standard Mode constantly maintains the set temperature. The temperature displayed is current only when the pump has been running for at least 2 minutes. The spa will run for at least 2 minutes every half hour to determine if the spa requires heating. "St" will be displayed momentarily when you switch into Standard Mode. Economy Mode heats the spa to the set-point when the spa is in a filtration cycle. However, when it is not in a filtration cycle it will heat the spa to within 15° of the temperature set-point. The display will alternately flash "ECON", the current spa temperature, and "COOL" until the water is within 15° of the set temperature.

### Freeze Protection

Freeze Protection is activated if the temperature sensors in the heater detect a drop to 44°. All pumps (including the blower) activate automatically and remain on until 4 minutes after the sensors detect that the spa temperature has risen to 45° or higher. During this time "ICE" will be displayed and no button presses will be recognized until the spa water has reached 45°.

**Ozone** will only run with Pump 1 in low speed during Filtration cycles. For hot tubs with Filtration cycles, you will want to increase Filtration cycles to two, Four-hour cycles. Hot tubs with continuous circulation pumps do not need adjustment to their Filtration cycles.

## 1900D Control Panel



Press all buttons firmly. In multi-button sequences, if buttons are pressed too quickly or too slowly they may not register and you will need to repeat the sequence.



### Pump

All Jets are powered by a 2 speed pump. Pressing the 'Pump' button once puts the pump into low speed. Pressing a second time activates high speed. To turn off, press a third time. If left running on high speed, the pump will automatically turn off after 30 minutes (4 hours on low speed).



### Blower (not installed)

The blower is not an option for this spa, but the button is required in some key sequences.



### Light

The underwater light and grab bar lights (if installed on your spa) are turned on or off by pressing the light button. In some cases, the light is turned low, medium, high, off. The light button also controls any optional LED lighting if installed on your spa. By turning the LED lights on and off, you can cycle through the various colors programmed into the LED controller (Blue/Green, Purple, Blue, Green/Red, Green, Red, cycling through the colors, strobe effect).



### Set Temperature

The Set Temperature button is used to change the temperature set-point of the spa. When the Set Temperature button is pressed, the display will show the set temperature. Pressing the button a second time will cause the set temperature to increase or decrease depending on what direction was last chosen. Each successive press will change the set temperature in the same direction. If the opposite direction is desired, release the button and let the display revert to the actual water temperature. Press the button again to display the set temperature, and successive presses will make the temperature change in the desired direction. The minimum set point is 80°, while the maximum is 104°.

### Indicator Light (Heat)

The Heat Light is turned on whenever the heater is activated.

## Control Panel Features

### Power-up Sequence

When power to the spa is turned on, the Main Control Panel will display a series of diagnostic numbers and/or letters. When the diagnostic mode is finished, the pump will activate on low speed to detect the water temperature.

### Panel Lock

To lock or unlock the control panel, press 'Set Temperature' then 'Light'. When locked, the display will alternate "PL" with the spa temperature..

### Temperature Lock

To lock or unlock the temperature set-point, press 'Set Temperature' then 'Blower'. When locked, the display will alternate "SL" with the spa temperature.

### Heater Operation

The 2 speed pump controls all heating and Filtration – neither occurs unless the pump is running. The pump may automatically turn on low speed for approximately 2 minutes every half hour to detect water temperature. If heating is required, the pump will remain on in low speed. During this time, the pump cannot be shut off but can be activated to high speed.

### **Filtration Cycles**

Designate times when the pump activates on low speed to filter the spa water. The first filter cycle begins 1 minute after the spa is energized. The second filter cycle begins 12 hours later. Filter cycle duration is programmable for 2, 3, 4, or 5 hours. The default filter duration is 2 hours. To change the filter duration, press 'Cool' then 'Pump 1' and use the 'Cool' button to adjust. Press 'Pump 1' to exit programming.

### **Spa Modes**

Spa Modes can be changed by pressing 'Set Temperature' then 'Pump'.

Standard Mode constantly maintains the set temperature. The temperature displayed is current only when the pump has been running for at least 2 minutes. The spa will run for at least 2 minutes every half hour to determine if the spa requires heating. "St" will be displayed momentarily when you switch into Standard Mode. Economy Mode heats the spa to the set-point when the spa is in a filtration cycle. In spas with continuous circulation F1 & F2 Economy Cycle times must be set. However, when it is not in a filtration cycle it will heat the spa to within 15° of the temperature set-point. The display will alternately flash "ECON" and the current spa temperature.

### **Freeze Protection**

Freeze Protection is activated if the temperature sensors in the heater detect a drop to 44°. All pumps (including the blower) activate automatically and remain on until 4 minutes after the sensors detect that the spa temperature has risen to 45° or higher. During this time "ICE" will be displayed and no button presses will be recognized until the spa water has reached 45°.

### **Ozone**

Ozone will only run with Pump 1 in low speed during filtration cycles. For hot tubs with filtration cycles, you will want to increase filtration cycles to two, four-hour cycles. Hot tubs with continuous circulation pumps do not need adjustment to their filtration cycles.

# Common Diagnostic Messages

Troubleshooting Code	Meaning	Action
OHH	Overheat - The spa has shut down. One of the sensors has detected 118°F approximately 47.8°C 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 service or your local dealer.
OHS	Overheat - The spa has shut down. One of the sensors has detected 110°F approximately 43.3°C at the heater.	DO NOT ENTER WATER. Remove the spa cover and allow water to cool. Once the spa reaches 107°F, (approximately 41.7°C) the spa should automatically reset. IF spa does not reset call service or your local dealer.
ICE	Potential Freeze condition exists.	No Action required. The pumps and the blower will automatically activate regardless of spa status.
SnA	Spa is shut down. The sensor that is plugged into sensor "A" Jack is not working.	IF the problem persists, contact service or your local dealer (this may appear temporarily in an overheat situation and disappear when the heater cools.)
SnB	Spa is shut down. The sensor that is plugged into sensor "B" Jack is not working.	IF the problem persists, contact service or your local dealer (this may appear temporarily in an overheat situation and disappear when the heater cools.)
SnS	Sensors are out of balance. IF this is alternating with the temperature, it may be a temporary condition. IF the display shows only this message (periodic blinking) the spa is shut down.	IF problem persists, contact service or local dealer.
HFL	A substantial difference between the temperature sensors was detected. This could indicate a flow problem.	Check the water level in spa. Add water if necessary. IF the water level is okay, make sure the pumps have been primed. IF the problem persists, contact your dealer or service organization.
LF	Persistent low flow problems. (Displays on the fifth occurrence of the "HFL" message within 24 hrs.) Heater is shut down, but other spa functions continue to run normally.	Follow actions required for HFL message. Heating capacity of the spa will not reset automatically; you may press any button to reset.

# Common Reminder Messages

Troubleshooting Code	Frequency	Action Required
rPH	Every 7 days	Test and adjust pH levels per manufacturer's instructions.
rSA	Every 7 days	Test and adjust sanitizer levels per manufacturer's instructions.
rCL	Every 30 days	Remove, Clean and reinstall Filter per manufacturer's instructions.
rt9	Every 30 days	Test & reset GFCI per manual instructions.
Rdr	Every 90 days	Drain and refill spa or test TDS level to see if water needs to be replaced.
rCO	Every 180 days	Clean and condition cover per manufacturer's instructions.
rtr	Every 180 days	Clean and condition wood per manufacturer's instructions.
rCH	Every 365 days	Install new Filter.

# Notes