



STANDARD TROUBLESHOOTING APPROACH
S.T.A. MANUAL 2011+ JLX/J200
2011-2013 J300

LED SERIES

The following symbol is placed throughout this manual for your protection. Always use extreme caution whenever performing repairs to electrical control system components of any kind!

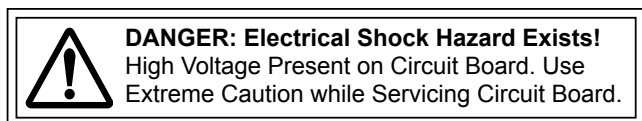


Table of Contents

1.0	Standard Troubleshooting Approach (S.T.A.)	1
1.1	Why a Standard Troubleshooting Approach?	1
1.2	How to Use the S.T.A.	1
1.3	Professional Customer Service	1
1.4	Before Leaving the Shop	1
1.5	Fixing the Hot Tub	1
1.6	Before Calling Technical Support	1
1.7	Before Leaving the Customer	1
1.8	Satisfying the Customer	2
2.0	Electro Static Discharge (E.S.D.)	3
2.1	E.S.D. - What is it? What does it do?	3
2.2	Avoiding E.S.D. Damage	3
2.3	What About Wrist Straps and Special Mats?	3
2.4	Must Wrist Straps and Mats be Used When Replacing A Circuit Board?	3
3.0	Main Control Panel Functions	4
3.1	J-LX Control Panel	4
3.2	J300 Control Panel	5
3.3	J200 Control Panel	6
4.0	Standard Programming Functions	7
4.1	Setting Filter Cycle Start Time (J200/ 2011-2013 J300/ JLX Collections)	7
4.2	Filtration Options	7
4.3	Programming Filter Cycles (J-LX/ 2011-2013 J300 Collection)	8
4.4	Programming Filter Cycles (2011-2012 J200 models equipped with a circulation pump)	9
4.5	Programming Filter Cycles (2013+ J200 models not equipped with a circulation pump)	9
4.6	Programming the Circulation Pump Filtration Cycle (For models equipped with a circulation pump)	10
4.7	Programming the CLEARARRAY® (Ultraviolet) Water Purification System (For models equipped with a circulation pump)	10
4.8	Programming the CLEARARRAY (Ultraviolet) Water Purification System (For models <u>NOT</u> equipped with a circulation pump)	11
4.9	2011 Aftermarket Ozonator Facts	12
4.10	2012+ CLEARARRAY Facts	13
5.0	Additional Control Panel Functions	13
5.1	Setting Water Temperature and Overtemp Feature	13
5.2	Selecting Jets Speed	14
5.3	Lock/Unlock Control Panel	14
5.4	Summer Logic (Models equipped with the Circulation Pump Option)	14
5.5	Multicolored Light System Operation (J-LX/J300 Models, except 2014 J300s)	14
5.6	Multicolored Light System Operation (Standard light for J-210 Models)	15
5.7	Multi-Colored LED Light System Operation (J200 Collection)	15
6.0	Understanding Circuit Board Pin Assignments	16
6.1	Circuit Board Jumpers (All North American 60 Hz 1-Pump Models)	16
6.3	Circuit Board Jumpers (Domestic 60 Hz Models)	17
6.4	Circuit Board Jumpers (All Export 50 Hz 1-Pump Models)	18
6.5	Circuit Board Jumpers (All Export 50 Hz 2-Pump Models)	18

7.0	Troubleshooting Using The Control Panel.....	19
7.1	Control Panel Displays	19
7.2	Control Panel Default Display	19
7.3	Control Panel Status and Error Messages	19
7.4	Testing Flow/Pressure Switch	21
8.0	Troubleshooting without The Control Panel.....	22
8.1A	No Heat or Not Enough Heat (All Models).....	22
8.1B	No Heat or Not Enough Heat (All Models).....	23
8.1C	No Heat or Not Enough Heat (All Models).....	24
8.1D	No Heat or Not Enough Heat (All Models).....	25
8.1E	No Heat or Not Enough Heat (All Models).....	26
8.2	Intermittent Heating	27
8.3	Nothing Works	27
8.4	Hot Tub Doesn't Come On for Filter Cycle	28
8.5	House Breaker Trips	28
8.6A	DCU Unit (J-LX Collection)	29
8.6B	DCU Unit (J300 Collection).....	30
8.6C	Hot Tub Light Will Not Come On (J-LX/2011-2013 J300 Models)	31
8.6D	Light does not come on (J200 Collection Standard light)	32
8.6E	2013+ Light diagram of the DCU Unit (J200 Collection).....	33
8.6F	Hot Tub Light Will Not Come On (J200 Collection CL Lighting)	34
8.7	No Jets.....	35
8.8	2011 Ozonator Not Working	36
8.9	2012+ CLEARARRAY Not Working.....	37
8.10	Weak or Surging Jets	38
8.11	Jets Pump Runs and Quits During Jet Mode.....	39
8.12	Circulation Pump Not Working (JLX, J300 and J200 with circ pump option only)	40
8.13	Troubleshooting A Thermal Pump Cutout	41
8.14	Pump 1 Hums and Will Not Start	41
APPENDIX		42
A1	Checking Voltage to Hot Tub	43
A2	Checking Current Consumption of Devices	45
A3	Checking Voltages to Devices	46
A4	Testing Flow/Pressure Switch	47
A5	About Fuses.....	48
A6	The Watchdog “- - -”	48
A7	Understanding Sanitizers.....	49
A8	Understanding pH.....	49
A9	North American 60 Hz 120V/240V Convertible 1-Pump Models	50
A10	North American 60 Hz 240V 1- or 2-Pumps Models.....	51
A11	Export 50 Hz 230V 1-Pump Models	52
A12	Export 50 Hz 230V 1- or 2-Pump Models	53
A13	Load Box Connection Diagrams A - D (North American 60 Hz)	54
A14	Temperature Sensor/Hi-Limit Sensor Resistance Chart.....	56
A15	Flow Switch Illustration (Models with a circulation pump).....	57
A16	Pressure Switch Illustration (Models without a circulation pump).....	57
A17	Sensor Harness Diagram	57
A18	Transformer Test.....	58
A19	Troubleshooting The Optional Stereo System	59
A20	Glossary of Terms.....	62
A21	Troubleshooting Data Collection Form	63

1.0 Standard Troubleshooting Approach (S.T.A.)

1.1 Why a Standard Troubleshooting Approach?

Service prices are basically set by local industry and geographic region. Stiff competition in the service industry has made it difficult to raise the price of a service contract; or charge more for time and materials than the competitive shop down the street. If your service business is to be profitable you must control the overall **cost of service**. The total cost of service is made up of many individual cost factors, but three in particular are more important than the rest combined:

1. Time of Repair - How long it takes to find and fix a problem.
2. Time Between Failures - How often you are called to repair any one particular hot tub? How many times are you called back to fix the same problem on the same hot tub?
3. Parts Usage - Except in rare circumstances, only one part fails. How many parts do you replace before you find the bad one?

This S.T.A. manual has been designed to help you control the overall cost of service by focusing on the three important aspects of your job outlined above. The S.T.A. will help you fix your customer's hot tub quickly, fix it well, and use fewer parts.

1.2 How to Use the S.T.A.

The S.T.A. was developed by the Technical Support Department and is designed to be the communications link between you and your customers. If you call for help on any symptom covered in this book, you will be told to do what the S.T.A. recommends, therefore, you will save time by calling technical support after you have done what the S.T.A. tells you to do.

1.3 Professional Customer Service

Doing your job in a way that keeps cost of service low and profit margin high also creates customer satisfaction. That's being a professional!

1.4 Before Leaving the Shop

Phone the customer(s), personally if possible, and ask what problem(s) should be corrected. This may not tell you what work must be done or what part(s) must be replaced, but it will tell you what you must fix after you arrive.

1.5 Fixing the Hot Tub

Use the S.T.A. to see how the Technical Support Department would approach the customer's complaint. Try to fix the problem following the S.T.A. Use your experience and other information to help you answer any "Whys" or "Hows." The S.T.A. is designed to keep unnecessary part replacement to a minimum. Least expensive, most likely, and easily changed parts are always swapped first. Some parts, like control panels and temperature sensors do not require complete installation to be temporarily swapped out for testing purposes. You should carry such spares as "Tools."

1.6 Before Calling Technical Support

Make sure you have followed the S.T.A. and filled out a "Troubleshooting Data Collection Form" (refer to example on page 63). Have the S.T.A. manual and the Troubleshooting Data Worksheet near the telephone. Technical Support can help you best if these two things become the communications tools for the phone call.



1.7 Before Leaving the Customer

Even if you didn't have to fill out a Troubleshooting Data Collection Form, please do so. If this is a warranty repair, the information will be needed when your office fills out the "Warranty reimbursement form." In any case, it will help you spot trouble before it happens. Pumps burn up if voltage at the hot tub is too low. Circuit breakers trip if heaters and motors draw too much current (Amps). Wires overheat and connections burn if wire size is too small or push-on connectors are loose. **Call backs cause cost of service to increase!**

1.8 Satisfying the Customer

Most customers do not care what work you have done or what parts you have replaced, but they always care whether or not their problem goes away. When you are done, show them that their problem is gone. If they ask how you did it, take a few minutes to explain. Show them the bad part(s) and explain or show why it is bad.



- **Develop** the habit of examining the hot tub's you service. Compliment customers on the things they are doing right. Tell them how their care and attention can stop trouble before it starts.
- **Mention** if you noticed any adverse conditions, especially in hot tub's under warranty or contract, that could lead to failure. Can the customer correct the problem? Would they like you to correct it? Can you recommend someone? Would they like an estimate?
- **Think** of yourself and the customer as a "team" trying to keep the product up and running as cost-effective and time-efficient as possible. That's good for the customer, and it is good for your business.

2.0 Electro Static Discharge (E.S.D.)

2.1 E.S.D. - What is it? What does it do?

Static electricity is always being generated around us, even at those times of the year when we no longer get zapped after walking across a rug and touching something.



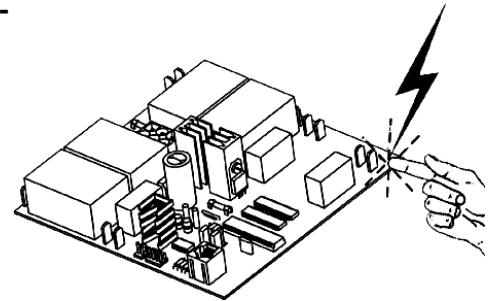
Like all state-of-the-art circuit boards, the hot tubs circuit board can be damaged by unnoticed static electricity. Damaged is the key word. Sometimes a board which has been subjected to E.S.D. will fail immediately upon being put back into service.

- **If the hot tub runs only a few days**, the customer thinks you provided poor service.
- **If the hot tub runs only a few months**, the customer thinks the circuit board is a low quality product.
- **The customer loses** use of the hot tub. **You lose money** because you must go back to make it right. Jacuzzi loses its reputation for quality.

2.2 Avoiding E.S.D. Damage

We can't prevent static charges from building up within our bodies as we go about our jobs, so we must do three things to protect circuit boards from getting zapped:

1. Never transport or ship circuit boards - **Good boards or bad boards** - except in static protective bags.
2. Never remove the board from the static protective bag unless you are ready to install it in the hot tub.
3. After removing the bad board from the hot tub, A) lay it on the ground, B) remove the replacement board from the static protective bag, C) lay the replacement board on the ground, D) place the bad board in the bag from which you removed the replacement board, E) return bad board(s) in undamaged sealed static protective bags.



2.3 What About Wrist Straps and Special Mats?

The purpose of these devices is to keep the technician, the work surface, and the circuit board at the same electrical potential, and to drain into ground any static charges which might build up. Proper use of the wrist strap and special mat guarantees maximum protection against E.S.D. damage.

2.4 Must Wrist Straps and Mats be Used When Replacing A Circuit Board?

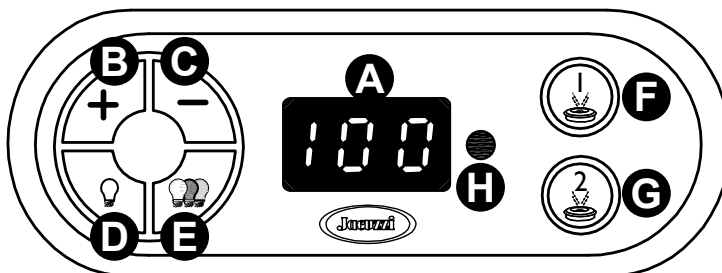
No, if you keep the spare board in the protective bag during transport and you observe a few simple techniques during replacement.

The possibility of E.S.D. damage to the circuit board during replacement will be minimal because of the hot tub's design and the way you normally work on it. Touching the grounding lug or heater will drain all built-up static charges from your body much like a wrist strap would. Laying the bad board on the ground will tend to keep it neutral. Touching a finger to the grounding lug or heater immediately before removing the good board from the bag will drain any charges built up by the rustling of your clothes. Laying the good board on the ground after removing it from the bag will tend to keep it neutral. Another quick touch of the grounding lug or heater before picking up the bad board will again drain built up charges. Slipping the bad board into the protective bag will allow it to be transported safely. Another quick touch of the grounding lug or heater before picking up the good board will again drain any charges built up by the rustling of your clothes. In the process of installing the replacement board, you and the board will be grounded to the load box, grounding lug, or heater, draining off charges you may build up during installation.

3.0 Main Control Panel Functions

3.1 J-LX Control Panel

- A. 2013+ P/N 6600-506 SMT panel (replaced 6600-239 early in 2013)
- B. 2011-2012 P/N 6600-440



Display shown for example purposes only, actual water temperature display will vary.

Button

Function

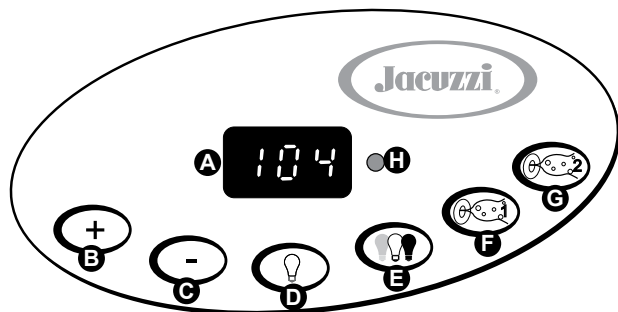
- A** LED Display: Can display current water temperature (default display), water temperature setpoint, selected filtration/heating mode, and error messages.
- B** Warmer Button: Increases water temperature setpoint.
- C** Cooler Button: Decreases water temperature setpoint.
- D** Light Button: Turns waterfall, footwell and accent lighting on in unison. Press once for high intensity, a second time for medium intensity, a third time for low intensity, a fourth time to turn off. The displayed color is changed using the light mode button (E) below.
- E** Light Mode Button: Selects one of 4 color modes for waterfall, footwell and accent lighting.
- F** Jets 1 Button: Turns jets pump #1 on and off. Press once for low speed; a second time for high speed and a third time to turn off.
- G** Jets 2 Button: Turns high-speed jets pump #2 on and off. Press once to turn on; a second time to turn off.
- H** Heat Indicator: Lit when heater is on.

OPERATION DETAILS

- Temperature Adjustment: 65 to 104°F (18 to 40°C); temperature override not possible. Software default setting is 100°F (38°C).
- Light System Operation: Light runs for 2 hours then shuts off.
- Jets Button Operation: Jets run for 20 minutes after activated then turn off automatically to conserve energy. Simply press JETS Button to continue operation for an additional 20 minutes.

3.2 J300 Control Panel

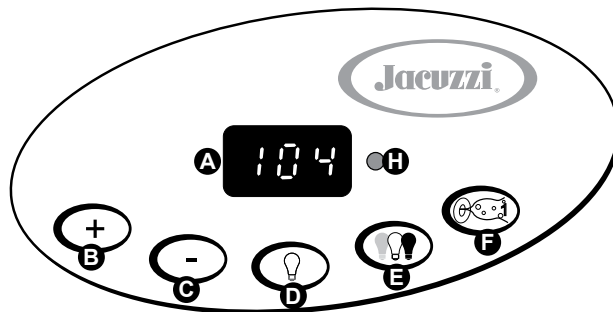
2-pump J-375, J-365, J-355, J-345 and J-335



Display shown for example purposes only, actual water temperature display will vary.

- A. 2013 P/N 6600-504 SMT panel
(replaced 6600-235 early in 2013)
- B. 2008-2012 P/N 2600-328

1-pump J-315 and J-325



Display shown for example purposes only, actual water temperature display will vary.

- A. 2013 P/N 6600-503 SMT panel
(replaced 6600-237 early in 2013)
- B. 2008-2012 P/N 2600-331

Button

Function

- A** LED Display: Can display current water temperature (default display), water temperature setpoint, selected filtration/heating mode, and error messages.
- B** Warmer Button: Increases water temperature setpoint.
- C** Cooler Button: Decreases water temperature setpoint.
- D** Light Button: Turns waterfall, footwell, pillows and cupholder lights on in unison. Press once for high intensity, a second time for medium intensity, a third time for low intensity, a fourth time to turn off. The displayed color is changed using the light mode button (E) below.
- E** Light Mode Button: Selects one of 4 color modes for waterfall, footwell, pillows and cupholder lights.
- F** Jets 1 Button: Turns jets pump #1 on and off. Press once for low speed; a second time for high speed and a third time to turn off.
- G** Jets 2 Button: Turns high-speed jets pump #2 on and off. Press once to turn on; a second time to turn off (2-pump models only)
- H** Heat Indicator: Lit when heater is on.

OPERATION DETAILS

- Temperature Adjustment: 65 to 104°F (18 to 40°C); temperature override not possible. Software default setting is 100°F (38°C).
- Light System Operation: Light runs for 2 hours then shuts off.
- Jets Button Operation: Jets run for 20 minutes after activated then turn off automatically to conserve energy. Simply press JETS Button to continue operation for an additional 20 minutes.

3.3 J200 Control Panel

Used on:

- 2012+ J-280, J-275, J-245, J-235
- 2011 2-pump J-280 and J-270



- A. Mid 2013+ P/N 6600-501 SMT panel
- B. 01/2013-Mid 2013 6600-329
- C. 2009-2012 P/N 2600-329

Used on:

- 2013+ J-210
- 2011-2012 1-pump J-230 and J-210



- A. Mid 2013+ P/N 6600-500 SMT panel
- B. 2009-Mid 2013 P/N 2600-333

Button

Function

- A** LED Display: Can display current water temperature (default display), water temperature setpoint, selected filtration/heating mode, and error messages.
- B** Heat Indicator: Lit when heater is on.
- C** Jets 1 Button: Turns jets pump #1 on and off. Press once for low speed; a second time for high speed and a third time to turn off.
- D** Jets 2 Button: Turns high-speed jets pump #2 on and off. Press once to turn on; a second time to turn off (2-pump models only)
- E** Light Button:
With standard incandescent light: Turns underwater light on and off.
With optional (2011-2012)/standard (2013+) LED lighting system: Turns underwater light and top rim accent lights on in one of three random modes or one of seven solid colors.
- F** Warmer Button: Increases water temperature setpoint.
- G** Cooler Button: Decreases water temperature setpoint.

OPERATION DETAILS

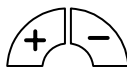
- Temperature Adjustment: 65 to 104°F (18 to 40°C); temperature override not possible. Software default setting is 100°F (38°C).
- Light System Operation: Light runs for 1 hour then shuts off.
- Jets Button Operation: Jets run for 20 minutes after activated then turn off automatically to conserve energy. Simply press JETS Button to continue operation for an additional 20 minutes.

4.0 Standard Programming Functions

4.1 Setting Filter Cycle Start Time (J200/ 2011-2013 J300/ JLX Collections)

Two methods for setting the filter cycle start time are possible:

1. Turn power on to the hot tub **two minutes prior** to the desired filter cycle start time, or
2. Press and hold both WARMER and COOLER buttons **at the same time**, then press the JETS 1 button once to reset the control panel and start the power-up sequence. During the power-up sequence, the factory default filter cycle (F1) and temperature setpoint 100°F (38°C) are automatically selected. To select another filter cycle at this time, refer to Section 4.2 below. The selected filter cycle will start approximately two minutes after the power-up sequence ends. *Example: If you desire your first filter cycle to begin at 10:00 AM, perform either of the above steps 1 or 2 at 9:58 AM. Filter cycle start time may vary slightly from setpoint.*



4.2 Filtration Options

The control system activates a programmable “standard” or “economy” filtration/heating cycle to remove larger debris missed by the circulation pump filtration system (when equipped). These cycles utilize pump 1 and the larger filter cartridge end to quickly clear “skim” the water of large debris and minimize their “bathtub ring” effect. Apart from their filtration benefit, each mode also effects the operation of your spa’s heater. Refer to Section 4.3 below for additional information.

A. F0-F3 Standard Skimming/Heating Modes (2011-2013 J300 Collection)

Standard filtration/heating modes are typically selected by customers that use their spa on a frequent basis and desire a fully heated spa when lifting the cover. In these modes, the water temperature is regulated by the set temperature, the circulation pump, and heater which turns on as needed. After the programmed set temperature is reached, the heater turns off and the circulation pump continues to operate for the remaining of the cycle to filter and clean your spa.

Note: In 2011-2012 the circulation pump had a default runtime of 24 hours. In 2013 the default time changed to 8 hours (except for the J-315 and J-325).

B. F4-F6 Economy Skimming/Heating Modes (2011-2013 J300 Collection)

Economy filtration/heating modes are typically selected by customers that use their spa on an infrequent basis or to simply desire to minimize energy consumption levels. In these modes, the water temperature is regulated by the set temperature, circulation pump, and heater only while a programmed filter cycle is running (unless in summer logic; refer to Section 5.4, page 14).

Note:

- Economy modes may consume less energy than standard modes above, in cold or freezing conditions.
- In 2011-2012 the circulation pump had a default runtime of 24 hours. In 2013 the default time changed to 8 hours (except for the J-315 and J-325).

C. F0-F3 Standard Skimming/Heating Modes (J-LX Collection)

Standard filtration/heating modes are typically selected by customers that use their spa on a frequent basis and desire a fully heated spa when lifting the cover. In these modes, the water temperature is regulated by the set temperature. The circulation pump, and heater turn on as needed. After the programmed set temperature is reached, the heater turns off and the spa continues normal operations.

Note: The circulation pump also supplies heated water to the spa when the heater turns on. Any time the circulation pump runs outside of a programmed cycle, that run time will reduce the length of the next cycle, started in 2014.

D. F4-F6 Economy Skimming/Heating Modes (J-LX Collection)

Economy filtration/heating modes are typically selected by customers in warm climates where heat up times are minimized due to higher ambient temperatures. In these modes, the water temperature is regulated by the set temperature. The circulation pump, and heater only while a programmed filter cycle is running (unless in summer logic; refer to Section 5.4, page 14).

Note: Economy modes may consume less energy than standard modes above, in cold or freezing conditions.



E. F0-F3 Standard Skimming/Heating Modes (J200 Collection; F0 Mode used on 2011-2012 circulation pump models)

Standard filtration/heating modes are typically selected by customers that use their spa on a frequent basis and desire a fully heated spa when lifting the cover. In these modes, the water temperature is regulated by the set temperature, and heater which turns on as needed. After the programmed set temperature is reached, the heater turns off followed by the jets pump 1 unless a programmed filtration cycle is running.

Note: Standard modes may consume more energy than Economy models below in cold or freezing climates.

F. F4-F6 Economy Skimming/Heating Modes (J200 Collection)

Economy filtration/heating modes are typically selected by customers in warm climates where heat up times are minimized due to higher ambient temperatures. In these modes, the water temperature is regulated by the set temperature, and heater only while a programmed filter cycle is running (unless in summer logic; refer to Section 5.4, page 14).

Note: Economy modes may consume less energy than standard modes above in cold or freezing conditions.

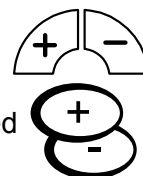
G. Lock Modes L1-L3

These modes are designed for use during spa service or to prevent unauthorized use.

Note: Economy modes may consume less energy than standard modes above in cold or freezing conditions.

4.3 Programming Filter Cycles (J-LX/ 2011-2013 J300 Collection)

To select a pre-programmed filter cycle or lock mode, press and hold both control panel WARMER and COOLER buttons **at the same time**, then release. Then press either WARMER or COOLER buttons to select either filter mode F0-L2. During the filtration heating cycle the jets pump1 low speed and circulation pump will activate.



Standard Mode

- F0** 5 minutes of filtration per day (one 5 minute "Blow-Out" cycle every 24 hours to purge all plumbing lines).
- F1** 1 hour of filtration per day (one 30-minute cycle every 12 hours); this is the factory default setting.
- F2** 1.5 hours of filtration per day (one 30-minute cycle every 8 hours).
- F3** 2 hours of filtration per day (one 30-minute cycle every 6 hours).

Economy Mode

- F4** 1 hour of filtration/heating per day (one 30-minute cycle every 12 hours).
- F5** 1.5 hours of filtration/heating per day (one 30-minute cycle every 8 hours).
- F6** 2 hours of filtration/heating per day (one 30-minute cycle every 6 hours).

Lock Mode

- L1** Lock Out (disables all hot tub functions to permit filter cleaning).

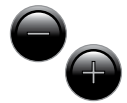
Note: The spa should not be left in this lock mode for an extended period of time. Especially in colder climates or when freezing conditions exist.

- L2** Lock Mode (disables the jets buttons to prevent unauthorized use of the hot tub) filtration/heating cycles and heater will continue to operation as programmed in this mode. The temperature display flashes when this function is enabled. *Example: The "F3" filter cycle was enabled prior to choosing lock mode. The hot tub continues to perform filter cycle "F3" until lock mode is canceled, allowing another filter cycle to be selected.*

- L3*** Lock Mode (disables the temperature up and down buttons to prevent unauthorized temperature adjustments). Filtration/heating cycle will continue to operate as programmed in this mode. The jets and lights buttons will still continue to operate as normal. The temperature display flashes when this function is enabled. *Due to a difference in software this feature is not available for all models, started in 2014.

Note: To exit a Lock Mode you will need to re-enter the filtration/heating modes and select a cycle from F0-F6.

4.4 Programming Filter Cycles (2011-2012 J200 models equipped with a circulation pump)



To select a pre-programmed filter cycle or lockout mode, press and hold both control panel WARMER and COOLER buttons **at the same time**, then release. Then press either WARMER or COOLER buttons to select either filter mode F0 through L2 below:

Standard Mode

- F0** 5 minutes of filtration per day (one 5 minute “Blow-Out” cycle every 24 hours to purge all plumbing lines).
- F1** 1 hour of filtration per day (one 30-minute cycle every 12 hours); this is the factory default setting.
- F2** 1.5 hours of filtration per day (one 30-minute cycle every 8 hours).
- F3** 2 hours of filtration per day (one 30-minute cycle every 6 hours).

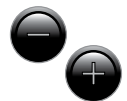
Economy Mode

- F4** 1 hour of filtration/heating per day (one 30-minute cycle every 12 hours).
- F5** 1.5 hours of filtration/heating per day (one 30-minute cycle every 8 hours).
- F6** 2 hours of filtration/heating per day (one 30-minute cycle every 6 hours).

Lock Mode

- L1** Lock Out (disables all hot tub functions to permit filter cleaning) - If hot tub is heating when the system is put into lockout mode, the heater will immediately turn off and the pump will cycle water for 30 seconds to cool heater element, then turn off.
- L2** Lock Mode (disables the jets and light buttons to prevent unauthorized use of the hot tub) - filter cycles and heater will continue to operation as programmed in this mode. The temperature display flashes when this function is enabled. *Example: The “F3” filter cycle was enabled prior to choosing lock mode. The hot tub continues to perform filter cycle “F3” until lock mode is canceled, allowing another filter cycle to be selected.*

4.5 Programming Filter Cycles (2013+ J200 models not equipped with a circulation pump)



To select a pre-programmed filter cycle or lockout mode, press and hold both control panel WARMER and COOLER buttons **at the same time**, then release. Then press either WARMER or COOLER buttons to select either filter mode F1 through L2 below:

Standard Mode

- F1** 4 hours of filtration a day (2 hour cycle every 12 hours): this is the factory default setting.
- F2** 6 hours of filtration a day (2 hour cycle every 8 hours)
- F3** 8 hours of filtration a day (2 hour cycle every 6 hours)

Economy Mode

- F4** 4 hours of filtration a day (2 hour cycle every 12 hours)
- F5** 6 hours of filtration a day (2 hour cycle every 8 hours)
- F6** 8 hours of filtration a day (2 hour cycle every 6 hours)

Lock Mode

- L1** Lock Out (disables all hot tub functions to permit filter cleaning).
- Note:** The spa should not be left in this lock mode for an extended period of time. Especially in colder climates or when freezing conditions exist.
- L2** Lock Mode (disables the jets buttons to prevent unauthorized use of the hot tub) filtration/heating cycles and heater will continue to operation as programmed in this mode. The temperature display flashes when this function is enabled. *Example: The “F3” filter cycle was enabled prior to choosing lock mode. The hot tub continues to perform filter cycle “F3” until lock mode is canceled, allowing another filter cycle to be selected.*
- L3*** Lock Mode (disables the temperature up and down buttons to prevent unauthorized temperature adjustments). Filtration/heating cycle will continue to operate as programmed in this mode. The jets and lights buttons will still continue to operate as normal. The temperature display flashes when this function is enabled. *Due to a difference in software this feature is not available for all models, started in 2014.
- Note:** To exit a Lock Mode you will need to re-enter the filtration/heating modes and select a cycle from F0-F6.

4.6 Programming the Circulation Pump Filtration Cycle (For models equipped with a circulation pump)

Press and hold the **Jets pump 1** (Ⓜ) and **Cooler** (Ⓢ) button **at the same time** for 3 seconds to access the circulation pump programming. Continually press the **Warmer** (Ⓢ) button to scroll up through the cycles below. Then select a cycle and press the **Jets pump 1** (Ⓜ) button to activate that cycle. Upon pressing the jets pump 1 button the system will save your selection, exit the program menu and return to the main menu.

Note:

- 2014+ Any time the circulation pump runs outside of a programmed cycle (except for C0 and C6), that run time will reduce the length of the next cycle.
- After 10 seconds the programming screen will revert back to the temperature if no buttons are pressed. You cannot have more than one circulation pump cycle activated at a time.

C0	0 hours of circulation per day
C1	4 hours of circulation per day
C2	8 hours of circulation per day (recommended factory default setting)
C3	12 hours of circulation per day
C4	16 hours of circulation per day
C5	20 hours of circulation per day
C6	24 hours of circulation per day

Note: The recommended factory default setting for the Select Series is 8 hours. This setting should not be altered. Running the circulation pump less than the factory recommended time might result in issues with water quality maintenance.

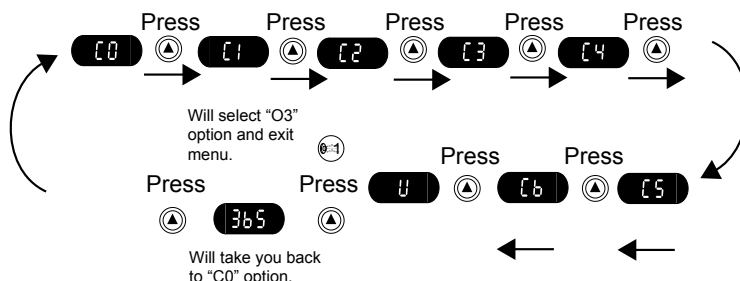


In extreme bitter cold weather, 32°F (0°C), we recommend you program the circulation pump to run 24 hours.

4.7 Programming the CLEARARRAY® (Ultraviolet) Water Purification System (For models equipped with a circulation pump)

A. Programming the CLEARARRAY System (U) or Corona Discharge Ozone (O3)

Press and hold the **Jets pump 1** (Ⓜ) and **Cooler** (Ⓢ) button **at the same time** for 3 seconds. Scroll pass the circulation pump programming menus by pressing the Warmer button, Figure 1.



1. After the last cycle, "C6," the LED screen will display "U" or "O3." If the LED screen is displaying "U" then pressing the Jets pump 1 will change the sanitizing system from "U" to "O3" and exit the programming menu. If the LED screen is displaying "O3" then pressing the Jets pump 1 will change the sanitizing system from "O3" to "U" and exit the programming menu. You will see one of the two configurations below:
 - A. C0, C1, C2, C3, C4, C5, C6, U, 365 (duration countdown timer)
 - B. C0, C1, C2, C3, C4, C5, C6, O3, =

Note: For the O3 option the "=" disables the duration countdown timer.

- If you do not wish to change the option do not press any buttons and after 10 seconds the display will return to the main menu.

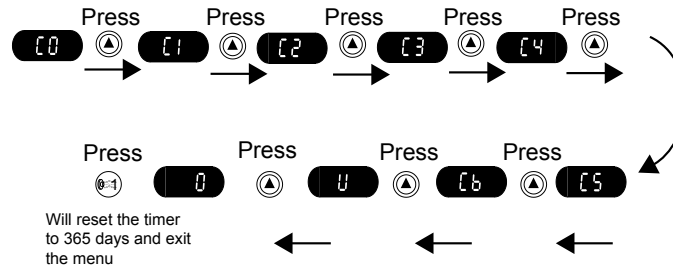
Note: If the CLEARARRAY System has been selected, when the time allotted has expired (365 days) the display screen will flash between the water temperature and “blb.” At this time the UV bulb must be replaced, the quartz tube must be cleaned and the duration countdown timer needs to be reset.

blb

B. Resetting the duration countdown timer (CLEARARRAY System only)

Once the duration countdown timer for the CLEARARRAY System has reached zero, you will need to reset it, replace the UV bulb and clean the quartz tube.

To reset the duration countdown timer:



- Press and hold the **Jets pump 1** (⊕) and **Cooler** (⊖) button at the same time for 3 seconds.
- Press the **Warmer** (⊕) button until the display shows “0.”
- If the counter has reached “0,” pressing the **Jets pump 1** (⊕) button will reset the timer. If the timer is not at “0” pressing the Jets pump 1 will not reset it.

Note: If the spa power is interrupted, the duration countdown timer is not affected. The number of days remaining is stored in the memory and will continue to countdown once power is regained.

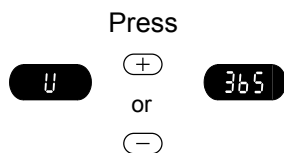
- If the duration countdown timer is not at “0” and you need to reset it:
 - Press and hold the Jets pump 1 and Cooler buttons at the same time for 3 seconds.
 - Press the Warmer button to scroll to “U.”
 - Press the Jets pump 1 button to switch from “U” to “O3.”
 - Press and hold the Jets pump 1 and Cooler buttons at the same time for 3 seconds.
 - Press the Warmer button to scroll to “O3.”
 - Press the Jets pump 1 button to switch from “O3” to “U.” The timer has been reset to 365 days.

4.8 Programming the CLEARARRAY (Ultraviolet) Water Purification System (For models NOT equipped with a circulation pump)

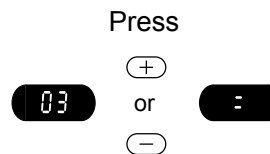
A. Programming the CLEARARRAY System (U) or Corona Discharge Ozone (O3)

Press and hold the **Jets pump 1** (⊕) and **Cooler** (⊖) button at the same time for 3 seconds to enter the sanitizing system program. The screen will display one of the two menus below:

CLEARARRAY menu



O3 menu



- If the LED screen is displaying “U” then pressing the Jets pump 1 will change the sanitizing system from “U” to “O3” and exit the programming menu. If the LED screen is displaying “O3” then pressing the Jets pump 1 will change the sanitizing system from “O3” to “U” and exit the programming menu.

Note: For the O3 option the “=” disables the duration countdown timer.

- If you do not wish to change the option do not press any buttons and after 10 seconds the display will return to the main menu.

Note: If the CLEARARRAY System has been selected, when the time allotted has expired (365 days) the display screen will flash between the water temperature and “blb.” At this time the UV bulb must be replaced, the quartz tube must be cleaned and the duration countdown timer needs to be reset.

blb

B. Resetting the duration countdown timer (CLEARARRAY System only)

Once the duration countdown timer for the CLEARARRAY System has reached zero, you will need to reset it, replace the UV bulb and clean the quartz tube.

To reset the duration countdown timer:



1. Press and hold the **Jets pump 1** () and **Cooler** () button **at the same time** for 3 seconds.
2. Press the **Warmer** () button until the display shows “0.”
3. If the timer has reached “0,” pressing the **Jets pump 1** () button will reset it. **If the timer is not at “0” pressing the Jets pump 1 button will not reset it.**

Note: If the spa power is interrupted, the duration countdown timer is not affected. The number of days remaining is stored in the memory and will continue to countdown once power is regained.

4. If the duration countdown timer is not at “0” and you need to reset it:
 - a. Press and hold the Jets pump 1 and Cooler buttons at the same time for 3 seconds.
 - b. Press the Warmer button to scroll to “U.”
 - c. Press the Jets pump 1 button to switch from “U” to “O3.”
 - d. Press and hold the Jets pump 1 and Cooler buttons at the same time for 3 seconds.
 - e. Press the Warmer button to scroll to “O3.”
 - f. Press the Jets pump 1 button to switch from “O3” to “U.” The timer has been reset to 365 days.

4.9 2011 Aftermarket Ozonator Facts

Ozone System Specifications are:

J-LX Ozone System Specifications

- Circulation pump and ozone run 8 hours. Cycle starts approximately two minutes after power up.
- Ozonator shuts off when either JETS button is pressed. The Ozonator will resume operation approximately 5 minutes after jets are turned off intentionally or automatically. The ozonator also shuts off if the hot tub goes into “summer logic.” See Section 5.4 (page 14).
- Pressing a JETS button during an active filter cycle cancels the filter cycle until the next term.

Note: Pump may stay on if a heat call is present.

J300 Ozone System Specifications (All 2011-2013 models)

J200 Ozone System Specifications (J-270, J-280, and J-230 models with a Circulation Pump)

- Circulation pump and ozone run 24 hrs.
- Ozonator shuts off when either JETS button is pressed. The Ozonator will resume operation approximately 5 minutes after jets are turned off intentionally or automatically. The ozonator also shuts if the hot tub goes into “summer logic.” See Section 5.4 (page 14).
- Pressing a JETS button during an active filter cycle cancels the filter cycle until the next term.

Note: Pump may stay on if a heat call is present.

J200 Ozone System Specifications (Models without Circulation Pump)

- Ozonator runs during a programmed filter cycle.
- Ozonator turns off when either JETS button is pressed and will resume operation approximately 5 minutes after jets are turned off intentionally or automatically.
- Pressing a JETS button during an active filter cycle cancels the filter cycle until the next term.

Note: Pump may stay on if a heat call is present.

4.10 2012+ CLEARRAY Facts

Our water purification system will begin disinfecting your water instantly. CLEARRAY Water Purification System is exclusive technology utilizing natural ultraviolet technology to sanitize your water, disinfecting bacteria, viruses, and algae in portable hot tubs. The ultraviolet light otherwise known as UV-C or germicidal light inactivates the microorganisms by disrupting the DNA so that it cannot reproduce and is considered lifeless. The ballast is the power supply for the purification system; it has two LED indicator lights the green indicating incoming power flow and the red indicating the system is properly working. CLEARRAY is standard for all models.

Note:

- **For JLX/2011-2013 J300 Models:** The CLEARRAY System only runs when the circulation pump is running and shuts off when either jets pump is manually activated during spa use. The system will remain off for 5 minutes after both jets pumps time out or are manually turned off, then resume operations if the circulation pump is programmed to run.
- **For J200 Models:** The CLEARRAY System only runs when the jets pump 1 is running.

System Specifications are:

2011+ J-LX/J-LXL/

2011-2013 J-375/J-365/J-355/J-345/J-335 CLEARRAY

- Circulation pump and CLEARRAY run 8 hours (unless altered). Cycle starts approximately two minutes after power up.
- CLEARRAY shuts off when either JETS button is pressed. It will resume operation approximately 5 minutes after jets are turned off intentionally or automatically. The CLEARRAY also shuts off if the hot tub goes into "summer logic." See Section 5.4 (page 14).

2011-2013 J-325/J-315 Ozone System Specifications

J200 Ozone System Specifications (Models with a Circulation Pump)

- Circulation pump and CLEARRAY run 24 hrs. Cycle starts approximately two minutes after power up.
- CLEARRAY shuts off when either JETS button is pressed. It will resume operation approximately 5 minutes after jets are turned off intentionally or automatically. The CLEARRAY also shuts if the hot tub goes into "summer logic." See Section 5.4 (page 14).

J-200 CLEARRAY System Specifications (Models without Circulation Pump)

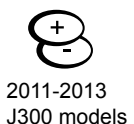
- The CLEARRAY will run whenever jets pump 1 is running.

5.0 Additional Control Panel Functions

5.1 Setting Water Temperature and Overtemp Feature

1. Press WARMER or COOLER button once and release while the current water temperature is displayed to view the current temperature setpoint, then;
2. Press WARMER or COOLER button within 3 seconds to increase or decrease set temperature setpoint in 1 degree increments as desired. Water temperature can set to any value within 65-104°F (18-40°C);
3. After 3 seconds of keypad inactivity the LED display will return to actual water temperature and the new temperature setpoint will be maintained.
4. To access the overtemp feature that allows the spa to reach 106°F (41°C) follow the steps below:
 - A. Press and hold the WARMER button then;
 - B. Press and hold the JETS 1 button at the same time for 2 seconds. You will see the temperature rise to 106°F (41°C) on the LED display. To lower the temperature, press the COOLER button.
 - C. When the overtemp has been activated, the white decimal point after the last digit will flash on and off every second as an indicator for being in the overtemp mode.

Note: Once the temperature goes below 104°F (40°C) and you would like to raise the temperature to 106°F (41°C) again, you will have to repeat step 4 above.



5.2 Selecting Jets Speed

- Press JETS 1 once for low speed; a second time for high speed; a third time to turn off.
- Press JETS 2 (2 Pump Models Only) once for high speed; a second time to turn off.

Note: Anytime a pump has been manually turned on by selecting either jet button, it will automatically turn off after approximately 20 minutes. If at this time you desire more jet operation, simply turn the jet pump back on.

5.3 Lock/Unlock Control Panel

The control panel temperature display flashes when Lock Mode is active. Lock Mode disables the jets and underwater light to prevent unauthorized use of the hot tub or disables all hot tub functions to permit filter cleaning.



5.4 Summer Logic (Models equipped with the Circulation Pump Option)

When water temperature in the hot tub rises to 2°F (1°C) above the temperature setpoint, the hot tub goes into “summer logic.” When this happens, the circulation pump automatically turns off to prevent heat addition from the pump that would eventually create an overheat condition. The circulation pump, main pump, CLEARRAY and aftermarket ozone (if applicable) will remain off until the water temperature cools to the set temperature, then reactivate as programmed. **This setting is not user-programmable.**



Note: Summer logic does not take effect until the hot tub's water reaches 95°F (35°C) or higher.

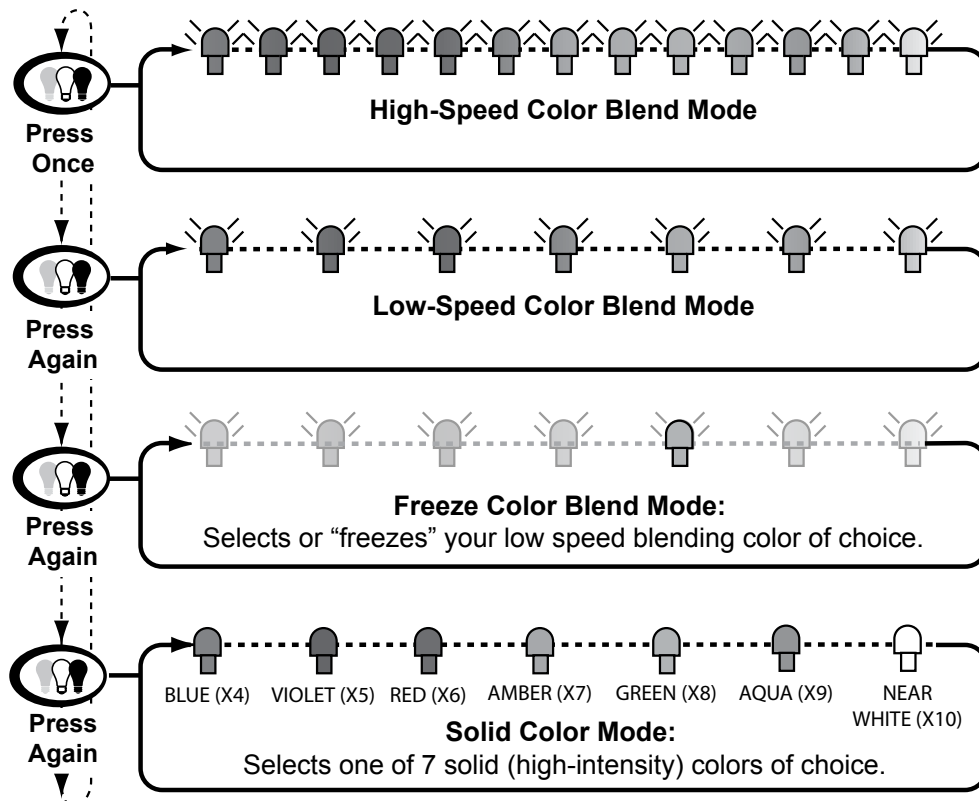
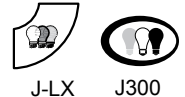
5.5 Multicolored Light System Operation (J-LX/J300 Models, except 2014 J300s)

- A. Pressing the LIGHT button activates the Footwell, Waterfall, Air Control LED Lights and Accent lights (for the J-LX Models) in sequence as follows: High - Medium - Low - Off.



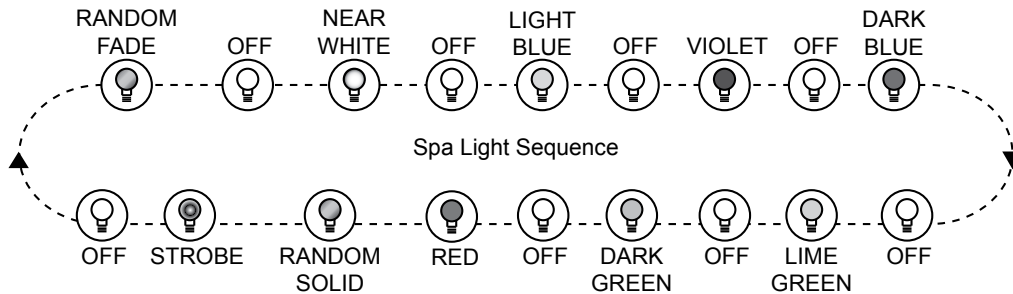
Anytime the light system has been manually activated, it will automatically turn off after approximately **2 hours**. If at this time you desire more light operation, simply turn the light back on.

- B. This button offers four light modes for your enjoyment. Press the LIGHT MODE button to select your favorite lighting effect as follows:



5.6 Multicolored Light System Operation (Standard light for J-210 Models)

Press the LIGHT button once to turn the spa light on in “Random” mode, then repeatedly press the button to turn the light off or to select one of 6 constant colors illustrated below.



You must press the LIGHT button within 5 seconds between each “off” or “color” step in the light sequence to prevent it from resetting.

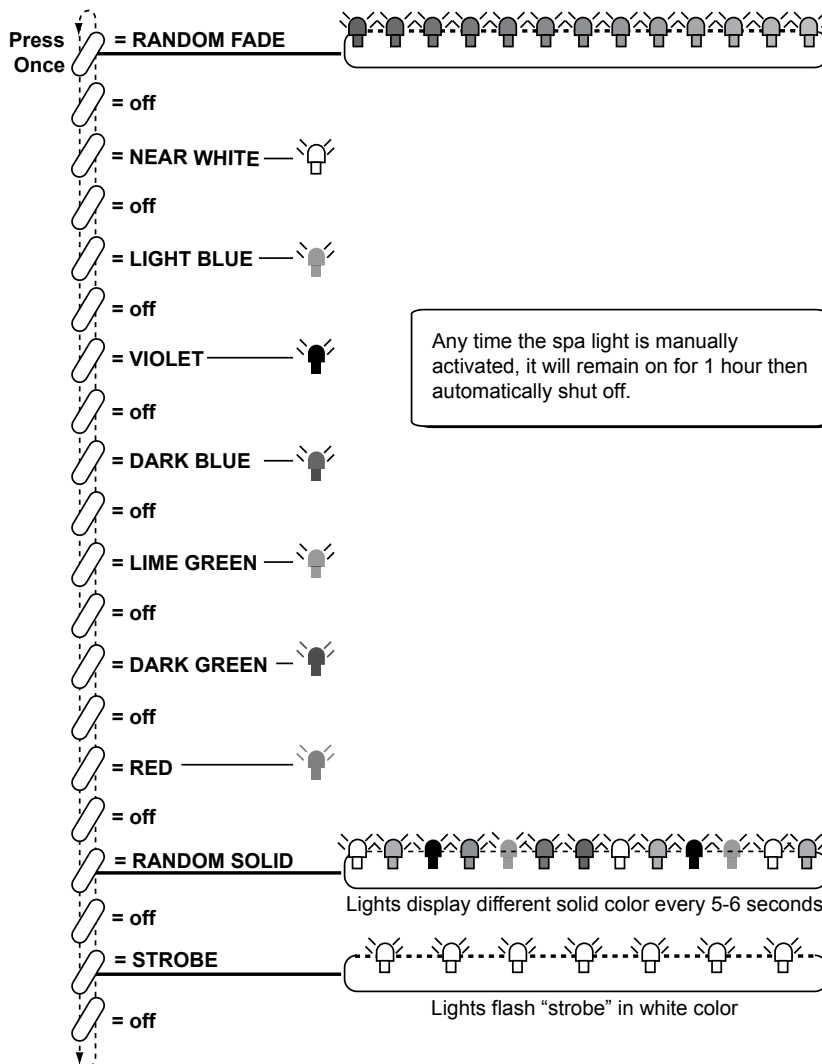
Note: Any time the spa light is manually turned on, it will automatically turn off after approximately 1 hour. If you desire more light at this time, simply turn the light back on.

5.7 Multi-Colored LED Light System Operation (J200 Collection)

Press LIGHT button once to turn on Random Fade and continue pressing to display one of seven constant colors, Random Solid color or Strobe (lights flash in white color).

Note:

- Anytime the light has been manually turned on, it will automatically turn off after approximately **1 hour** to maximize bulb life. If at this time you desire more light operation, simply turn the light back on.
- Light system was “optional” in 2011-2012. It became standard in 2013+.



6.0 Understanding Circuit Board Pin Assignments

6.1 Circuit Board Jumpers (All North American 60 Hz 1-Pump Models)

All North American 1-pump circuit boards can be configured for either 15/30A or 40A operation (40/50A for J230 models). Refer to jumper pin table and circuit board diagrams for specific system details.

MODEL	CIRCULATION PUMP	BOARD					LOGIC
		6600-726	6000-167	6600-044	6600-286	6600-288	
J-LX (2011+)	Yes	X	X				3.60+
J-LX (2011+)	Yes	X	X				3.60+

J-375 (2012-2013)	Yes		X				3.60+
J-375 (2011)	Yes					X	3.57+
J-365 (2012-2013)	Yes		X				3.60+
J-365 (2011)	Yes					X	3.57+
J-355 (2012-2013)	Yes		X				3.60+
J-355 (2011)	Yes					X	3.57+
J-345 (2012-2013)	Yes		X				3.60+
J-345 (2011)	Yes					X	3.57+
J-335 (2012-2013)	Yes		X				3.60+
J-335 (2011)	Yes					X	3.57+
J-325 (2012-2013)	Yes			X			3.60+
J-325 (2011)	Yes				X		3.57+
J-315 (2012-2013)	Yes			X			3.60+
J-315 (2011)	Yes				X		3.57+

6.2 Circuit Board Jumpers (All North American 60Hz 2-Pump Models)

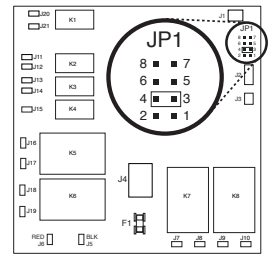
All North American 2-pump circuit boards can be configured for either 40, 50A, or 60A operation. Refer to jumper pin table and circuit board diagram below for specific system details (factory jumper settings shown):

MODEL	Circ Pump	BOARD								LOG-IC
		6600-042	6600-046	6000-167	6600-287	6600-288	6600-289	6600-720	6600-722	
J-280 (2013+)	No		X					X		5.59+
J-280 (2012)	No		X							5.59+
J-280 (2012)	Yes			X						3.60+
J-280 (2011)	No				X					5.57+
J-280 (2011)	Yes					X				3.57+
J-275 (2012+)	No		X					X		5.59+
J-270 (2012)	No		X							5.59+
J-270 (2012)	Yes			X						3.60+
J-270 (2011)	No				X					5.57+
J-270 (2011)	Yes					X				3.57+
J-245 (2012+)	No		X					X		5.59+
J-235 (2012+)	No		X					X		5.59+
J-230 (2012)	No				X					5.59+
J-230 (2012)	Yes					X				3.60+
J-230 (2011)	No		X							5.57+
J-230 (2011)	Yes			X						3.57+
J-210 (2012+)	No	X							X	5.57+
J-210 (2011)	No						X			5.57+

6.3 Circuit Board Jumpers (Domestic 60 Hz Models)

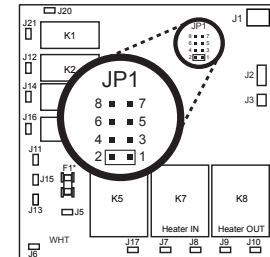
Circuit Board #6600-726, 6000-167 and 6600-288; Micro Chip 3.57+

Pins 1-2:	Jumper ON	Enables 40A logic; forces heater off when either pump is on high speed (Pump 2 only runs in high speed)
Pins 1-2:	Jumper OFF	Enables 50A logic; forces heater off when both pumps are on high speed
Pins 3-4:	Jumper ON	Enables 2 Pump Operation
Pins 3-4:	Jumper OFF	Not Used. (Enables 1 Pumps Operation)
Pins 5-6:	Jumper ON	Enables 60A logic; (Remove JP1 1-2 Jumper). Allows the heater to operate when both pumps are on high speed.
Pins 5-6:	Jumper OFF	Leave off for 40A or 50A Logic
Pins 7-8:	Jumper ON	Enables Celsius (°C) temperature display
Pins 7-8:	Jumper OFF	Enables Fahrenheit (°F) temperature display



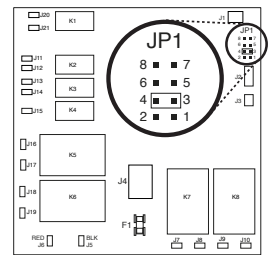
Circuit Board #6600-724, 6600-044 and 6600-286; Micro Chip 3.57+

Pins 1-2:	Jumper ON	Enables 15A logic; forces heater off when pump is on high speed (3-wire 120 VAC operation only)
Pins 1-2:	Jumper ON	Enables 30A logic; forces heater off when pump is on high speed (4- +wire 120/240 VAC operation only)
Pins 1-2:	Jumper OFF	Enables 40A logic; allows the heater to operate when pump is on high speed (4-wire 120/240 VAC operation only)
Pins 3-4:	Jumper ON	Not Used
Pins 3-4:	Jumper OFF	Enables 1 Pump Operation
Pins 7-8:	Jumper ON	Enables Celsius (°C) temperature display
Pins 7-8:	Jumper OFF	Enables Fahrenheit (°F) temperature display



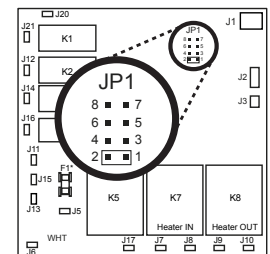
Circuit Board #6600-720, 6600-046 and 6600-287; Micro Chip 5.57+

Pins 1-2:	Jumper ON	Enables 40A logic; forces heater off when either pump is on high speed (Pump 2 only runs in high speed)
Pins 1-2:	Jumper OFF	Enables 50A logic; forces heater off when both pumps are on high speed
Pins 3-4:	Jumper ON	Enables 2 Pump Operation
Pins 3-4:	Jumper OFF	Enables 1 Pump Operation
Pins 5-6:	Jumper ON	Enables 60A logic; (Remove JP1 1-2 Jumper). Allows the heater to operate when both pumps are on high speed
Pins 5-6:	Jumper OFF	Leave off for 40A or 50A Logic
Pins 7-8:	Jumper ON	Enables Celsius (°C) temperature display
Pins 7-8:	Jumper OFF	Enables Fahrenheit (°F) temperature display



Circuit Board #6600-722, 6600-042 and 6600-289; Micro Chip 5.57+

Pins 1-2:	Jumper ON	Enables 15A logic; forces heater off when pump is on high speed (3-wire 120 VAC operation only)
Pins 1-2:	Jumper ON	Enables 30A logic; forces heater off when pump is on high speed (4-wire 240 VAC operation only)
Pins 1-2:	Jumper OFF	Enables 40A logic; allows the heater to operate when pump is on high speed (4-wire 120/240 VAC operation only)
Pins 3-4:	Jumper ON	Not Used
Pins 3-4:	Jumper OFF	Enables 1 Pump Operation
Pins 7-8:	Jumper ON	Enables Celsius (°C) temperature display
Pins 7-8:	Jumper OFF	Enables Fahrenheit (°F) temperature display



6.4 Circuit Board Jumpers (All Export 50 Hz 1-Pump Models)

These circuit boards can be configured for 20A or 30A logic. Each mode affects overall energy consumption and heater performance.

Pins 1-2:	Jumper ON	Enables 20A logic; forces heater off when jets pump 1 is running in high speed
Pins 1-2:	Jumper OFF	Enables 30A logic; allows heater to operate when jets pump 1 is running in high speed
Pins 3-4:	Jumper ON	Enables 2 Pump Operation (2-pump models only)
Pins 3-4:	Jumper OFF	Enables 1 Pump Operation
Pins 5-6:	Jumper ON	Not Used
Pins 5-6:	Jumper OFF	Not Used
Pins 7-8:	Jumper ON	Enables Celsius (°C) temperature display
Pins 7-8:	Jumper OFF	Enables Fahrenheit (°F) temperature display

6.5 Circuit Board Jumpers (All Export 50 Hz 2-Pump Models)

These circuit boards can be configured for 20A, 30A or 40A logic modes. Each mode affects overall energy consumption and heater performance.

Pins 1-2:	Jumper ON	Enables 20A logic; forces heater off when either jets pump is on high speed (Pump 2 only runs in high speed)
Pins 1-2:	Jumper OFF	Enables 30A logic; allows heater to operate with one jets pump running in high speed
Pins 3-4:	Jumper ON	Enables 2 Pump Operation
Pins 3-4:	Jumper OFF	Enables 1 Pump Operation
Pins 5-6:	Jumper ON	40A logic (Remove JP1 1-2 Jumper); allow heater to operate with both jets pumps running in high speed
Pins 5-6:	Jumper OFF	Leave off for 20A or 30A logic setting
Pins 7-8:	Jumper ON	Enables Celsius (°C) temperature display
Pins 7-8:	Jumper OFF	Enables Fahrenheit (°F) temperature display

1 Pump (LX 10) Non-Circulation Pump Board

6600-289 → 6600-042 → 6600-722 (5.60 LOGIC)

1 Pump (LX 10) Circulation Pump Board

6600-286 → 6600-044 → 6600-724 (3.61 LOGIC)

2 Pump (LX 15) Non-Circulation Pump Board

6600-287 → 6600-046 → 6600-720 (5.60 LOGIC)

2 Pump (LX 15) Circulation Pump Board

6600-288 → 6000-167 → 6600-726 (3.61 LOGIC)

7.0 Troubleshooting Using The Control Panel

7.1 Control Panel Displays

Complete operating instructions for the control panel can be found in the owner's manual. The hot tubs self-diagnostic control system constantly monitors the hot tub for proper operation. When anything goes wrong, the control panel displays a message for the user which may result in a service call. Refer to Section 7.3 below for a listing of error messages and probable causes.

7.2 Control Panel Default Display

The control panel displays the following information during initial start-up:

1. Control panel displays current software microchip revision, then
2. Control panel displays "888" and all indicator LED's are lit, permitting visual inspection of all display segments and indicator lights for proper operation.
3. After the initial start-up sequence ends actual water temperature is displayed. If the water temperature at this time is less than the factory default temperature setting of 100°F (38°C):
 - **J-LX and J-LXL Models:** The low speed pump, circulation pump and heater will turn on and run until the water temperature rises to the factory default temperature setting. Then the low speed pump and heater turn off. The circulation pump will continue to run for the remainder of the 8 hrs.
 - **2011-2013 J300 and J200 (2011-2012 with Circulation Pump) Models:** The circulation pump and heater will turn on and run until the water temperature rises to the factory default temperature setting. Then the heater turns off and the circulation pump remains on for the remainder of the programmed cycle.
 - **J200 (2011+ without Circulation Pump) Models:** The low speed pump and heater will turn on and operate until the water temperature rises to the factory default temperature setting, then both turn off.



Example sequence shown. Actual sequence can vary depending on model.

Approximately two minutes after initial start-up, the first filtration cycle begins to operate. The filtration cycle can be modified any time after the start-up sequence ends. You will be able to select a pre-programmed filter cycle and reset your temperature setpoint at this time. Press either COOLER or WARMER button once at this time to display the current temperature setpoint. You can change the setpoint by pressing either COOLER or WARMER button within 3 seconds. Each button press increases or decreases the temperature setpoint by one degree. Three seconds after the setpoint is set, the display defaults back to actual water temperature.

7.3 Control Panel Status and Error Messages

SN1 Nonfunctional Hi-limit Sensor (All Models)

Open or shorted hi-limit sensor. Heater is deactivated. Refer to test steps 1-2 below:

1. Turn off main breaker to hot tub. Refer to appendix, page 56, for expected hi-limit sensor resistance/water temperature values.
2. Remove hi-limit sensor connector from circuit board test point 21. Refer to pages 50-53 for your circuit board configuration. Set ohmmeter to 100 kΩ - 200 kΩ range, then measure resistance across hi-limit sensor wires (refer to page 56). If sensor resistance tests OK ($\pm 200 \Omega$), check sensor connections. If connections are OK, replace circuit board. If sensor resistance is incorrect, replace hi-limit sensor.



SN2 Nonfunctional Temperature Sensor (All Models)

Open or shorted temperature sensor. Heater is deactivated. Refer to test steps 1-2 below:

1. Turn off main breaker to hot tub. Refer to appendix, page 56, for expected hi-limit sensor resistance/water temperature values.
2. Remove temperature sensor connector from circuit board test point 21. Refer to pages 50-53 for your circuit board configuration. Set ohmmeter to 100 kΩ - 200 kΩ range, then measure resistance across temperature sensor wires (refer to page 56). If sensor resistance tests OK ($\pm 200 \Omega$), check sensor connections. If connections are OK, replace circuit board. If sensor resistance is incorrect, replace temperature sensor.



FL1 & FL2 Water Flow Problem (All Models)

- **FL1:** flow or pressure switch not closed when circulation pump is running. Heater is deactivated. Proper water flow is inhibited or flow/pressure switch may be obstructed, misaligned, or defective. Refer to troubleshooting steps 1-5 below:



1. Remove filter and allow air to bleed out of cartridge. Check filter for trapped air.
2. Check for proper water level.
3. Check for clogged filter cartridge.
4. Check for sticking or damaged floating skimmer.
5. If problem persists, refer to Section 7.4 (page 21) for flow/pressure switch testing instructions.

- **FL2:** flow switch or pressure switch closed when pump is not running. Heater is deactivated and pump may or may not turn on. Flow/pressure switch is defective. Refer to Section 7.4 (page 21) for switch testing instructions.



COL Cool Condition (All Models)

If the water temperature drops 20°F (11°C) below the set temperature, the low speed pump and heater will activate to raise the water temperature within 15°F (8°C) of the set temperature. No corrective action is necessary. This condition is common during water changes and/or first time fill ups.



ICE Freeze Condition (All Models)

A potential water freeze condition of 55°F (13°C) has been detected. No action is required. The low speed pump and heater will activate and raise water temperature to approximately 65°F (18°C), canceling the “ICE” error message. After the error message is canceled, the low speed pump will turn off (circulation pump models only) and the heater will remain on until the set temperature is reached.



OH Overheat Condition (All Models)

Water temperature is above acceptable limits. DO NOT ENTER HOT TUB WATER! Water temperature has reached 116°F (47°C) and the low speed pump has activated to circulate water through the heater to cool it down for approximately 6 minutes. Refer to test steps 1-4 below:



1. Verify actual water temperature with an accurate thermometer. If actual water temperature is less than 110°F (44°C), proceed to steps 2-4.
2. Turn off main breaker to hot tub. Refer to appendix page 56 for expected hi-limit/temperature sensor resistance/water temperature values.
3. Remove hi-limit sensor connector from circuit board points 22. Verify that the heater is not excessively hot. Refer to pages 50-53 for your circuit board configuration. Set ohmmeter to 100-200 kΩ range, then measure resistance across sensor wires (refer to page 56). If resistance tests OK ($\pm 200\Omega$), check wiring harness connections. If wiring harness connections test OK, replace circuit board. If sensor resistance is incorrect, replace hi-limit sensor.
4. Set ohmmeter to 100-200 kΩ range, then measure resistance across temperature sensor wires (refer to page 56). If resistance tests OK ($\pm 200\Omega$), replace circuit board. If temperature sensor resistance is incorrect, replace sensor.

“- - -” Watchdog (All Models)

Water temperature has reached 118°F (48°C). DO NOT ENTER HOT TUB WATER! The entire system is disabled. Refer to test steps 1-4 below:



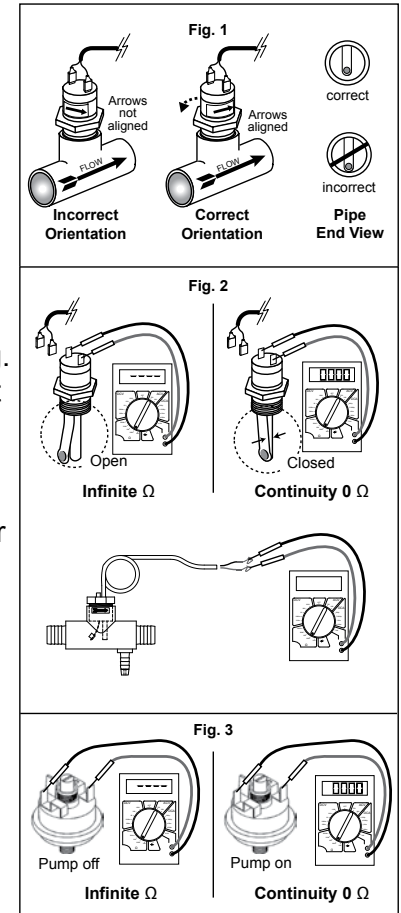
1. Check hi-limit and temperature sensor resistance values. Both sensors should measure close in resistance to each other (e.g. one may be defective and way out of range). Refer to appendix page 56 for expected hi-limit/temperature sensor resistance/water temperature values. If either sensor is faulty, replace it and recheck system. If problem persists, proceed to steps 2.
2. Plug in new control panel. If problem persists, proceed to step 3. If problem corrects, replace panel.
3. Check voltage at transformer secondary. Refer to Section A29, page 58 for transformer testing instructions. If voltage is bad, replace transformer. If voltage is good, perform step 4.
4. Check circuit board transformer connections. If connections are loose or oxidized, repair connections and retest system. If problem persists, replace circuit board.

7.4 Testing Flow/Pressure Switch

Testing The Flow Switch

- All J-LX Models
- All 2011-2013 J300 Models
- All J200 Models (with the Circulation Pump Option)

- A. Verify flow switch directional arrow is pointing in the direction of flow away from the heater output. If switch orientation is incorrect, loosen or tighten switch no more than 1/2 turn, being careful not to bottom out switch in fitting. The switch's flow arrow must be parallel to tee fitting as shown (Fig. 1). Test system operation. If condition corrects, skip steps B-C.
- B. Remove switch from fitting making note of the number of turns (revolutions) it takes to do so. Visually inspect switch for debris interference or damage. If debris is present, remove debris, then install switch with the same number of turns as originally installed. Test system. If switch is damaged, replace switch and retest system. If condition corrects, skip step C.
- C. Test switch operation with an ohmmeter (set to 1000-2000 Ω range) for continuity across switch terminals. Measure resistance across switch terminals for infinite resistance with the magnet arm not touching the switch body (Fig. 2), and for continuity (0 Ω) with the magnet arm touching the switch body (Fig. 2). If flow switch tests OK, check switch wiring harness. If wiring harness tests OK, replace circuit board.
- D. Verify that low flow is not preventing the flow switch from closing.



Testing The Pressure Switch

- All J200 Models (without the Circulation Pump)

- A. Remove switch. Visually inspect switch for debris blockage. If debris is present, remove debris, install switch and test system. If condition corrects, skip step B.
- B. Disconnect wires from switch terminals. Set ohmmeter to 1000-2000 Ω range. Measure resistance across switch terminals for infinite resistance with pump off (Fig. 3). If continuity (0 Ω) is measured with pump off, the switch is defective, replace switch. If switch measures infinite Ω (no continuity) with pump off, switch is OK. Turn on main pump and measure across switch terminals for continuity (0 Ω). If continuity (0 Ω) is measured, switch is OK. Check wiring harness. If wiring harness tests OK, replace circuit board.

If the switch tests ok in the steps above, check the wiring harness connections between switch and circuit board. Scrape the switch's contact pin surfaces to remove any oxidation or conformal coating.

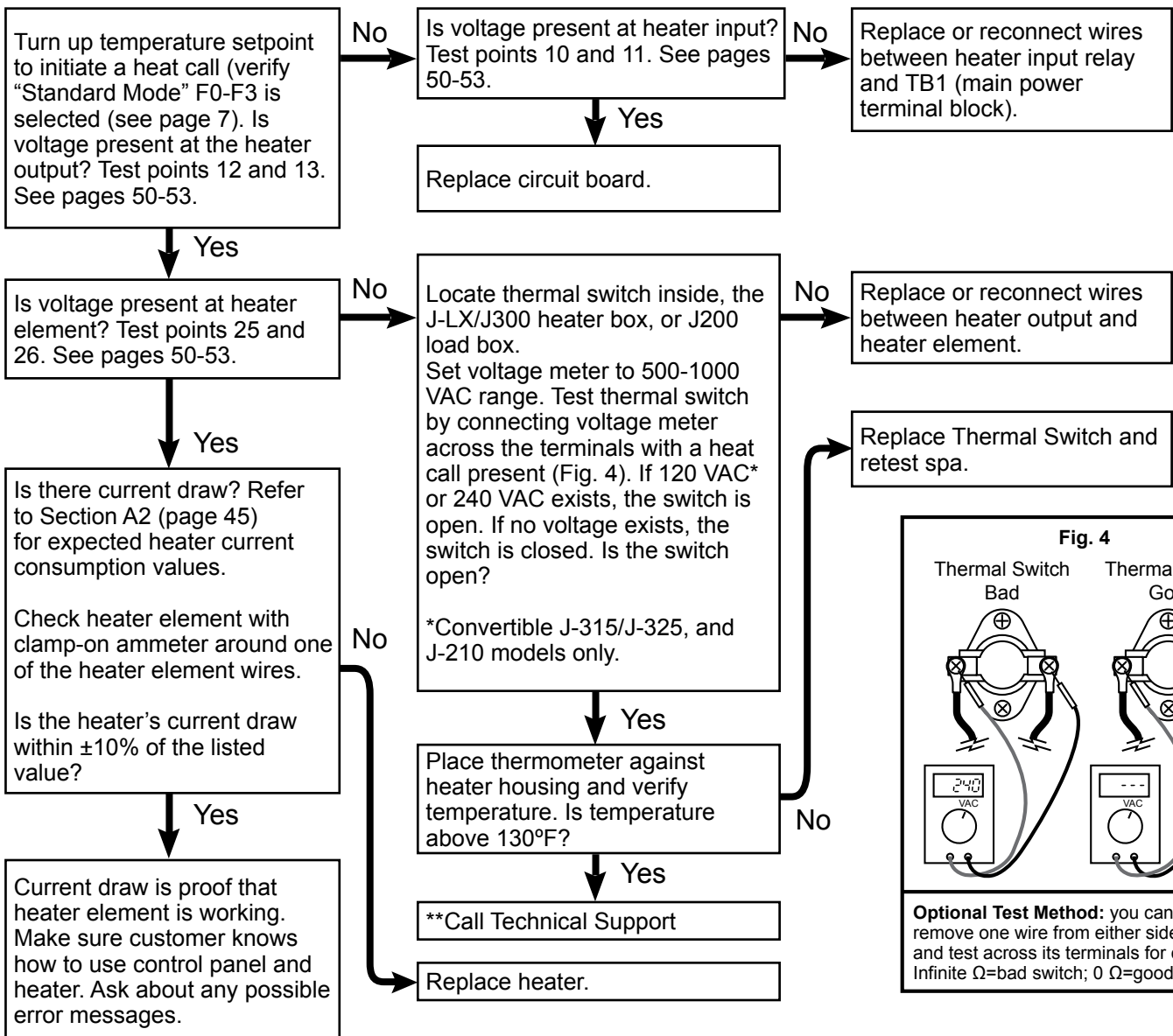
8.0 Troubleshooting without The Control Panel

- **Diagnostic Tools for Sections 8.1A-8.1E:** Clamp-on ammeter, voltmeter, and ohmmeter
- **Suggested Spare Parts for Sections 8.1A-8.1E:** Circuit board, control panel, temperature sensor, pressure switch, flow switch, heater assembly.

8.1A No Heat or Not Enough Heat (All Models)

- **Symptoms:** Low speed pump or circulation pump is moving water, panel heat indicator is lit, **water is not getting hot.**
- **Configuration:** 1-pump system heaters will not operate with the jets pump running in high speed unless the circuit board is configured for 40A operation. 2-pump system heaters will not operate with both jets pumps running in high speed, unless configured for 60A operation, or with either pump in high speed if circuit board is configured for 30A operation. Refer to Sections 6.1-6.5, pages 16-18.

Note: Jets pump 2 only runs in high speed. **This applies to 2011-2013 J300 Models not 2014+**



DANGER: Electrical Shock Hazard Exists!
High Voltage Present on Circuit Board. Use Extreme Caution while Servicing Circuit Board.



****WARNING:** heater temperature may have exceeded 130°F (54°C). Inspect heater. Call technical support if visible damage is apparent.

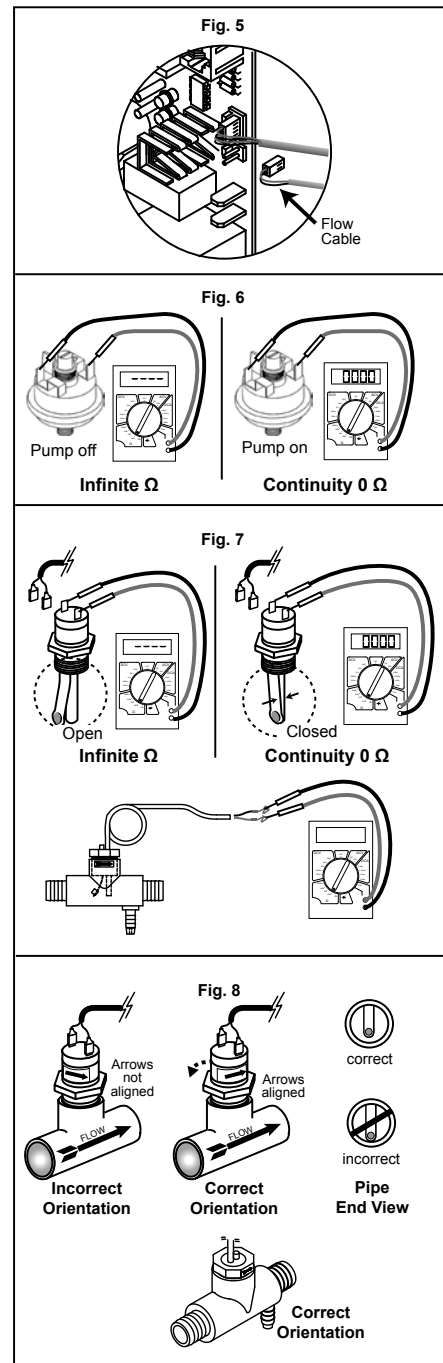
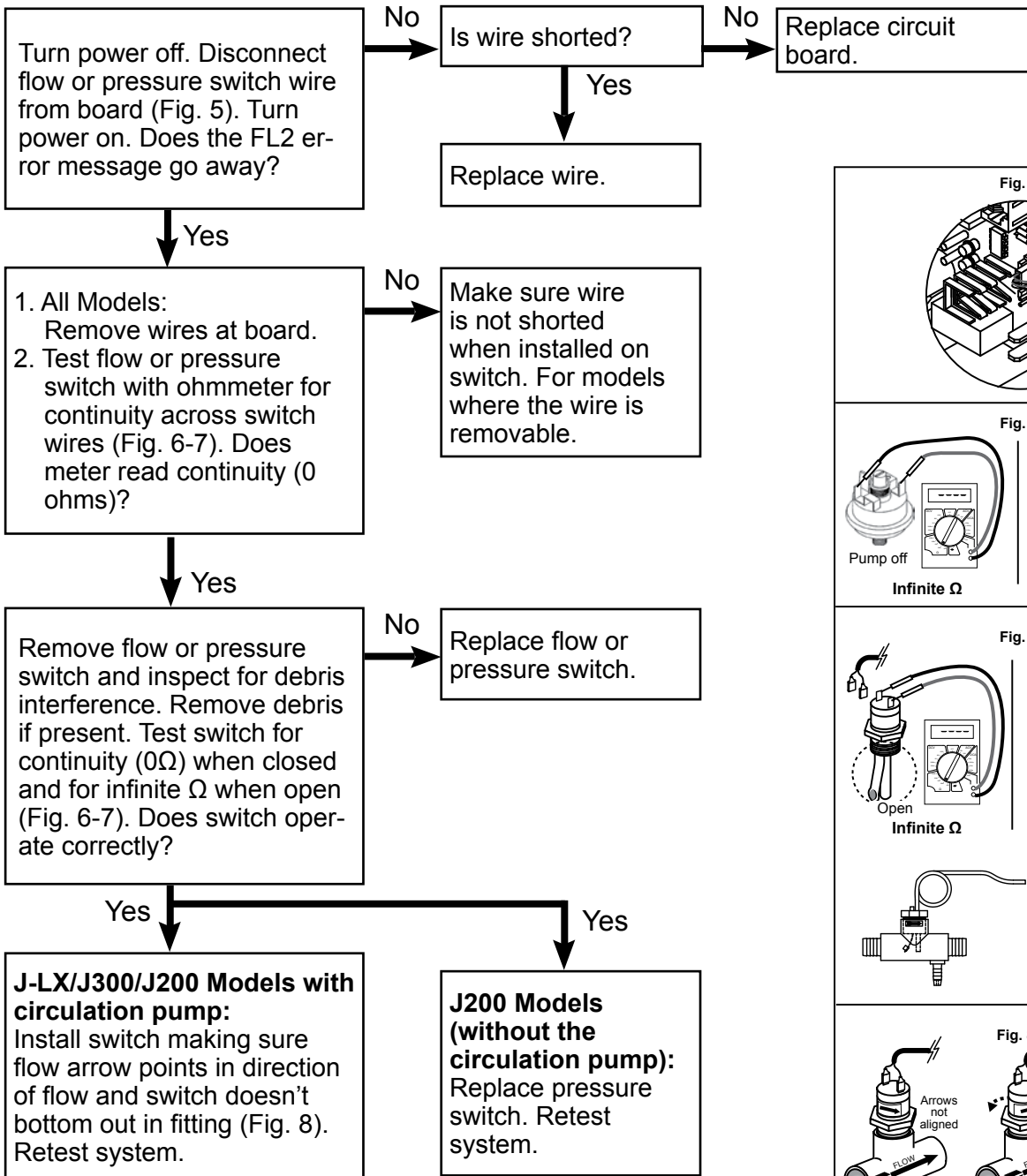
8.1B No Heat or Not Enough Heat (All Models)

- Symptoms:** low speed pump or circulation pump (heating pump) not turning, panel heat indicator not lit, panel is **flashing FL2**.



Standard Troubleshooting Approach

This applies to 2011-2013 J300 Models not 2014+



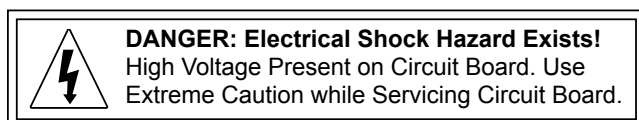
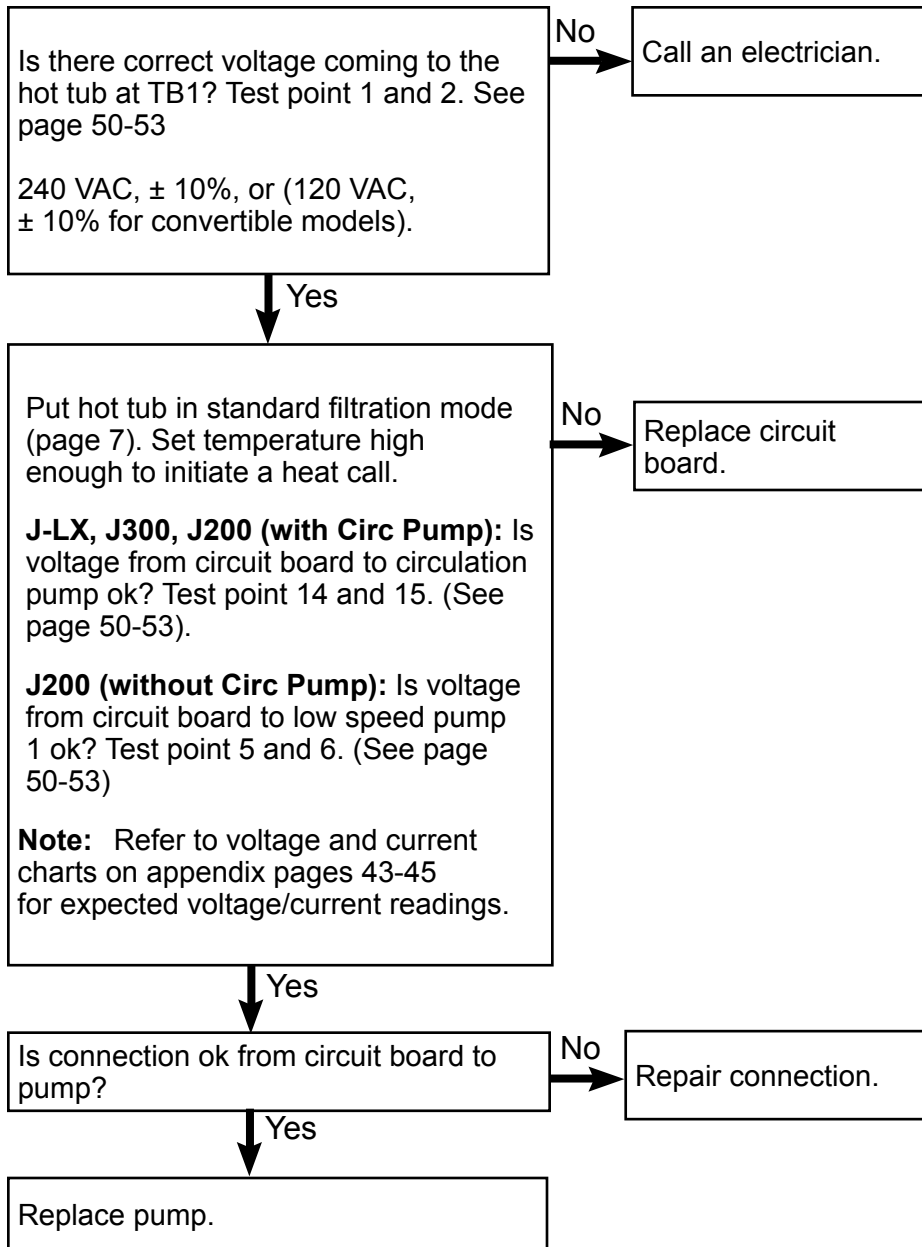
8.1C No Heat or Not Enough Heat (All Models)

- **Symptoms:** Low speed pump 1 or circulation pump (heating pump) not turning, panel heat indicator not lit, panel is **flashing FL1**.



Standard Troubleshooting Approach

This applies to 2011-2013 J300 Models not 2014+

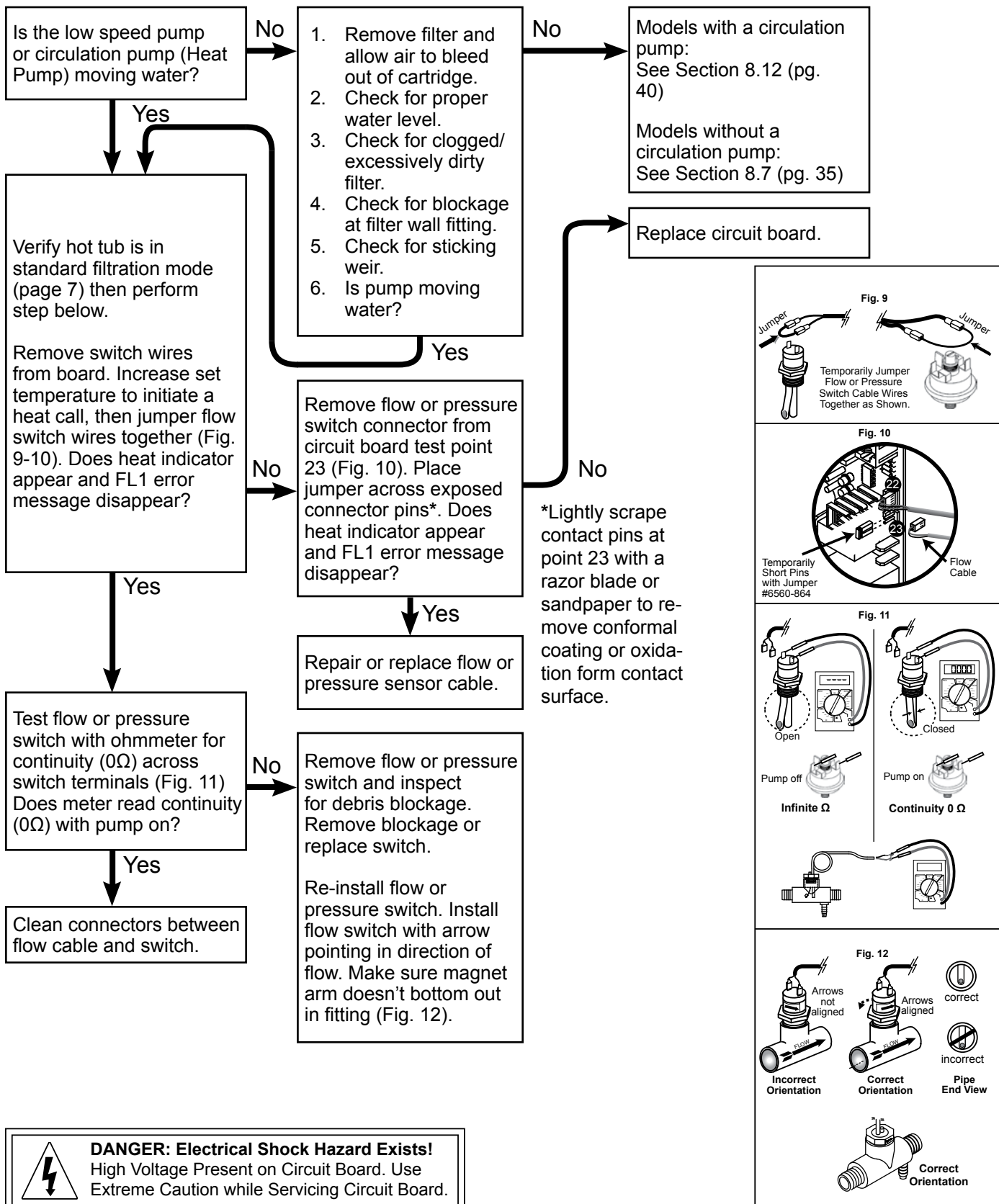


8.1D No Heat or Not Enough Heat (All Models)

- Symptoms:** Low speed pump 1 or circulation pump (heating pump) is turning, panel heat indicator not lit, panel is **flashing FL1**.

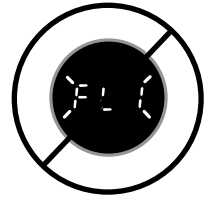


Standard Troubleshooting Approach

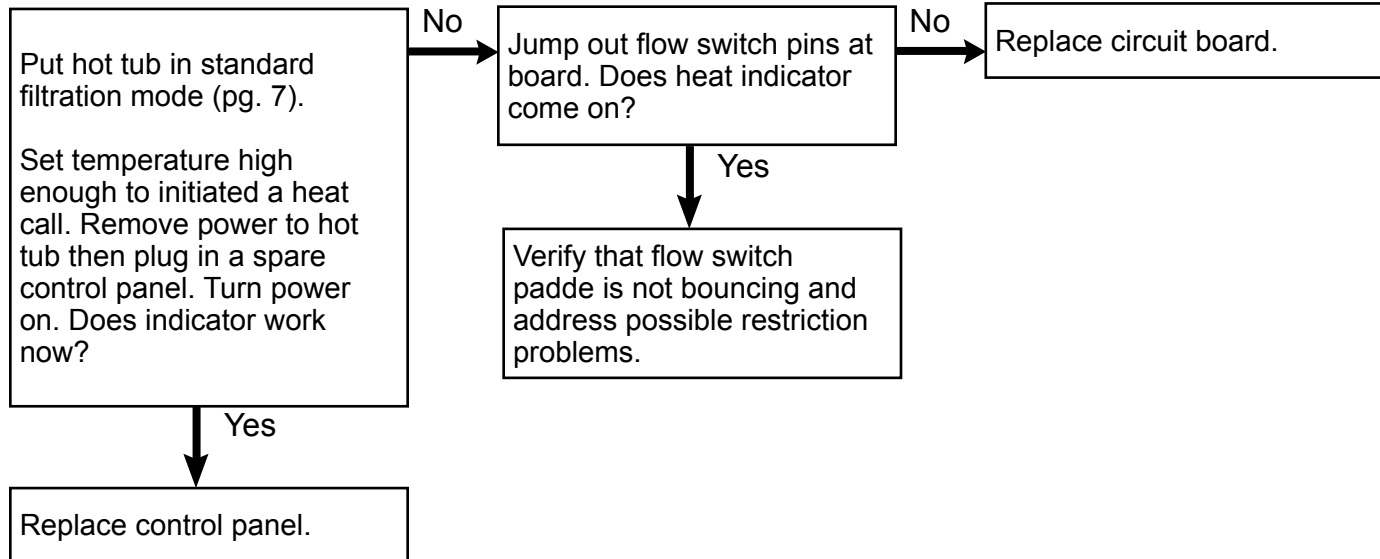


8.1E No Heat or Not Enough Heat (All Models)

- **Symptoms:** Low Speed Pump or circulation pump (heating pump) is turning, panel heat indicator not lit, panel is **NOT flashing FL1**.



Standard Troubleshooting Approach



8.2 Intermittent Heating

As with all intermittent problems, routine measurements and display panel error messages are not trustworthy. The following procedure will eliminate the most probable causes.

It is important to explain to the customer how difficult intermittent problems are to locate. You will be doing a series of things to eliminate the problem. Ask the customer to be patient and please cooperate by calling you back to inform you of the hot tubs status until the problem is corrected. It might be a good idea to review this S.T.A. with the customer. It may help he or she understand why it might take several service calls to effect a repair.

Suspects: circuit board, temperature sensor, control panel, wiring connections, and partial water flow obstructions.

Diagnostic Tools

Voltmeter, Ohmmeter

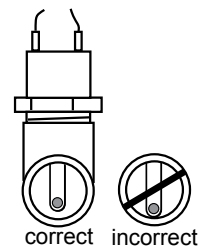
Suggested Spare Parts

Heater element, circuit board, temperature sensors, pressure switch, control panel

Standard Troubleshooting Approach

1. Check crimped wire connections to heater element. If burned, replace heater element wires. Verify heater element connections are good on circuit board. Check heater resistance, see current chart on page 45 for expected heater resistance values.
2. Check connections labeled "heater out" on circuit board (test points 12 and 13). Refer to pages 50-53 for your circuit board. If possible, clean and renew connections. If relay is physically burned at connections, replace circuit board.
3. Check flow switch or pressure switch for proper and consistent mechanical operation. Observe mechanical action of switch. **Refer to page 21 for flow switch testing procedure.**
4. Clean connections where panel plugs into board.
5. If all above items check out, ask the customer if the SN2 error has ever displayed. If the SN2 error message has displayed, replace temperature sensor.
6. Tell the customer what you have done, that you are not sure the problem has been fixed, and that you want to be called immediately if the problem returns. Explain what you will do if the problem returns. Check back with the customer in a few days if you haven't been contacted.
7. If the customer calls back, call Technical Support.

Note: J-LX/2011-2013 J300/J200 (with circ pump) Models use a "magnetic reed switch" type flow switch that can remain closed from debris interference. Removal of the flow switch for cleaning and inspection will correct most problems. Record the number of turns it takes to remove the switch from the fitting. After cleaning, use the same number of turns to reinstall the switch. DO NOT thread the switch farther than originally installed, or the paddle may stick on the bottom of the fitting. Also, make sure flow arrow is pointing in direction of flow away from heater output.



8.3 Nothing Works

Things to remember: when a system fails, there is probably one, and only one problem. Verify power to the hot tub by observing the control panels LED display. The control panel will usually display something as long as there is power to the hot tub. Check for error messages. Displayed error messages usually indicate the problem.

Diagnostic Tools: Voltmeter

Suggested Spare Parts: Fuses, control panel, circuit board

Nothing Works (Panel Indicators lit)

1. Plug in spare control panel. If it works, change panel.
2. Remove power from hot tub. Check connections on sensor harness and verify proper resistance of temperature and hi-limit sensors (page 57). Replace defective temperature or hi-limit sensor then test system.
3. Check transformer. See Section A24, page 58.
4. Still no operation? Replace circuit board.

Nothing Works (Panel Dead)

1. **All Models** - Check for proper power to the hot tub on the main TB1 terminal block (page 43) as follows:
 - 120V Convertible North American Models: 120 VAC $\pm 10\%$ (3-wire).
 - 240V North American Models: 240 VAC $\pm 10\%$.
2. Check for power at transformer secondary. **Refer to appendix page 58.** If power exists on transformer secondary, plug in spare control panel. Still nothing? Replace board.
3. If no power exists at transformer secondary, check for voltage at transformer primary. **Refer to appendix page 58.** If voltage exists on the primary but is missing on the secondary, replace transformer.
4. No power at the transformer primary indicates either an open 1.25 Amp fuse, 20/30 Amp main fuse, or a loose or disconnected wire. If voltage exists on the primary but is missing on the secondary, replace transformer. See Section A5 (page 48) for specific fuse details.

8.4 Hot Tub Doesn't Come On for Filter Cycle

Turn power to hot tub off and on to restart filter cycle program. Does filter cycle start approximately two minutes after power is applied?

- **If yes:** the hot tub is functioning properly. Refer to Sections 4.3-4.7 (page 7) for filter cycle setup details. Take time to explain filter cycle selection and operation to your customer. Make sure your customer understands filter cycles are selectable, not programmable.
- **If no:** Select appropriate filter cycle mode within two minutes after applying power. Refer to Sections 4.3-4.7 (page 7). If filter cycle starts approximately two minutes after setting, no corrective action is required. If filter cycle does not start two minutes after setting, replace circuit board.

8.5 House Breaker Trips

The hot tubs current draw will vary depending on how the circuit board is jumpered. Jumper options determine whether multiple functions can operate together.

If the house breaker trips, check the hot tubs current draw. If jumpers are properly set and current draw is within expected limits, the house breaker or wiring is defective and must be repaired/replaced. The hot tubs current draw at the breaker represents the sum of all enabled devices. **Refer to appendix page 46.**

If the hot tub's current draw is high, individual device current measurements must be made to determine which device is pulling excessive current. **Refer to appendix page 46.** Repair or replace the device which is drawing excessive current.

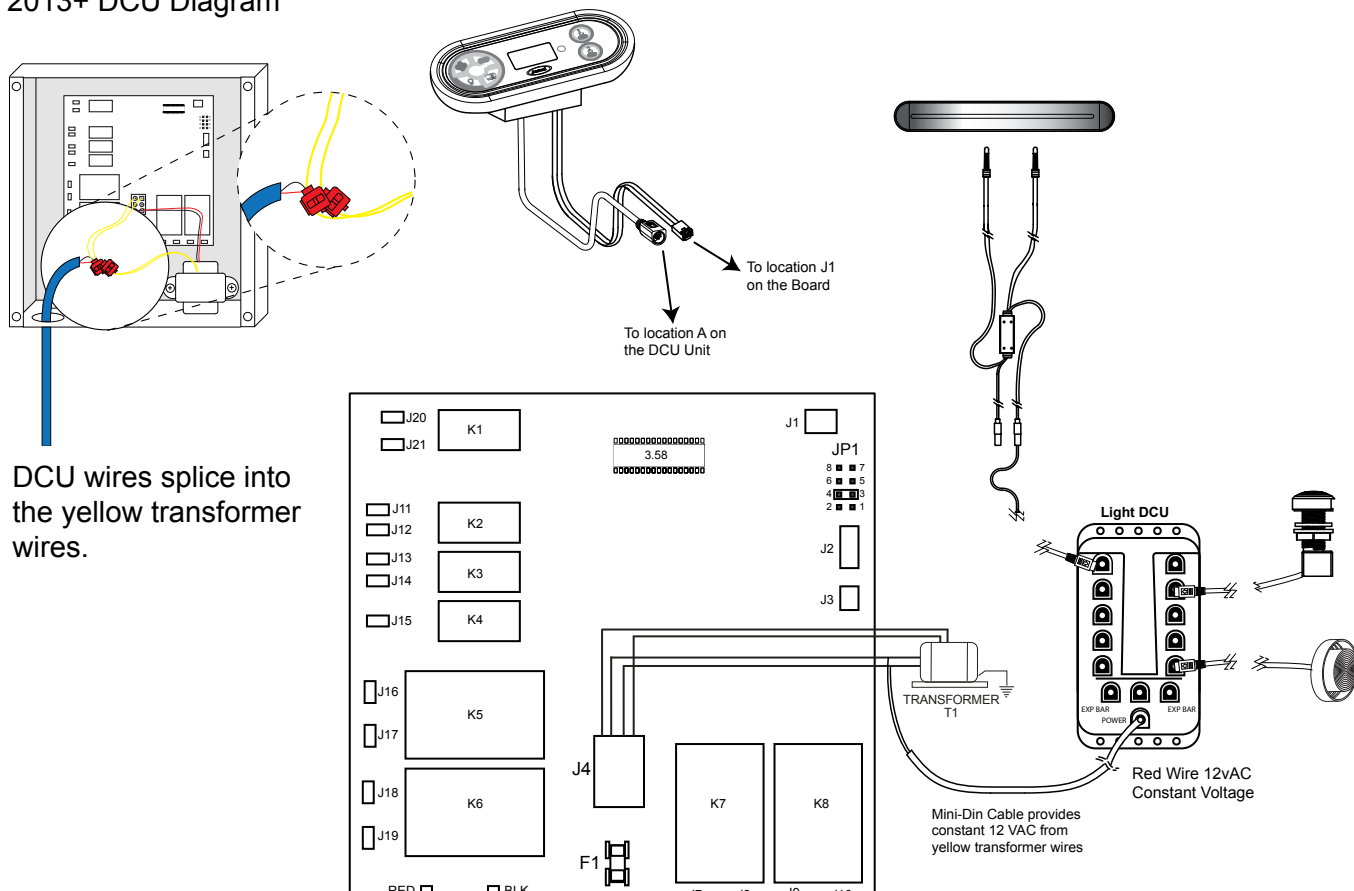
If the GFCI trips, try removing the heater, pump, ozonator (if installed), stereo power supply and circulation pump or pump 2 wires from the circuit board one at a time to find which device may be causing the GFCI to trip. For chronic GFCI tripping, call Technical Support.

North American 60Hz Installations:

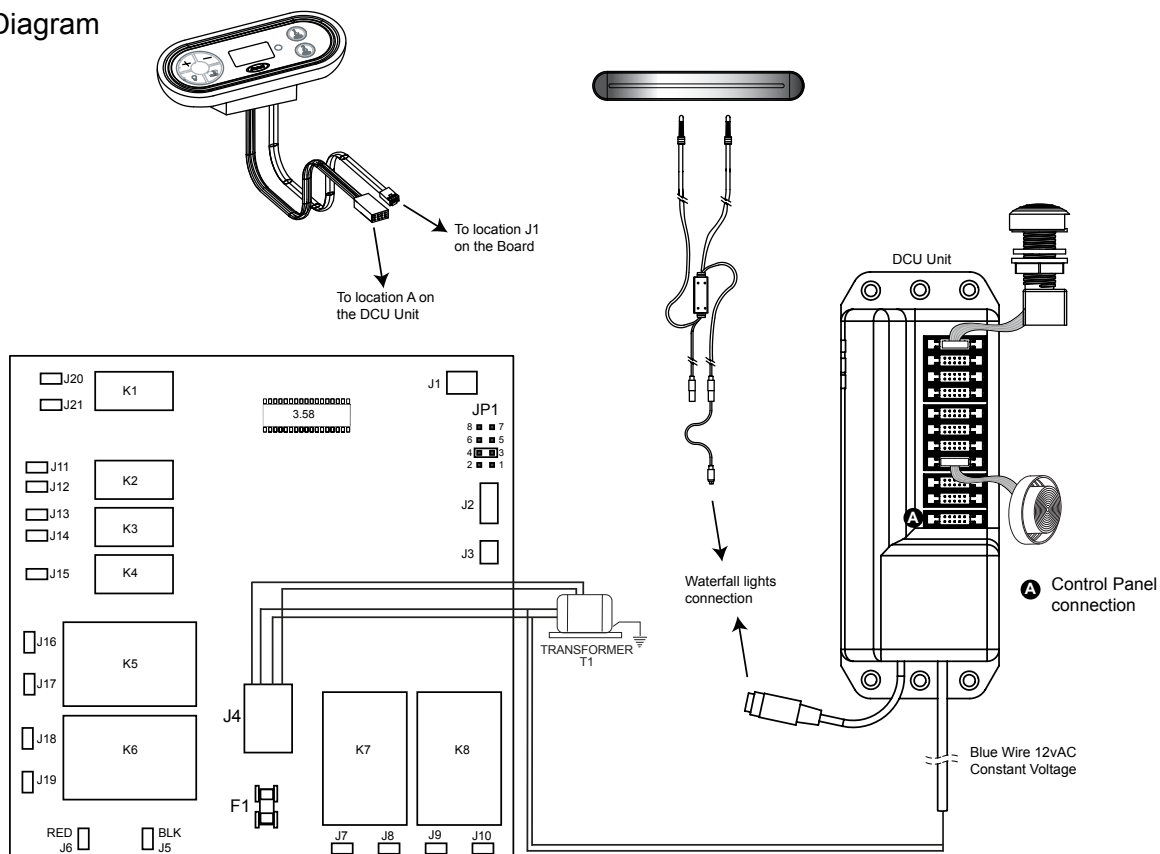
As of January 1, 1994 the National Electric Code (NEC) requires a Ground Fault Circuit Interrupter on all hot tub installations in the U.S. A GFCI must be wired correctly or it will trip. Make sure the electrician has wired the GFCI according to the diagram on pages 54.

8.6A DCU Unit (J-LX Collection)

2013+ DCU Diagram

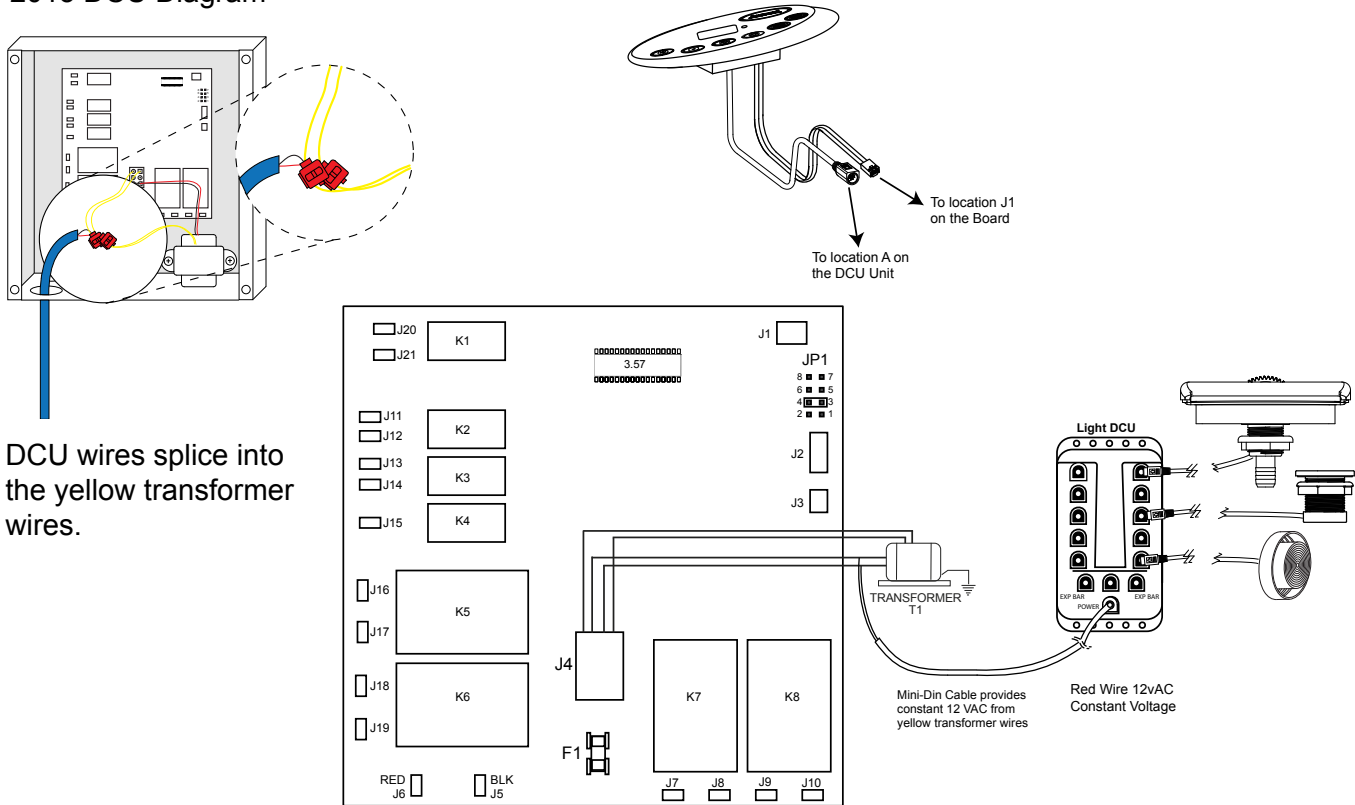


2011-2012 DCU Diagram

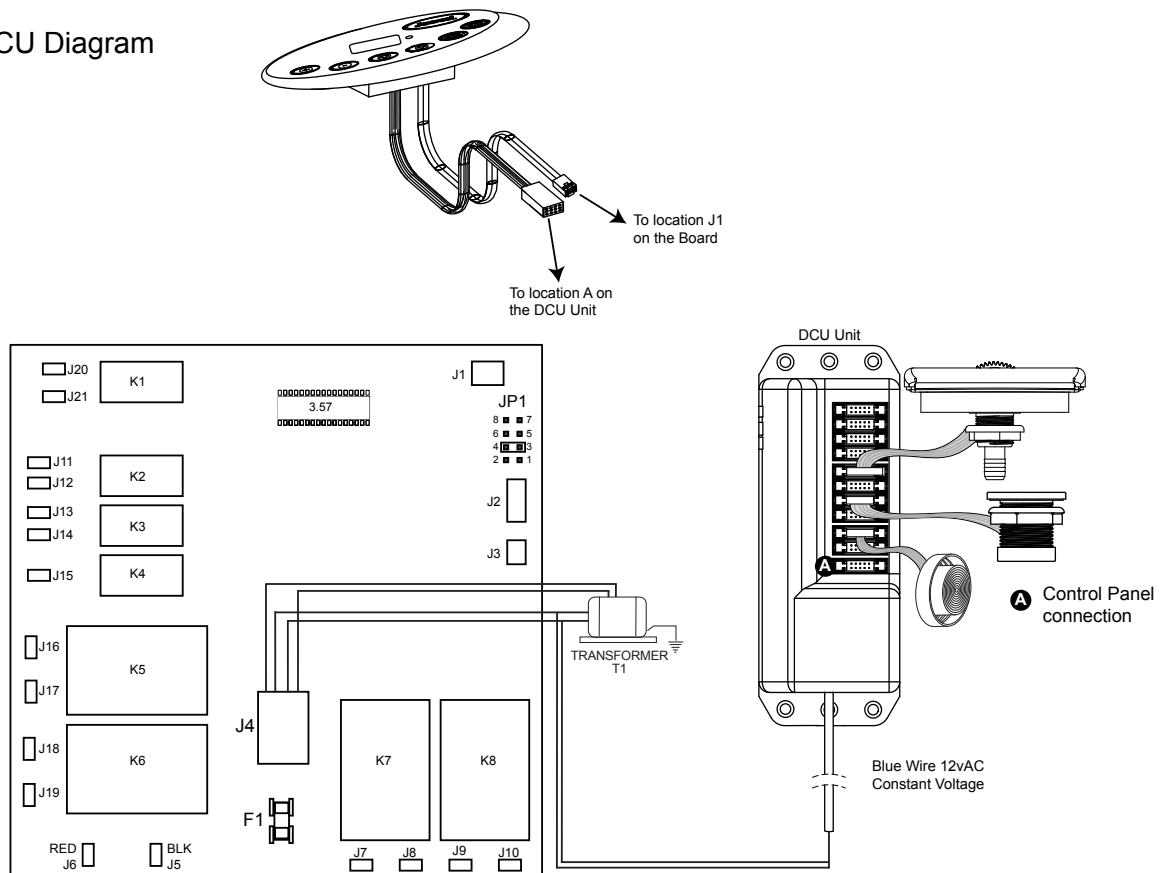


8.6B DCU Unit (J300 Collection)

2013 DCU Diagram



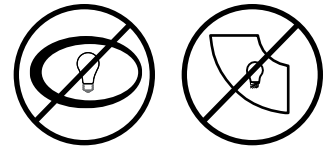
2011-2012 DCU Diagram



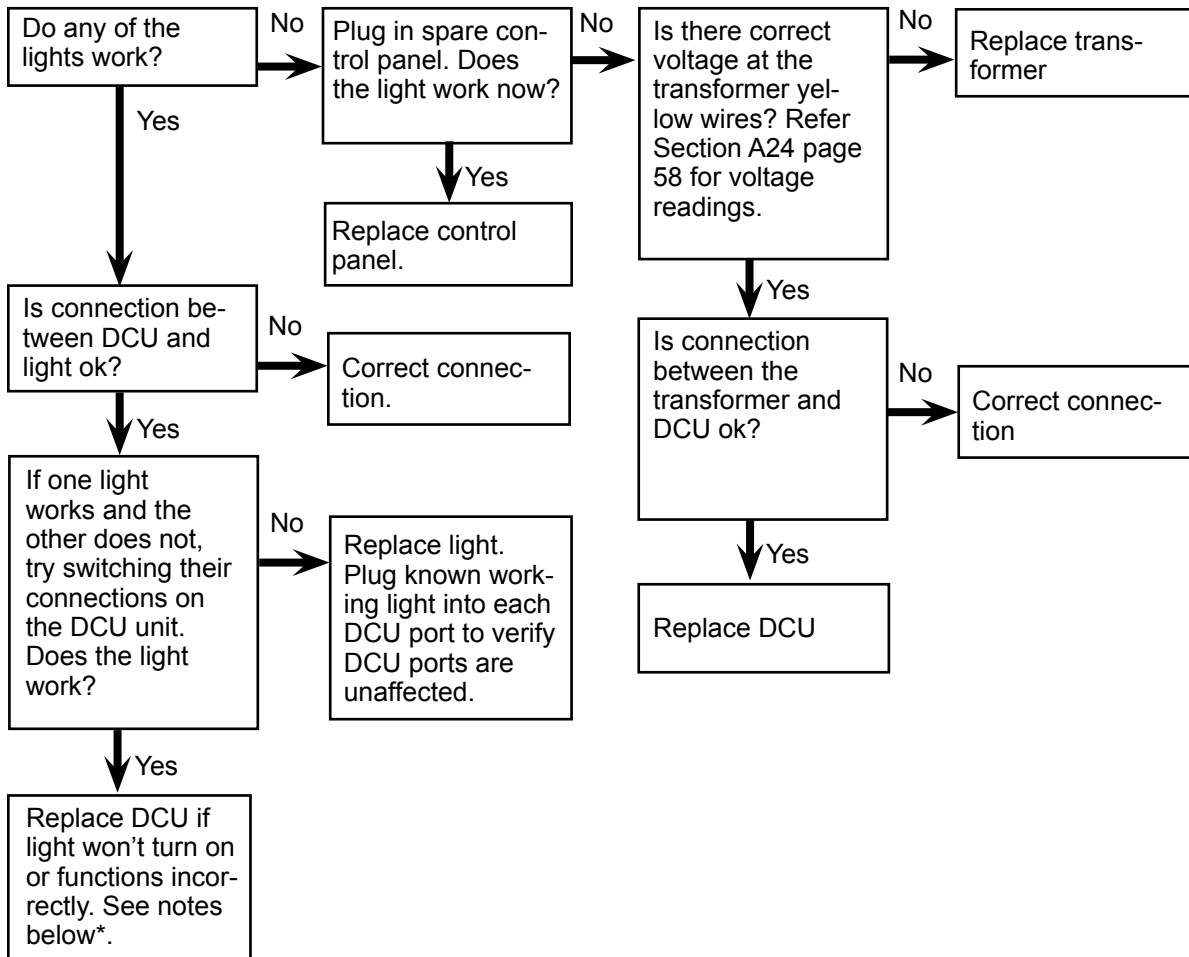
8.6C Hot Tub Light Will Not Come On (J-LX/2011-2013 J300 Models)

Diagnostic Tools: Voltmeter

Suggested Spare Parts: Circuit board, DCU, Lights



Standard Troubleshooting Approach
(Light has a two hour time out)



***Note:** Before replacing DCU, perform the tasks described below in order to prevent shorting out the new DCU.

Step 1: Unplug all lights except footwell light.

Step 2: Verify footwell light works and goes through all color functions correctly.

Step 3: Plug in one light next to footwell light connection. Verify that all color functions work correctly and light does not flicker or have missing color LED's. Unplug light and plug in another light in the same place and perform the same test as with the previous light. Continue to follow this procedure until all lights have been tested.

Step 4: Now replace DCU and any lights that were determined to perform incorrectly.

8.6D Light does not come on (J200 Collection Standard light)

A. 2011+ J210 Models

B. 2011-2012 J-230, J-270 and J-280

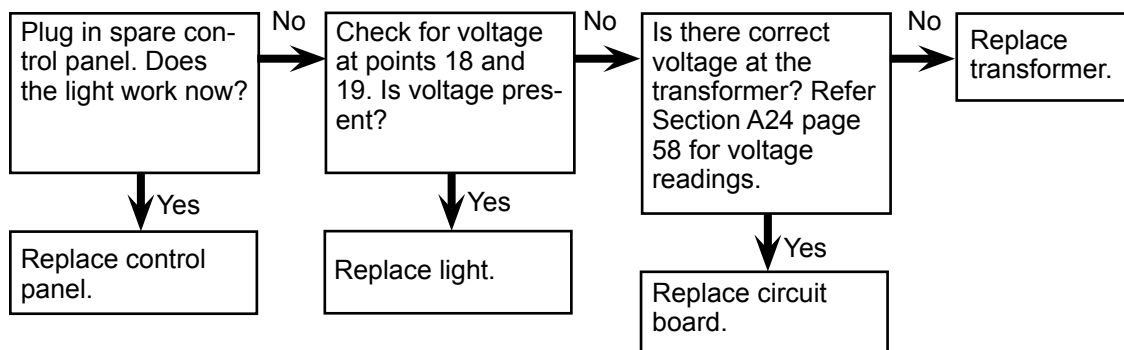
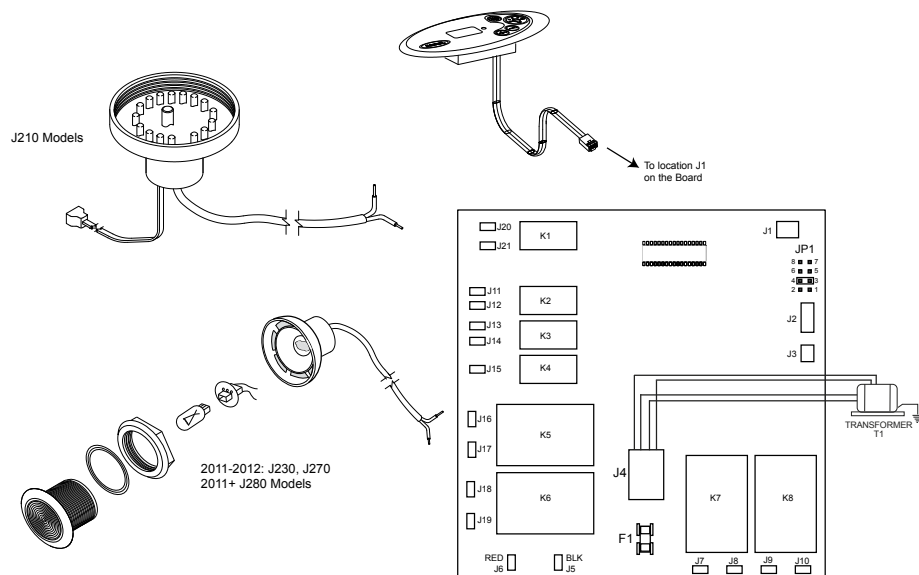
Diagnostic Tools: Voltmeter



Suggested Spare Parts: Circuit board, Transformer, Lights

Standard Troubleshooting Approach (Light has a one hour time out)

Refer to pages 50-53 for testing points.



(actual number of lights may vary by model)



8.6F Hot Tub Light Will Not Come On (J200 Collection CL Lighting)

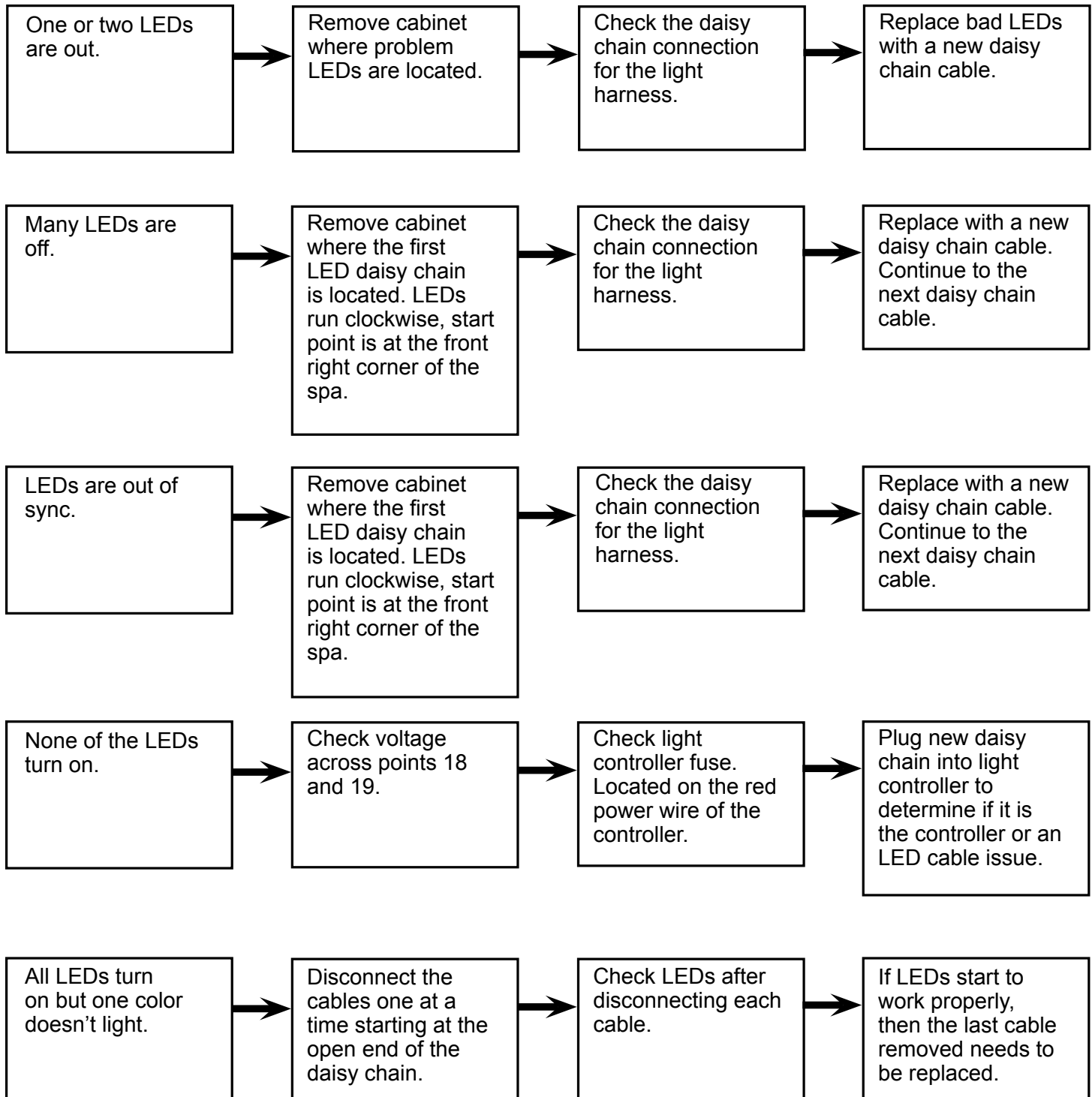


Diagnostic Tools: Voltmeter

Suggested Spare Parts: Circuit board, DCU, Lights

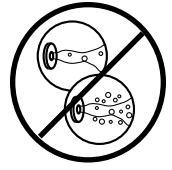
Standard Troubleshooting Approach (Light has a two hour time out)

All the LEDs are controlled by a central control box (protected by a inline fuse), the topside control panel functions and color cycles. The LED cables are daisy chained together with locking Molex connectors, they are run clockwise, starting at the front right corner of the spa.



8.7 No Jets

This is a condition of constant zero water pressure. The first step in diagnosing the problem is to determine if the pump is actually turning. Once this determination is made, follow the appropriate portion of the S.T.A.



Diagnostic Tools: Voltmeter

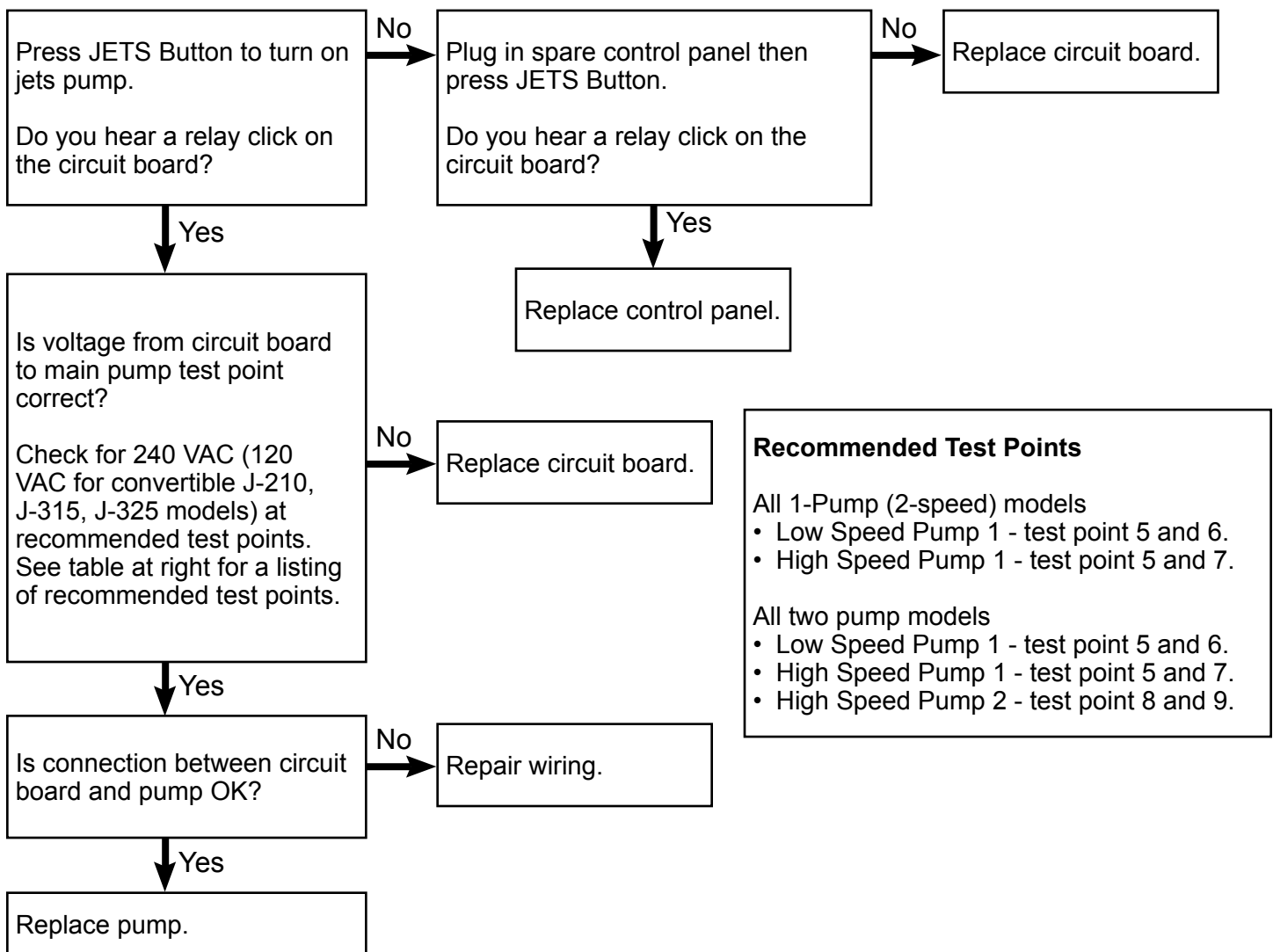
Suggested Spare Parts: Control Panel, Circuit Board, Jets Pump 1

Pump Is Turning (Checking for A Flow Problem)

1. Make sure jets are open. (Jets can be individually turned off, in some cases.)
2. Is the filter clogged?
3. Is there an obstruction in the plumbing line?
4. Check for air lock (clear air lock by opening union on pump discharge).

Standard Troubleshooting Approach

Refer to pages 50-53 for testing points. This applies to 2011-2013 J300 Models not 2014+



DANGER: Electrical Shock Hazard Exists!
High Voltage Present on Circuit Board. Use Extreme Caution while Servicing Circuit Board.

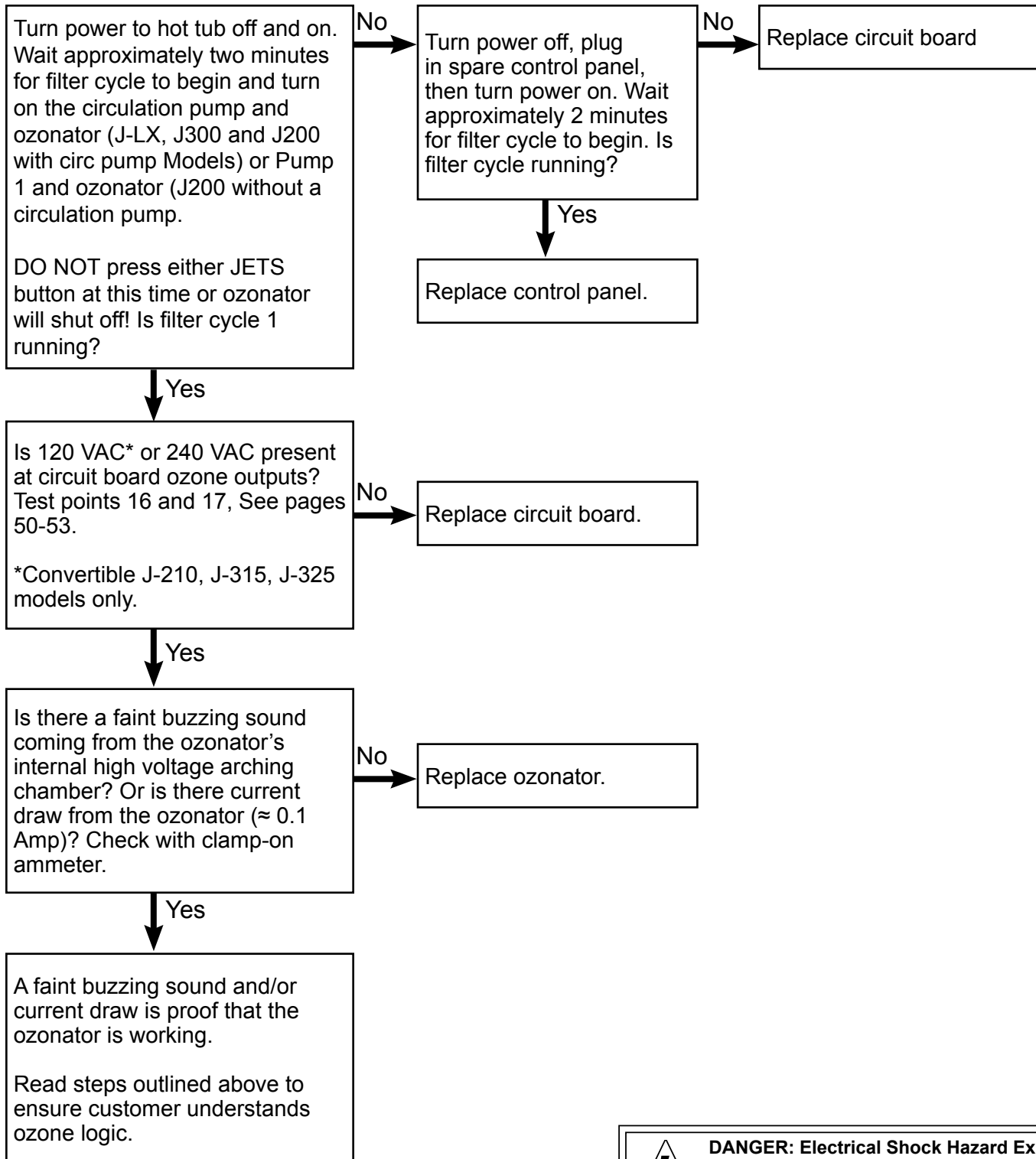
8.8 2011 Ozonator Not Working

Diagnostic Tools: Clamp-on Ammeter, Voltmeter

Suggested Spare Parts: Ozonator, Circuit Board, Control Panel

Standard Troubleshooting Approach

Refer to pages 50-53 for testing points. This applies to 2011-2013 J300 Models not 2014+



DANGER: Electrical Shock Hazard Exists!
High Voltage Present on Circuit Board. Use Extreme Caution while Servicing Circuit Board.

8.9 2012+ CLEARRAY Not Working

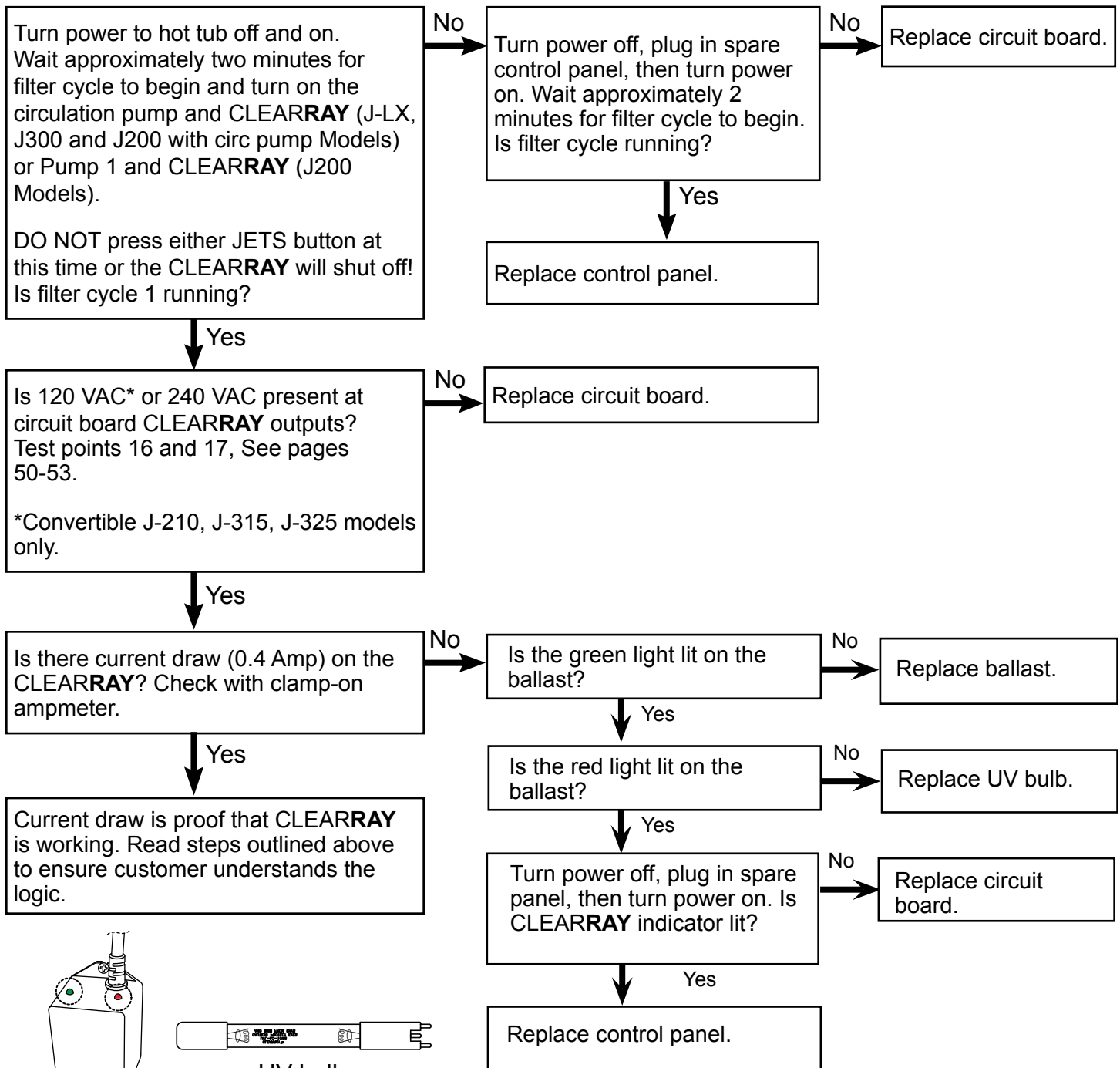
Verify that the CLEARRAY system should be running before proceeding (no error message, not in summer logic. CLEARRAY turns off when either jets button is pressed and will remain off for 5 minutes after function ends.

Diagnostic Tools: Clamp-on Ammeter, Voltmeter

Suggested Spare Parts: CLEARRAY ballast, UV bulb, circuit board, control panel

Standard Troubleshooting Approach. Refer to pages 50-53 for testing points.

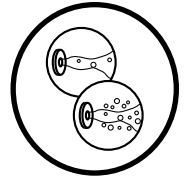
This applies to 2011-2013 J300 Models not 2014+



DANGER: Electrical Shock Hazard Exists!
High Voltage Present on Circuit Board. Use Extreme Caution while Servicing Circuit Board.

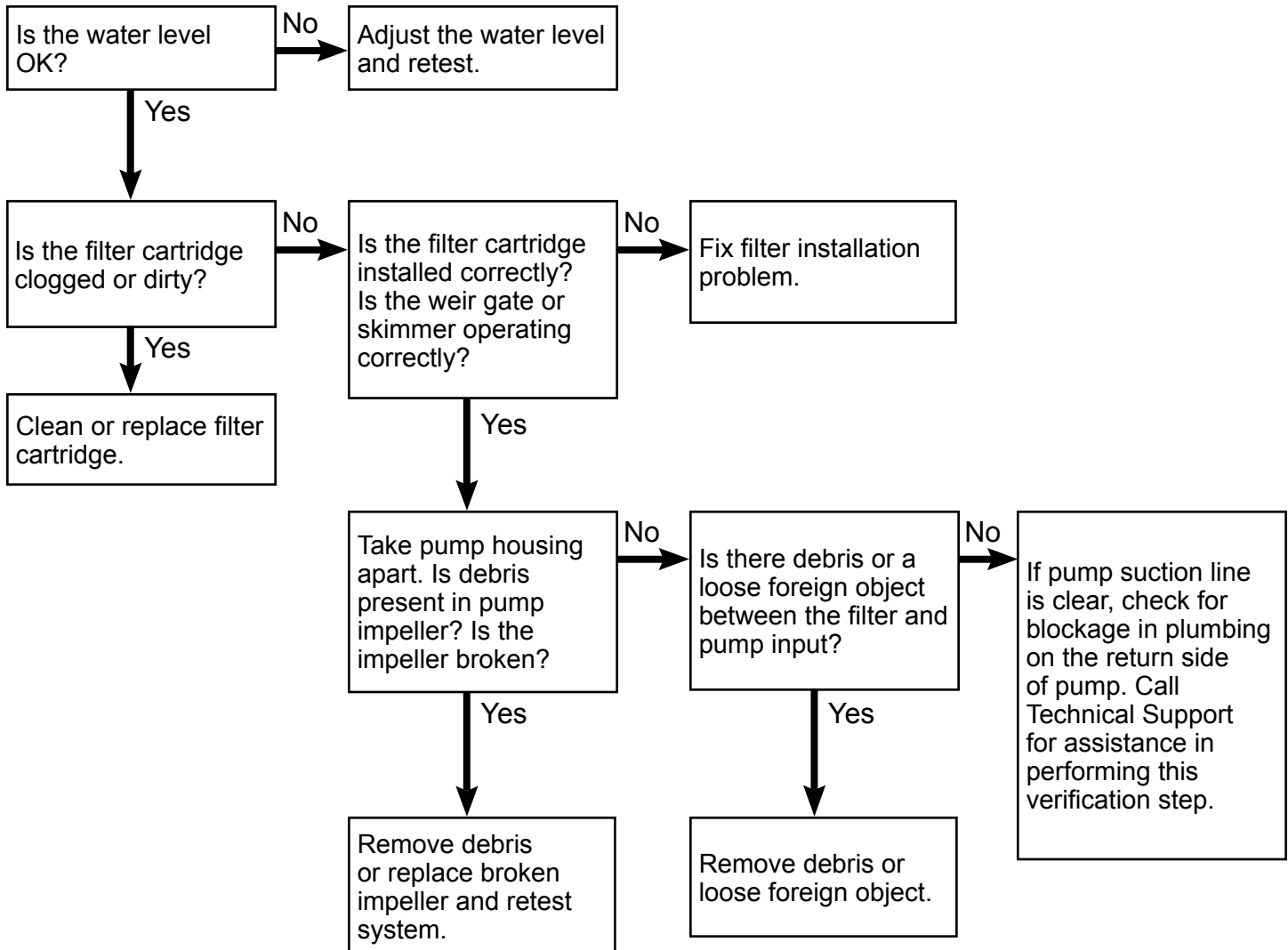
8.10 Weak or Surging Jets

Weak or surging jets are usually caused by an insufficient water supply to the pump or a clogged or broken pump impeller. The water level may simply be low, or there may be an obstruction in the water flow path to the pump or in the pump's impeller. Before making a service call, ask customer to verify all jets are open.



Suggested Spare Parts: Filter cartridge, Pump

Standard Troubleshooting Approach



8.11 Jets Pump Runs and Quits During Jet Mode

This is usually a problem of pump overheating. The pump motor incorporates a thermal cutout switch that triggers when the motor gets too hot. There is no reset for this condition. When the motor cools, the thermal switch resets automatically. In some cases, a faulty circuit can also cause this problem.

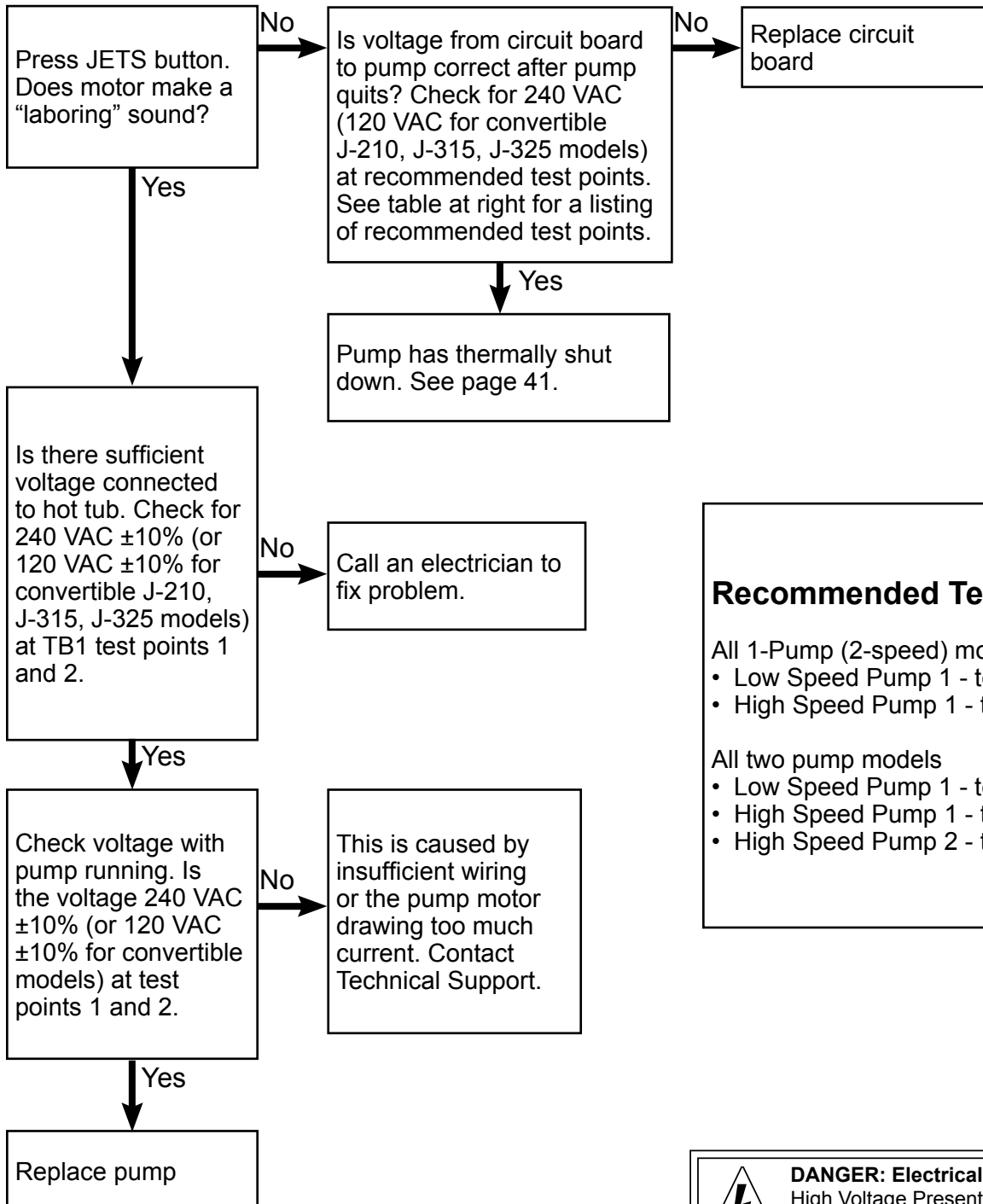


Diagnostic Tools: Clamp-on Ammeter, Voltmeter

Suggested Spare Parts: Circuit Board, Jets Pump

Standard Troubleshooting Approach **This applies to 2011-2013 J300 Models not 2014+**

Refer to pages 50-53 for testing points.



Recommended Test Points

All 1-Pump (2-speed) models

- Low Speed Pump 1 - test point 5 and 6.
- High Speed Pump 1 - test point 5 and 7.

All two pump models

- Low Speed Pump 1 - test point 5 and 6.
- High Speed Pump 1 - test point 5 and 7.
- High Speed Pump 2 - test point 8 and 9.



DANGER: Electrical Shock Hazard Exists!
High Voltage Present on Circuit Board. Use Extreme Caution while Servicing Circuit Board.

8.12 Circulation Pump Not Working (JLX, J300 and J200 with circ pump option only)



The circulation pump works as follows:

- 2011+ JLX Models circ pump runs 8 hrs (default)
- 2012-2013 J335/J345/J355/J365/J375 8 hrs (default)
- 2011 J335/J345/J355/J365/J375 8 hrs (default)
- 2011-2013 J315/J325 24 hrs (default)
- 2011-2012 J280/J270/J230 circ pump was an option, 24 hrs (default)

The circulation pump should be running unless “summer logic” is activated. Verify “summer logic” is not activated before starting. Refer to Section 5.4 (page 14) for details.

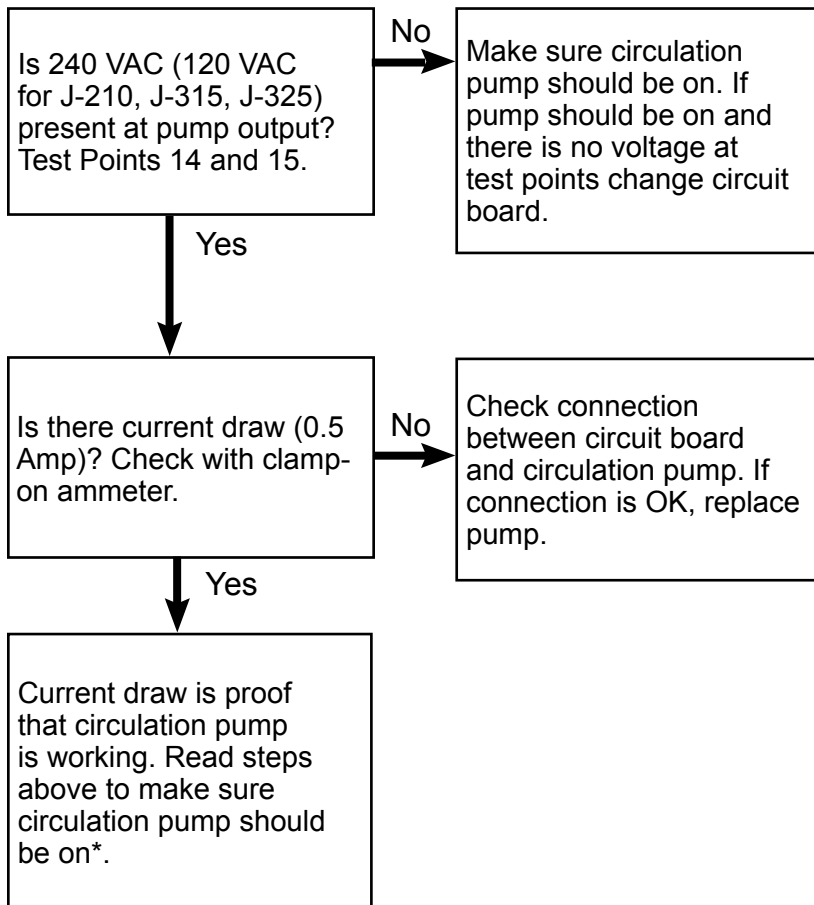
The circulation pump is preset to run for a specific filter cycle, two minutes after power up. If the circulation pump is not running, turn power off to the spa then back on and wait two minutes for the cycle to begin. Or raise the temperature to initiate a heat call.

Diagnostic Tools: Clamp-on Ammeter, Voltmeter

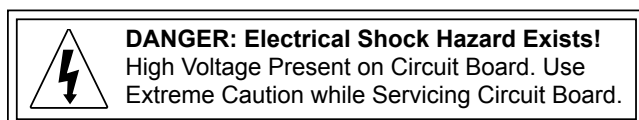
Suggested Spare Parts: Circuit Board, Circulation Pump

Standard Troubleshooting Approach **This applies to 2011-2013 J300 Models not 2014+**

Refer to pages 50-53 for testing points.



***Note:** If circulation pump is running but there is no flow, check for an excessively dirty filter, an air lock, blockage in the plumbing, debris in the pump, or a broken pump impeller.



8.13 Troubleshooting A Thermal Pump Cutout

1. Verify voltage to hot tub is 240 VAC $\pm 10\%$ (or 120 VAC $\pm 10\%$ for convertible models). An insufficient voltage supply can cause the motor to pull too much current and overheat. The situation must be corrected.
2. Check voltage to hot tub.
3. If voltage is OK, examine the environment in which the hot tub is installed. Hot sun, hot weather, and lack of breeze can cause heat build up in the equipment bay in addition to the normal heat produced by the pump. This can raise the temperature high enough to cause the pumps thermal cutout to trip. There are two possible solutions to thermal pump cutout problems which are not due to low line voltage. One is to change the filter cycle period so that it does not coincide with the hottest time of day and peak power consumption hours. Another is to ventilate the equipment bay. Call technical support for advice on this matter.
4. If there seems to be no overheating problem yet the motor keeps cutting out, the motor's thermal switch may be bad. In this case the pump should be replaced.



8.14 Pump 1 Hums and Will Not Start

If the pump impeller is not “frozen”, this condition usually indicates a bad start capacitor. This component is inside the pump motor housing.



Diagnostic Tools: Voltmeter

Suggested Spare Parts: Pump, Capacitor, Circuit Board

Standard Troubleshooting Approach

Press JETS 1 button. Check voltage at the following circuit board test points 5 and 6.

North American 60 Hz Models:

All models (except J-315/J-325/J-210): 240 VAC $\pm 10\%$

J-315/J-325/J-210: 120 VAC $\pm 10\%$

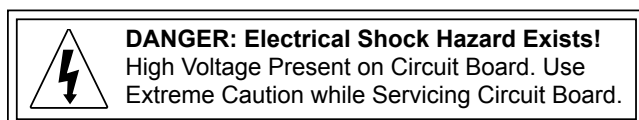
Export 50 Hz Models:

All models; 230 VAC $\pm 10\%$

All Models

If there is no voltage present at the recommended test points, replace circuit board. If voltage is present, the pump needs to be repaired or replaced. Try replacing the pump's start capacitor. If the pump still doesn't work, replace pump.

If pump 1 runs in low speed but hums in high speed, make sure circuit board is not sending voltage to both pump windings at the same time. **Disconnect pump wires from the circuit board before performing this test.** Test for voltage at test points 5 and 6. When voltage exists at test points 5 and 6 there should be no voltage at test points 5 and 7. Conversely, when voltage exists at test points 5 and 7, there should be no voltage at test points 5 and 6. If voltage is present across both sets of test points at the same time, replace circuit board. Refer to pages 50-53 for your specific circuit board layout.



APPENDIX

A1 Checking Voltage to Hot Tub

Correct supply voltage wiring to the hot tub is essential for safe/proper operation. The first step in troubleshooting a new installation should be to take voltage readings at the terminal block TB1. **Do not trust wire colors. Electricians make mistakes and electrons are color-blind.** A low line voltage or incorrectly wired hot tub will result in either of the following symptoms: A) Strange or intermittent symptoms, B) Displays with indications that simply cannot be correct

Many of the most perplexing problems in the past have been wiring errors and voltage drop problems. **Human safety depends on proper hot tub grounding. It is essential that the voltage readings described below are as indicated. The ground connection must be heavy duty wiring.**

- J-210, 2011-2013 J-315, 2011-2013 J-325 North American 60 Hz are convertible for either 120 VAC 3-wire operation or 240 VAC 4-wire operation. The 4-wire power configuration powers the heater with 240 VAC for increased performance while powering all other components with 120 VAC.
- All other models are North American 60 Hz are exclusively powered by 240 VAC.
- **All Models Export 50 Hz** are exclusively powered by 230 VAC $\pm 10\%$, **see Figure C below.**

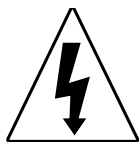
Verify All Convertible Models Power Connections as Follows:

North American Models (120 VAC/60 Hz, Fig. A)

- Hot to Neutral: Measure across test points 1 and 2 with voltmeter for 120 VAC.
- Hot to Ground Test: Measure across test points 2 to 23 for 120 VAC.

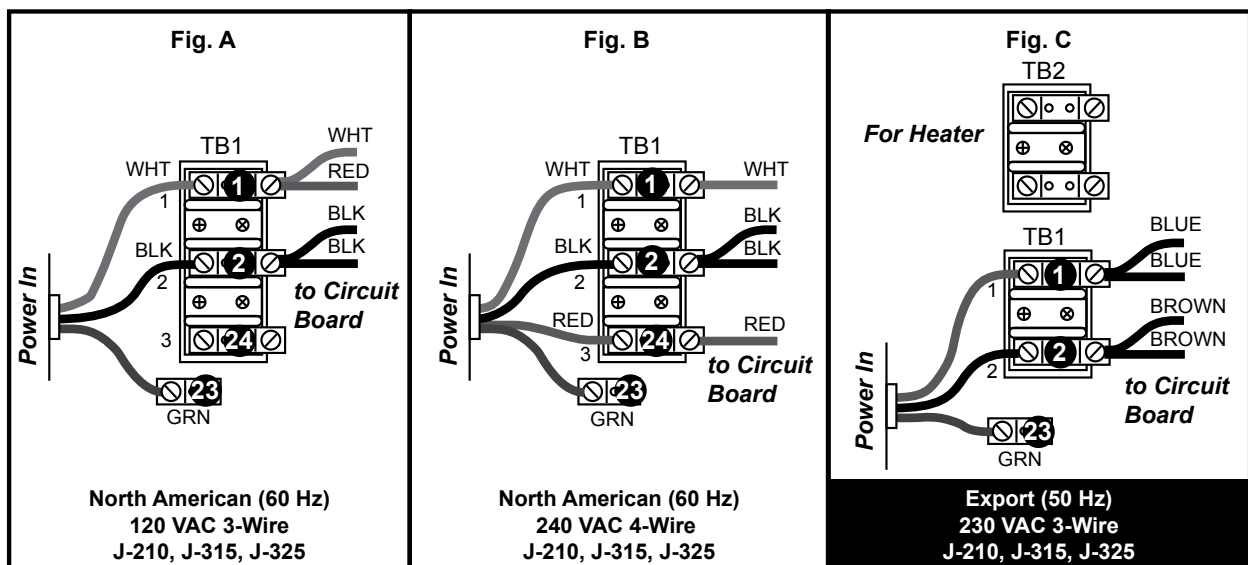
North American Models (240 VAC/60 Hz, Fig. B)

- Hot to Neutral: Measure across test points 1 and 2 with voltmeter for 120 VAC; then across test points 1 and 24 for 120 VAC.
- Hot to Ground: Measure across test points 2 and 23 for 120 VAC; then across test points 24 and 23 for 120 VAC.
- Hot to Hot: Measure across test points 2 and 24 for 240 VAC.



DANGER: Electrical Shock Hazard Exists!

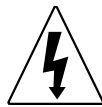
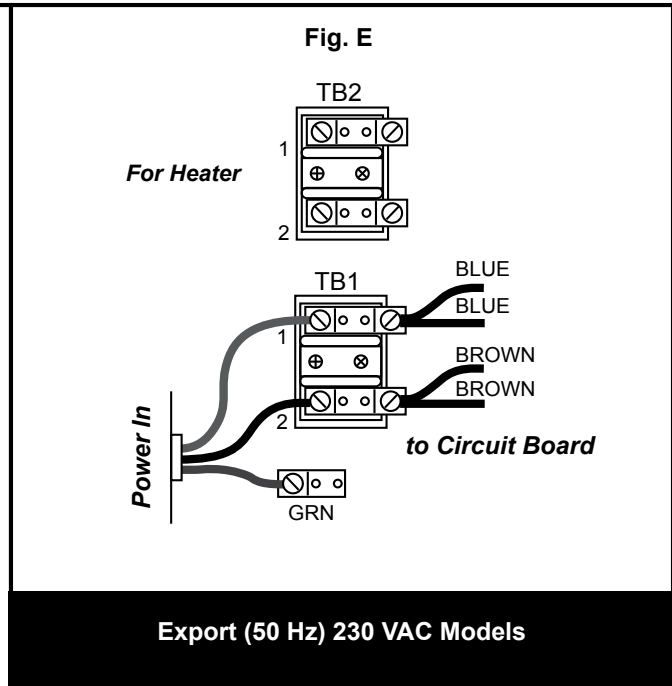
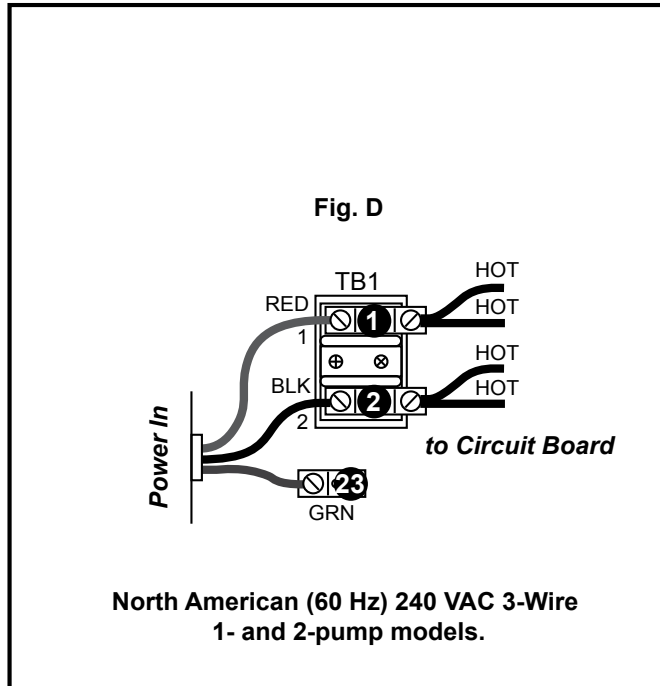
High Voltage Present on Circuit Board. Use Extreme Caution while Servicing Circuit Board.



Verify All 240 VAC Models power connections are as follows:

North American 240 VAC/60 Hz, Fig. D:

- Hot to Hot: Measure across test points 1 and 2 for 240 VAC.
- Hot to Ground: Measure across test points 1 and 23 for 120 VAC; then across 2 and 23 for 120 VAC.



DANGER: Electrical Shock Hazard Exists!
High Voltage Present on Circuit Board. Use
Extreme Caution while Servicing Circuit Board.

A2 Checking Current Consumption of Devices

This table lists current draw for most major hot tub components:

2011-2013 J300 Collection (North American 60 Hz)	
Device	Current Consumption $\pm 10\%$
Pump 1 (2-speed) High/Low	9.5A-12.0A/2.6A-3.6A
Pump 1 (2-speed) High/Low (J-315/J-325 only)	10.6A-13.6A/2.6A-3.9A
Pump 2 (High speed only)	9.0A-11.0A
Heater 1 kW/4 kW (Convertible Models Only)	7.0A-9.0A (120 VAC) 16.7A (240 VAC)
Heater 5.5 kW	19.5A-23.5A (240 VAC)
Circulation Pump	0.5A-1.0A
CLEARRAY (Standard)	0.4A
Ozone Generator (Opt)	0.1A

J-200 Collection (North American 60 Hz)	
Device	Current Consumption $\pm 10\%$
Pump 1 (2-speed) High/Low	9.5A-12.0A/2.6A-3.6A
Pump 1 (2-speed) High/Low (J-210 only)	10.6A-13.6A/2.6A-3.9A
Pump 2 (High speed only)	9.0A-11.0A
Heater 1 kW/4 kW (Convertible Models Only)	7.0A-9.0A (120 VAC) 16.7A (240 VAC)
Heater 5.5 kW	19.5A-23.5A (240 VAC)
Circulation Pump (Optional for J-230, J-270 J-280)	0.5A-1.0A
CLEARRAY (Standard)	0.4A
Ozone Generator (Optional)	0.1A

J-LX Collection (North American 60 Hz)	
Device	Current Consumption $\pm 10\%$
Pump 1 (2-speed) High/Low	9.5A-12.0A/2.6A-3.6A
Pump 2 (High speed only)	9.0A-11.0A
Heater 5.5 kW	19.5A-23.5A (240 VAC)
Circulation Pump	0.5A-1.0A
CLEARRAY (Standard)	0.4A
Ozone Generator (Opt)	0.1A

J-LX/2011-2013 J300/J200 Models (Export 50 Hz)	
Device	Current Consumption $\pm 10\%$
Pump 1 (2-speed) High/Low	6.3A-8.7A/2.2A-2.8A
Pump 2 (High speed only - for 2-pump models)	6.3A-8.7A
Heater 2.7 kW	9.5A-12.5A (230 VAC)
Circulation Pump	0.3A-0.7A
CLEARRAY (Standard)	0.4A
Ozone Generator (standard)	0.1A

A3 Checking Voltages to Devices

Device voltages are often measured at the circuit board to determine whether the board or device is bad. If the circuit board delivers voltage when device operation is called, the circuit board is probably good and the problem lies with the device or the wiring to the device. The following voltage chart shows operating voltages for all major hot tub components. Voltage is considered good if within $\pm 10\%$ of the listed value. Refer to appendix pages 50-53 for your specific circuit boards test point locations.

For all North American 60 Hz		
J-LX/J-LXL		
2011-2013 J-335/J-345/J-355/J-365/J-375 Models		
Device	Test Points	Voltage $\pm 10\%$
Pump 1 (Low Speed)	5 and 6	240 VAC
Pump 1 (High Speed)	5 and 7	240 VAC
Pump 2 (High Speed)	8 and 9	240 VAC
Circulation pump	14 and 15	240 VAC
Water heater	12 and 13	240 VAC
CLEARRAY or Ozone generator (optional)	16 and 17	240 VAC
2011-2013 J-315/J-325 Models		
Device	Test Points	Voltage $\pm 10\%$
Pump 1 (Low Speed)	5 and 6	240 VAC
Pump 1 (High Speed)	5 and 7	240 VAC
Circulation pump	14 and 15	240 VAC
Water heater	12 and 13	240 VAC
CLEARRAY or Ozone generator (optional)	16 and 17	240 VAC
2011-2012 J-230/J-270/J-280 Models with Circulation Pump		
Device	Test Points	Voltage $\pm 10\%$
Pump 1 (Low Speed)	5 and 6	240 VAC
Pump 1 (High Speed)	5 and 7	240 VAC
Pump 2 (N/A on J-230)	8 and 9	240 VAC
Circulation pump	14 and 15	240 VAC
Water heater	12 and 13	240 VAC
CLEARRAY or Ozone generator (optional)	16 and 17	240 VAC
J-210 Models		
2011-2013 J-315/J-325 Models		
Device	Test Points	Voltage $\pm 10\%$
Pump 1 (Low Speed)	5 and 6	120 VAC
Pump 1 (High Speed)	5 and 7	120 VAC
Water heater	12 and 13	120 VAC or 240 VAC*
CLEARRAY or Ozone generator (optional)	16 and 17	120 VAC
*Depends whether hot tub is connected to 120 VAC or 240 VAC supply		
J-230/J-235/J-245/J-270/J-275/J-280 Models without Circulation Pump Models		
Device	Test Points	Voltage $\pm 10\%$
Pump 1 (Low Speed)	5 and 6	240 VAC
Pump 1 (High Speed)	5 and 7	240 VAC
Pump 2 (N/A on J-230)	8 and 9	240 VAC
Water heater	12 and 13	240 VAC
CLEARRAY or Ozone generator (optional)	16 and 17	240 VAC

J-230/J-235/J-245/J-270/J-275/J-280 2011-2013 J-335/J-345/J-355/J-365/J-375 J-LX/J-LXL 2-pump Models Models (Export 50 Hz)		
Device	Test Points	Voltage $\pm 10\%$
Pump 1 (Low Speed)	5 and 6	230 VAC
Pump 1 (High Speed)	5 and 7	230 VAC
Pump 2	8 and 9	230 VAC
Circulation pump	14 and 15	230 VAC
Water heater	12 and 13	230 VAC
CLEARRAY or Ozone generator	16 and 17	230 VAC
J-210/2011-2013 J-315/2011-2013 J-325 1-pump Models (Export 50 Hz)		
Device	Test Points	Voltage $\pm 10\%$
Pump 1 (Low Speed)	5 and 6	230 VAC
Pump 1 (High Speed)	5 and 7	230 VAC
Circulation pump (if equipped)	14 and 15	230 VAC
Water heater	12 and 13	230 VAC
CLEARRAY or Ozone generator	16 and 17	230 VAC

A4 Testing Flow/Pressure Switch

When the “FL1 or FL2” message appears, it means the flow switch or pressure contacts have failed to close when the pump was turned on, or failed to open when the pump was turned off. This could be caused by an excessively dirty filter, an obstruction in the flow path or by a bad switch. The first thing to look for is an excessively dirty filter or an obvious obstruction, remembering (while not likely) that it is possible for a small object to work its way into the plumbing where it will not be obvious. After verifying no obvious blockage exists, the flow or pressure switch can be tested. Refer to page 21 for switch testing instructions.



A5 About Fuses

When current passes through a conductor the conductor heats up. If the conductor is a heavy piece of wire or a strip of metal, it will pass large currents and generate very little heat. If a wire is fine, or a strip of metal is thin, it will heat up at lower current levels. Fuses rely on this principle to protect circuits from massive current flows by simply melting if their current rating is exceeded. By selecting different alloys for the fuse element, fuses can be made to have their current rating exceeded for a short period of time. Such slow-blow fuses are excellent for protecting motor circuits where start-up currents (surge currents) are higher than running currents.

For 2014+ J300s see the 2014 J300 S.T.A.

Fuse	Part Number	1-Pump J-210, J-315/J-325, Models	1-Pump J-230 Models	2-Pump Models	1-Pump Export Models	2-Pump Export Models
Main Power, 20A	6660-106	X			X	X
Main Power, 30A	6660-105		X	X		
Transformer, 1.5A	6760-120	X	X	X	X	X

Testing Fuses

A good fuse should read continuity (0 Ω); a blown fuse will read no continuity (infinite ohms). See Figures 6 and 7 for testing methods.



CAUTION: Make sure replacement fuses are exactly those listed above. Never test a fuse for continuity while installed in the fuse holder.

Figure 6
on board test
(power on voltage reading)

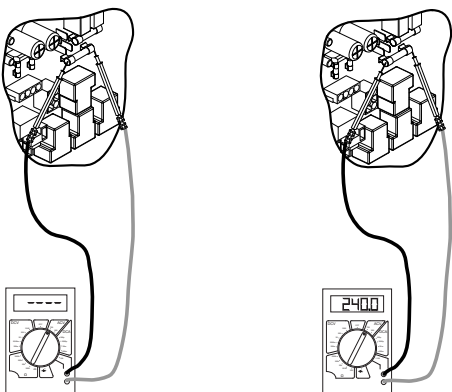
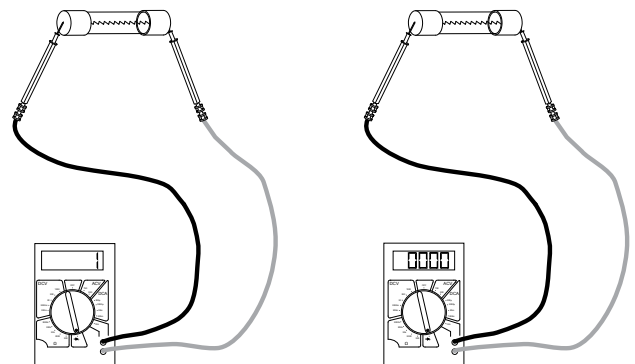


Figure 7
off board test
(resistance reading)



A6 The Watchdog “- - -”

Three horizontal dashes with no other control panel indicators illuminated is a result of the watchdog circuitry detecting a potential destructive condition within the hot tub.



There are many conditions that can cause a watchdog error message. Except for a runaway heat condition, most are caused by a faulty circuit board, bad hi-limit sensor, or temperature sensor. On rare occasions a control panel or a bad transformer will cause Watchdog. Confirm this by using a test panel and testing transformer connections on the circuit board, **refer to appendix page 58**.

1. Turn power to hot tub off. Verify proper resistance of hi-limit and temperature sensor (page 56). Replace defective temperature or hi-limit sensor then retest system. If watchdog error goes away, skip steps 2-4.
2. If the heater is not overly hot to touch and the watchdog displays an immediate dashed line error, the circuit board is probably bad. Check transformer primary and secondary voltages (page 58) before changing the circuit board.
3. See if the temperature in the heater has reached 118°F (48°C). If the heater got too hot, check for flow restrictions or a sticking weir gate and correct the problem.
4. If you cannot produce the watchdog error and the hi-limit and temperature sensors check out OK, tell the customer to call you if watchdog display reappears.

A7 Understanding Sanitizers

A. CLEARRAY

Our water purification system will begin disinfecting your water instantly. CLEARRAY Water Purification System is exclusive technology utilizing natural ultraviolet technology to sanitize your water, disinfecting bacteria, viruses, and algae in portable hot tubs. The ultraviolet light otherwise known as UV-C or germicidal light inactivates the microorganisms by disrupting the DNA so that it cannot reproduce and is considered lifeless. The ballast is the power supply for the purification system; it has two LED indicator lights the green indicating incoming power flow and the red indicating the system is properly working. CLEARRAY is standard for all models.

- As the water is filtered, it passes through the CLEARRAY unit, and is exposed to UV light that sanitizes the water.
- The combination of the CLEARRAY system and a residual sanitizer work in conjunction to keep your water clear and clean.

B. Ozone

Oxygen is an element, and like other gaseous elements, normally exists as a pair of atoms bonded together to make a whole molecule. Chemists therefore use the symbol O_2 to speak of “oxygen molecules” rather than oxygen atoms.

In the presence of an electric discharge like lightning, three molecules of O_2 can combine to form O_3 known as ozone. While oxygen has no smell, ozone has a very pronounced smell in large concentrations. In small quantities, it causes the pleasant “fresh air” smell that laundry has when dried on a outdoor clothesline. Some clothing dryer manufacturers have installed an ultraviolet lamp inside their machines to give clothes that “fresh-as-all-outdoors” smell.

The technician must understand three things about ozone:

1. Ozone (O_3) breaks down quickly into plain oxygen (O_2).
2. Ozone kills germs.
3. Ozone is a strong oxidizer.

Because ozone breaks down quickly into oxygen (O_2), a residual sanitizer must be used. There are two choices, chlorine or bromine. While chlorine is oxidized by ozone just as quickly as bromine, residual bromine compounds are a much better disinfectant than residual chlorine compounds. Hence ozone and bromine team up much better to do the overall job than ozone and chlorine.

A8 Understanding pH

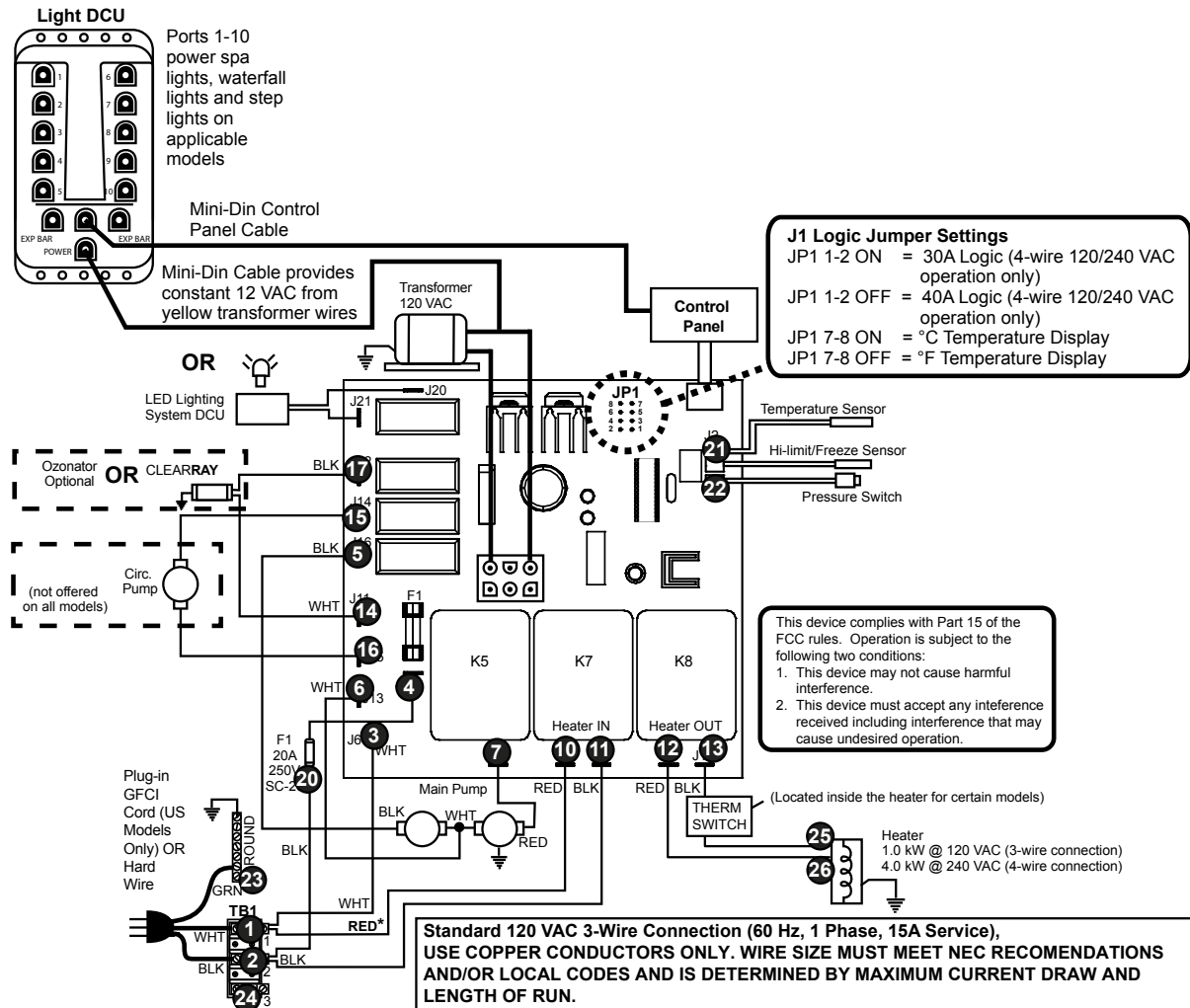
Keeping hot tub water clean and clear involves a very complex set of chemical reactions. Most importantly, the hot tub must be sanitized. Bacteria, algae, and other single-cell life forms that may find their way into the hot tub must be killed. Three chemical elements, chlorine, bromine, and ozone are all good sanitizing agents. When any of these elements come into contact with bacteria or algae, these single-cell organisms die. Therefore, to keep the water germ free, we must simply keep a residual of the sanitizing agent in the water.

Making germs dead is only half the objective, however. The dead cells of the bacteria and algae we have killed, and the organic “stuff” (dandruff, perspiration, dead skin cells, etc.) that our bodies deposit in the hot tub, will make the water cloudy and uninviting as they decompose. These microscopic contaminants must be “burned out” or oxidized. These oxidation reactions occur simultaneously with reactions known as reduction reactions. The balance of these chemical reactions is quite critical and can occur properly only if pH levels are maintained from 7.2 to 7.8 pH (Ideal 7.4 to 7.6). If the pH is out of range, the sanitizing agent itself will be oxidized or reduced and in effect be “used up” before it has a chance to do its job.

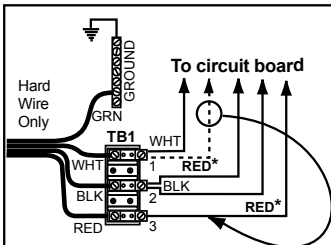
pH is critical for maximum disinfection, sanitizing, and cleaning results with the least amount of chemical addition. Make sure your customer understands the importance of regular water test intervals and the proper use of chemicals. Both are necessary to ensure maximum water quality and to maintain a healthy and fun hot tub environment.

A9 North American 60 Hz 120V/240V Convertible 1-Pump Models

- Board is shown with 2013+ DCU with minidin connectors.
- 2011-2013 J300s only
- 2011-2012 Models used the ribbon style DCU.
- This is a generic diagram actual connections and components may vary.



WARNING, ELECTRICAL SHOCK HAZARD EXISTS! Always remove power to spa before wiring and/or configuring the circuit board



Optional 4-Wire 240/120 VAC Convertible Heater Connection

1. Remove and discard the factory installed GFCI Cord.
2. Move RED* wire from TB1 position #1 to TB1 position #3 as shown below.
3. Permanently connect to the power supply. Use copper conductors ONLY. Wire size must be appropriate per NEC and/or local codes.
4. If hot tub is to be operated on 30A service, make sure the jumper provided at location JP1 #1 & 2 on the circuit board is installed. If hot tub is to be operated on 40A service, remove the jumper JP1 #1 & 2 on the circuit board.

EXTERNAL SERVICE PANEL BOX DISCONNECT MEANS MUST BE LOCATED NO CLOSER THAN 5 FT. (1.52m) FROM THE INSIDE WALLS OF THE SPA AND WITHIN SIGHT OF SPA

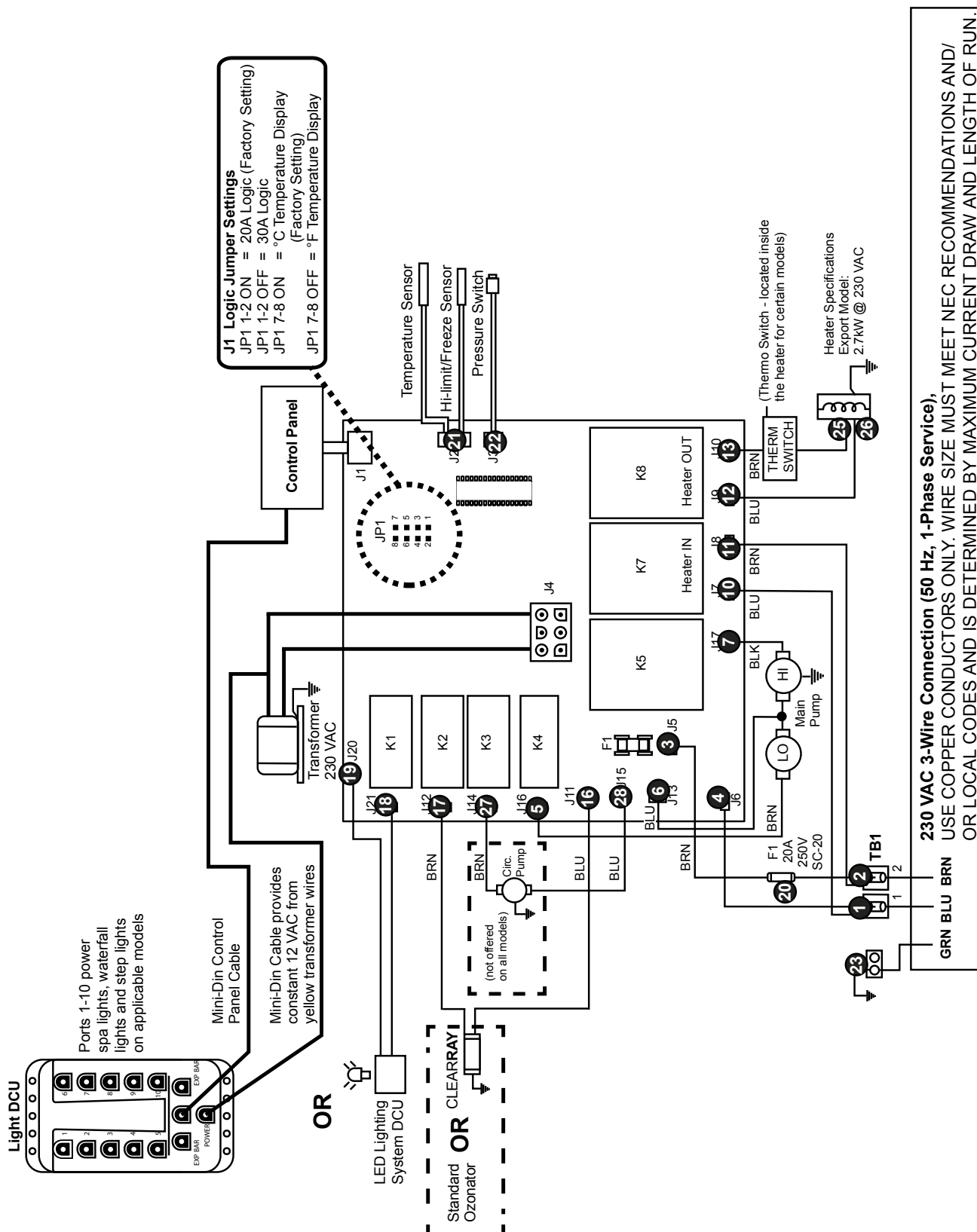
MAIN POWER ON/OFF SHUTOFF SWITCH

- Board is shown with 2013+ DCU with minidin connectors.
- 2011-2013 J300s only
- 2011-2012 Models used the ribbon style DCU.
- This is a generic diagram actual connections and components may vary.



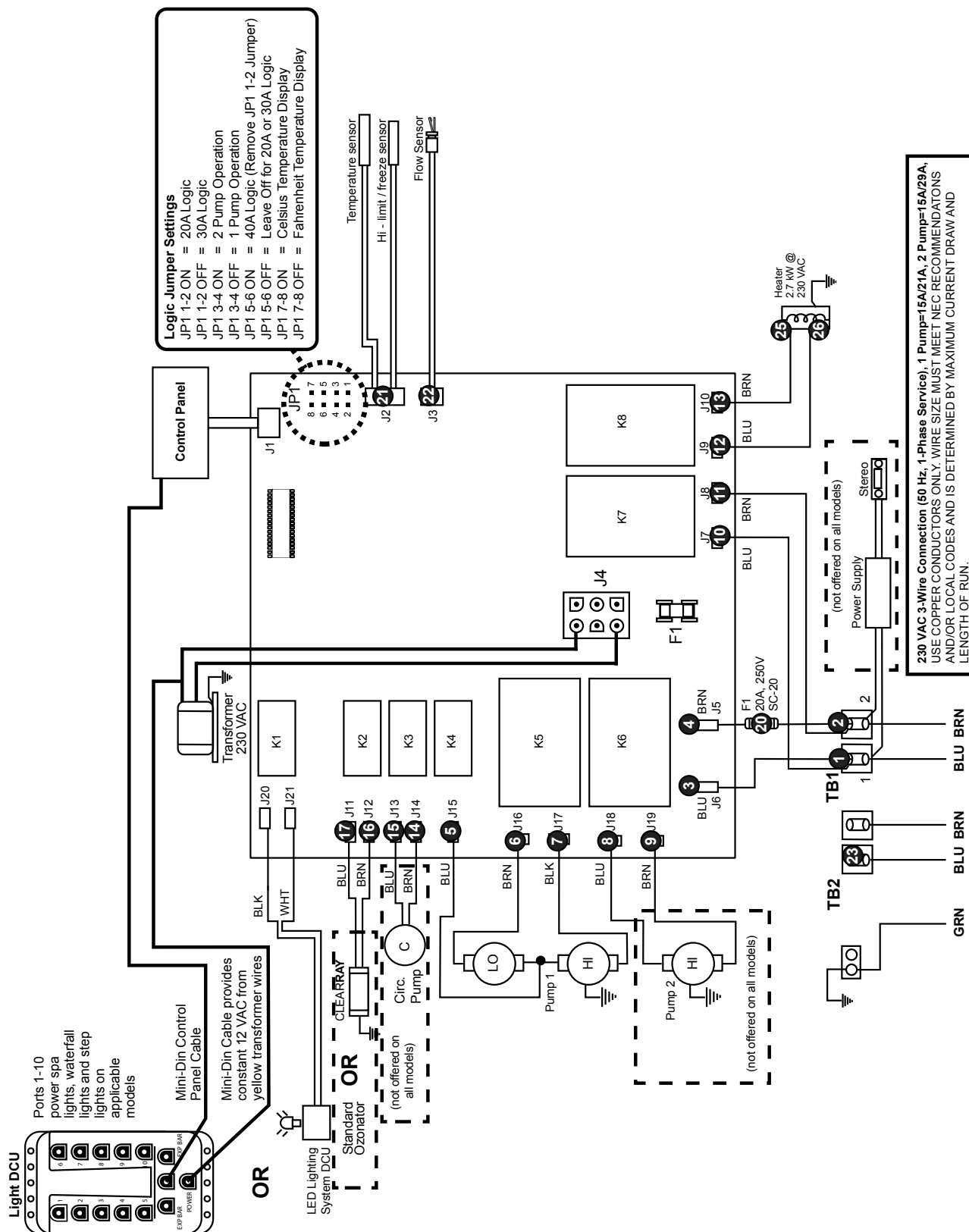
A11 Export 50 Hz 230V 1-Pump Models

- Board is shown with 2013+ DCU with minidin connectors.
- 2011-2013 J300s only
- 2011-2012 Models used the ribbon style DCU.
- This is a generic diagram actual connections and components may vary.

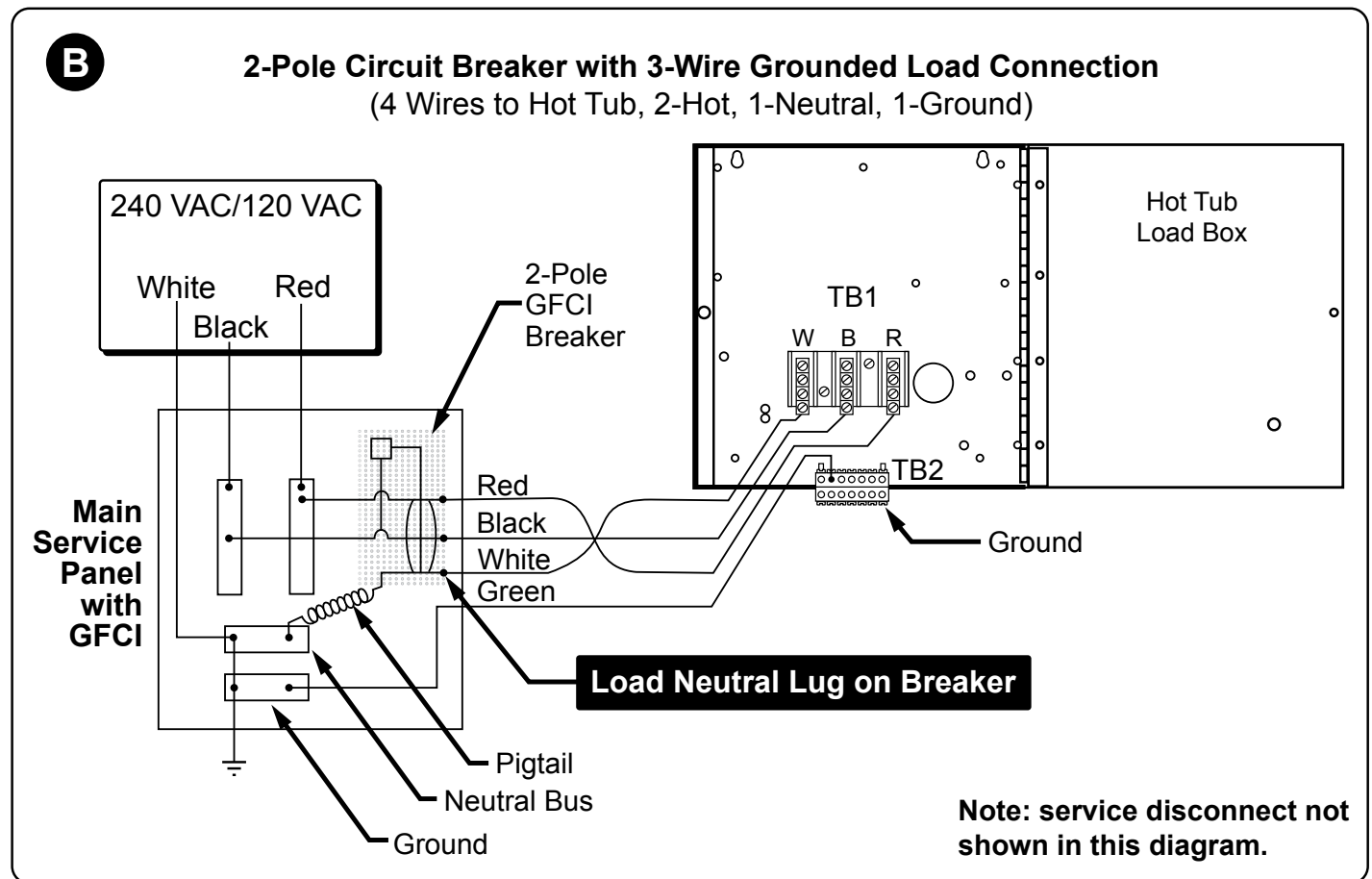
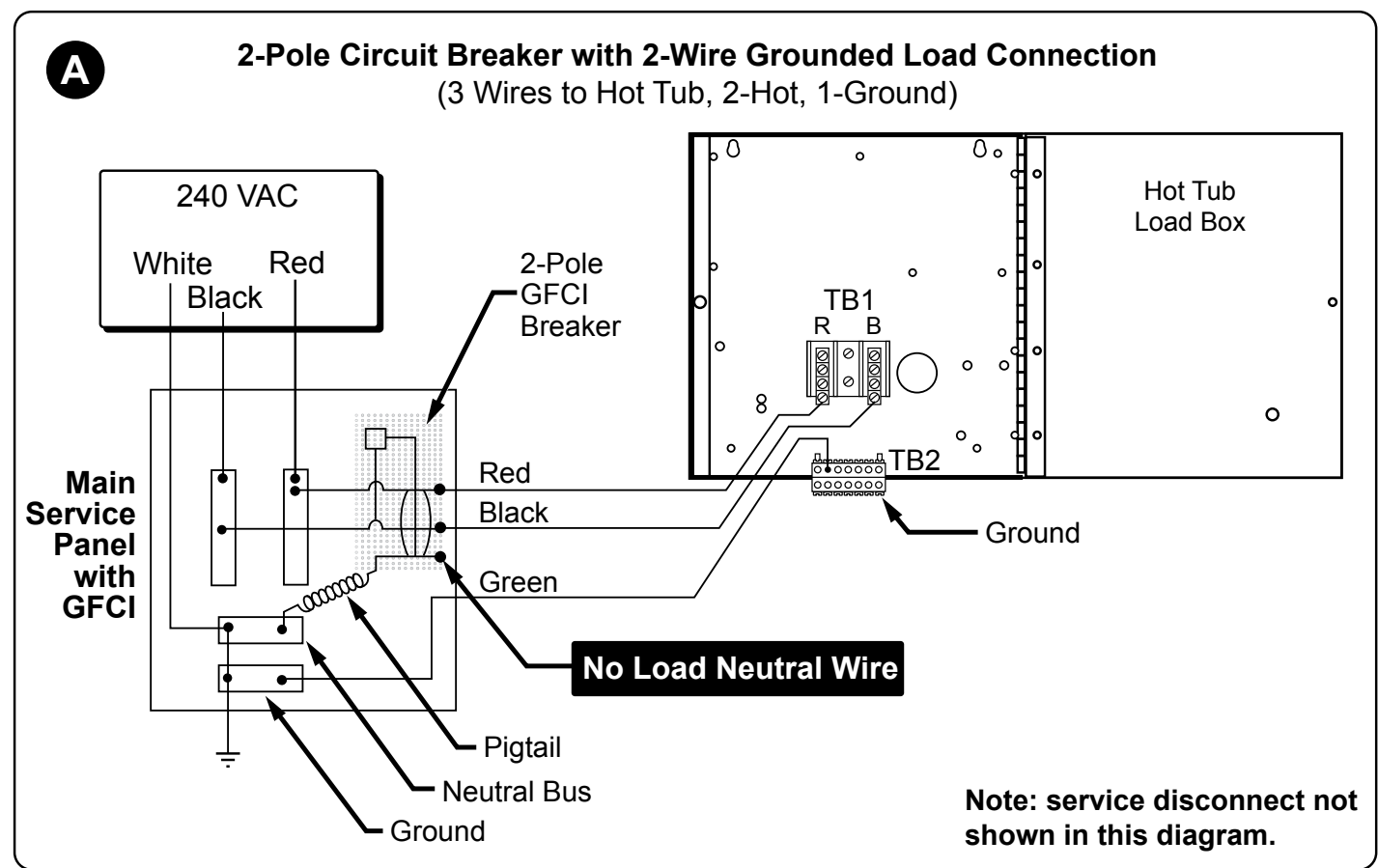


A12 Export 50 Hz 230V 1- or 2-Pump Models

- Board is shown with 2013+ DCU with minidin connectors.
- 2011-2013 J300s only
- 2011-2012 Models used the ribbon style DCU.
- This is a generic diagram actual connections and components may vary.

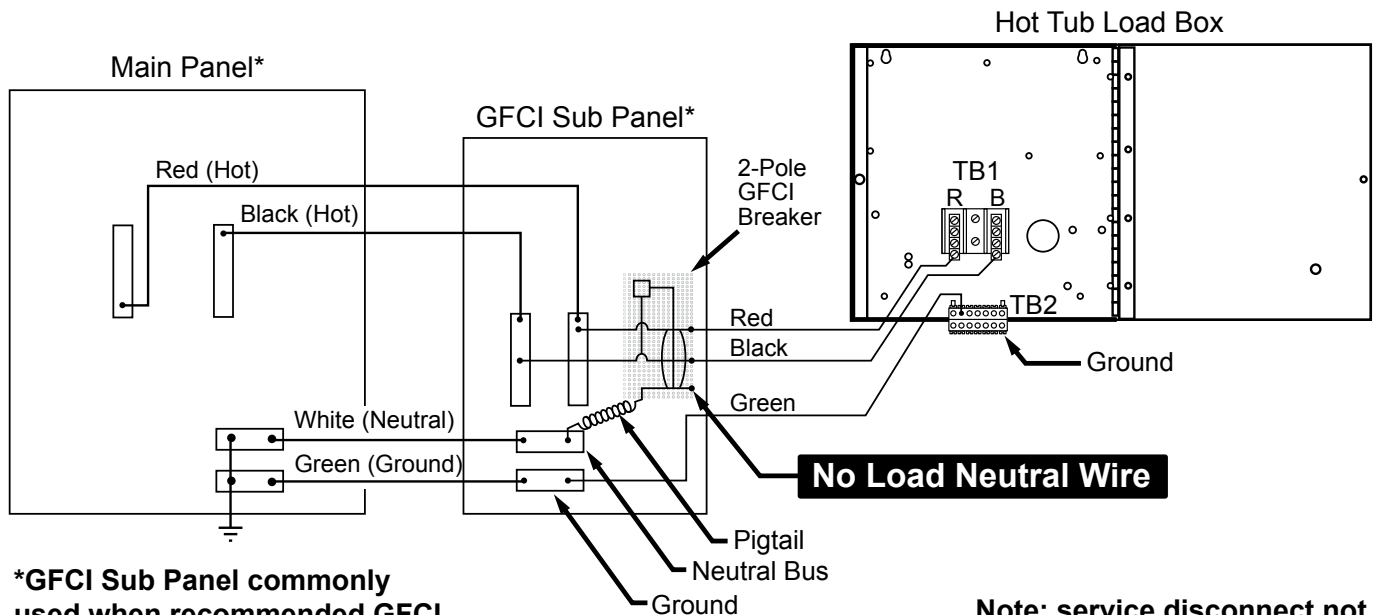


A13 Load Box Connection Diagrams A - D (North American 60 Hz)



C

Main Panel with Secondary GFCI Shut-Off Box Using a 2-Pole GFCI Breaker with 2-Wire Grounded Connection
(3 Wires to Hot Tub, 2-Hot, 1-Ground)

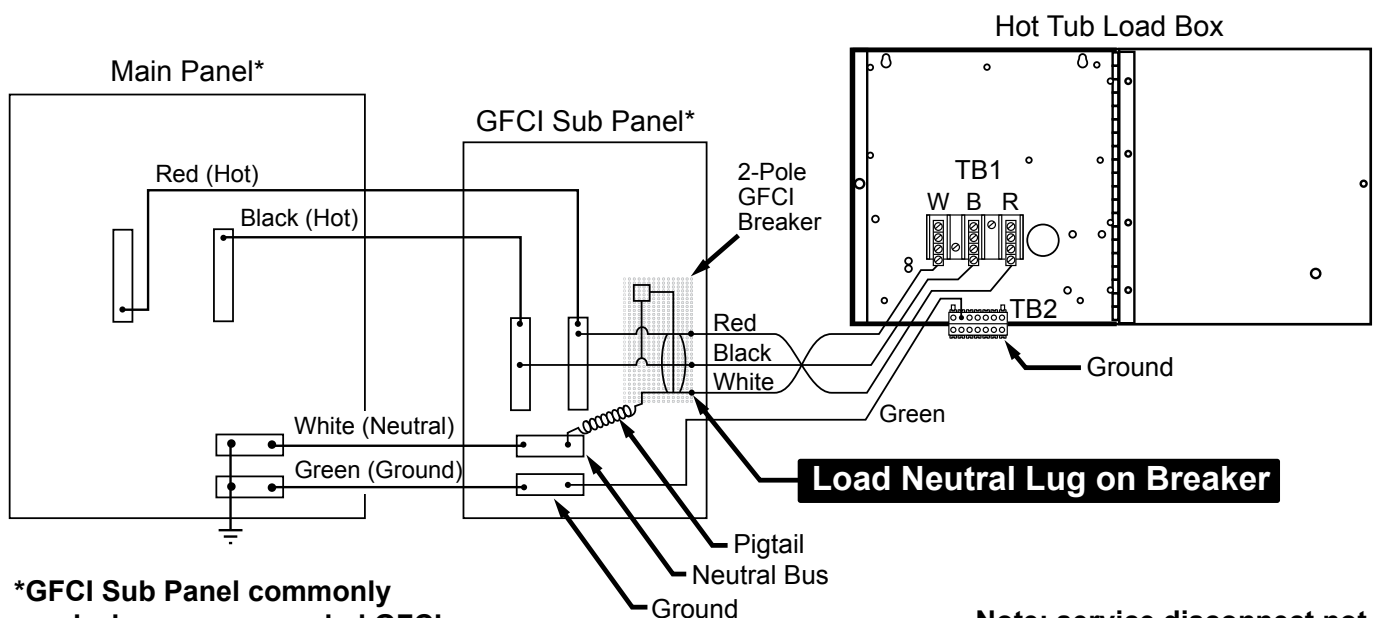


*GFCI Sub Panel commonly used when recommended GFCI does not install in Main Panel.

Note: service disconnect not shown in this diagram.

D

Main Panel with Secondary GFCI Shut-Off Box Using a 2-Pole GFCI Breaker with 3-Wire Grounded Connection
(4 Wires to Hot Tub, 2-Hot, 1-Neutral, 1-Ground)



*GFCI Sub Panel commonly used when recommended GFCI does not install in Main Panel.

Note: service disconnect not shown in this diagram.

A14 Temperature Sensor/Hi-Limit Sensor Resistance Chart

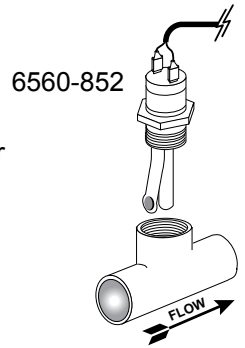
Fahrenheit (°F)	Celsius (°C)	Ohms (Ω)
59.0.....	15	48840
60.8.....	16	46J200
62.6.....	17	44610
64.4.....	18	42630
66.2.....	19	40770
68.0.....	20	39000
69.8.....	21	37290
71.6.....	22	35400
73.4.....	23	34170
75.2.....	24	32700
77.0.....	25	30000
78.8.....	26	28740
80.6.....	27	27540
82.4.....	28	26400
84.2.....	29	25311
86.0.....	30	24270
87.8.....	31	23280
89.0.....	32	22329
91.4.....	33	21429
93.2.....	34	20541
95.0.....	35	19740
96.8.....	36	18960
98.6.....	37	18210
100.4.....	38	17490
102.2.....	39	1J2000
104.0.....	40	16149
105.8.....	41	15519
107.6.....	42	14919
109.4.....	43	14349
111.2.....	44	13800
113.0.....	45	13281

A15 Flow Switch Illustration (Models with a circulation pump)

Flow Switch #6560-852

- 2011-2013 J315, J-325 Models

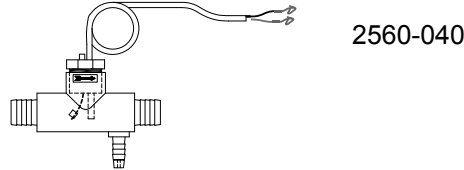
Connection: This flow switch style has spade connectors at top for easy cable removal for electronic troubleshooting.



Flow Switch #2560-040

- 2011+ JLX
- 2011-2013 J300 (except J-315 and J-325)
- 2011-2012 J-230, J-270, J-280 (with Circulation Pump)

Connection: This flow switch style has cable with curled finger connectors that can be removed from plug for electronic troubleshooting.

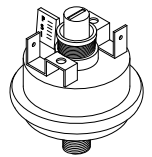


A16 Pressure Switch Illustration (Models without a circulation pump)

Pressure Switch #6560-869

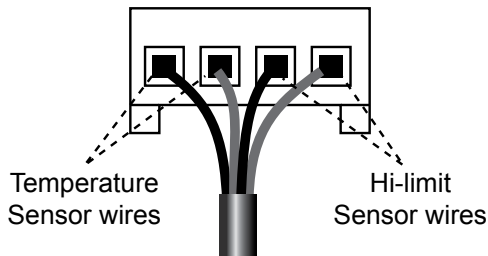
- 2012+ J J-235, J-245, J-275
- 2011+ J-210, J-280
- 2011-2012 J-230, J-270

Connection: This pressure switch has spade connectors at top for easy cable removal for electronic troubleshooting.

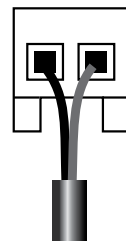


A17 Sensor Harness Diagram

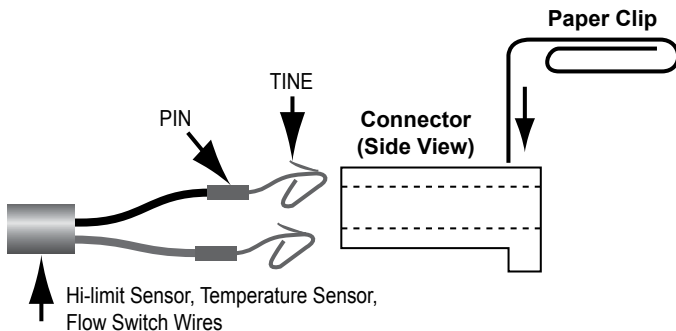
J2 Connector (Cable Side)
Shown while Plugged into Circuit Board



J3 Connector (Cable Side)
Shown while Plugged into Circuit Board



- Flow Switch
- Pressure Switch



To remove a sensor/switch wire from the either J2 or J3 connectors, insert the end of a paper clip into the slot corresponding with the wire to be removed. This will depress the tine on the pin allowing the wire to be pulled from the harness.

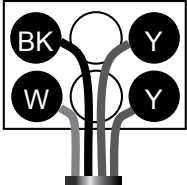
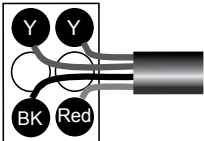
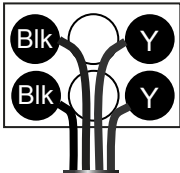
IMPORTANT!

When reinstalling the sensor/switch, make sure the tine on the pin is lifted so the sensor wire will lock into the connector body.

A18 Transformer Test

To Test Transformer:

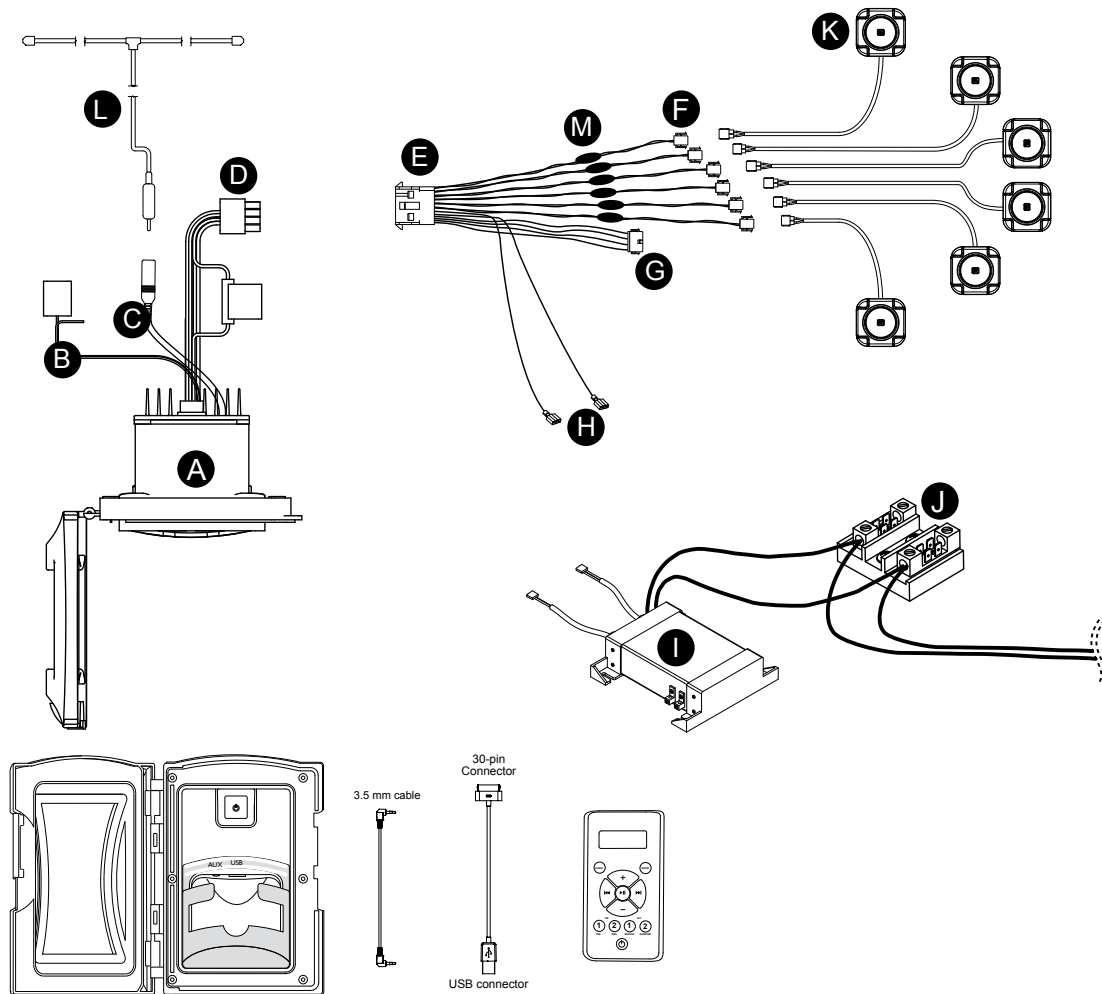
1. Leave transformer connector J4 plugged into the circuit board.
2. Set your Voltmeter to the 500 VAC range.
3. Place Voltmeter probes directly into backside (wire side) of J4 connector and test as follows:

North American 60 Hz 2011-2013 J-315/J-325 (120 VAC or 240 VAC Powered*) Connector J4 Voltage Black to White 120 VAC* Yellow to Yellow 12-14 VAC*	120 VAC/240 VAC Convertible Models* (Wire End View) 
North American 60 Hz J-210 (120 VAC or 240 VAC Powered*) Connector J4 Voltage Black to White 120 VAC* Yellow to Yellow 12-14 VAC*	
*Special instructions for all 120 VAC/240 VAC convertible power models. 120 VAC Power Configuration: Convertible models include a factory installed 10 foot GFCI cord rated at 15A/120 VAC. To use cord the hot tub must be installed within 10 feet of a dedicated, grounded type electrical outlet. Do not use an extension cord of any type! If the hot tub is more than 10 feet from an outlet, it must be hard wired to a single pole 15 amp GFCI breaker. Refer to pages 50-53 for specific circuit board configurations. 240 VAC Power Configuration: Convertible models can be hard wired for 4-wire 120 VAC/240 VAC power. This configuration powers the heater with 240 VAC while powering both pumps and ozone with 120 VAC. An external 30 or 40 amp dual pole GFCI breaker is required. Refer to pages 50-53 for specific circuit board configurations.	
North American 60 Hz J-LX, J-LXL, (240 VAC Powered) 2011-2013 J-335, J-345, J-355, J-365, J375 (240 VAC Powered) Connector J4 Voltage Black to Red 240 VAC Yellow to Yellow 12-14 VAC	240 VAC Models (Wire End View) 
North American 60 Hz J-230, J-235, J-245, J-270, J-275, J-280 (240 VAC Powered) Connector J4 Voltage Black to Red 240 VAC Yellow to Yellow 12-14 VAC	
All Export 50 Hz Models	
230 VAC Powered Connector J4 Voltage Black to Black 230 VAC Yellow to Yellow 12-14 VAC	Export 50 Hz Models (Wire Side View) 

A19 Troubleshooting The Optional Stereo System

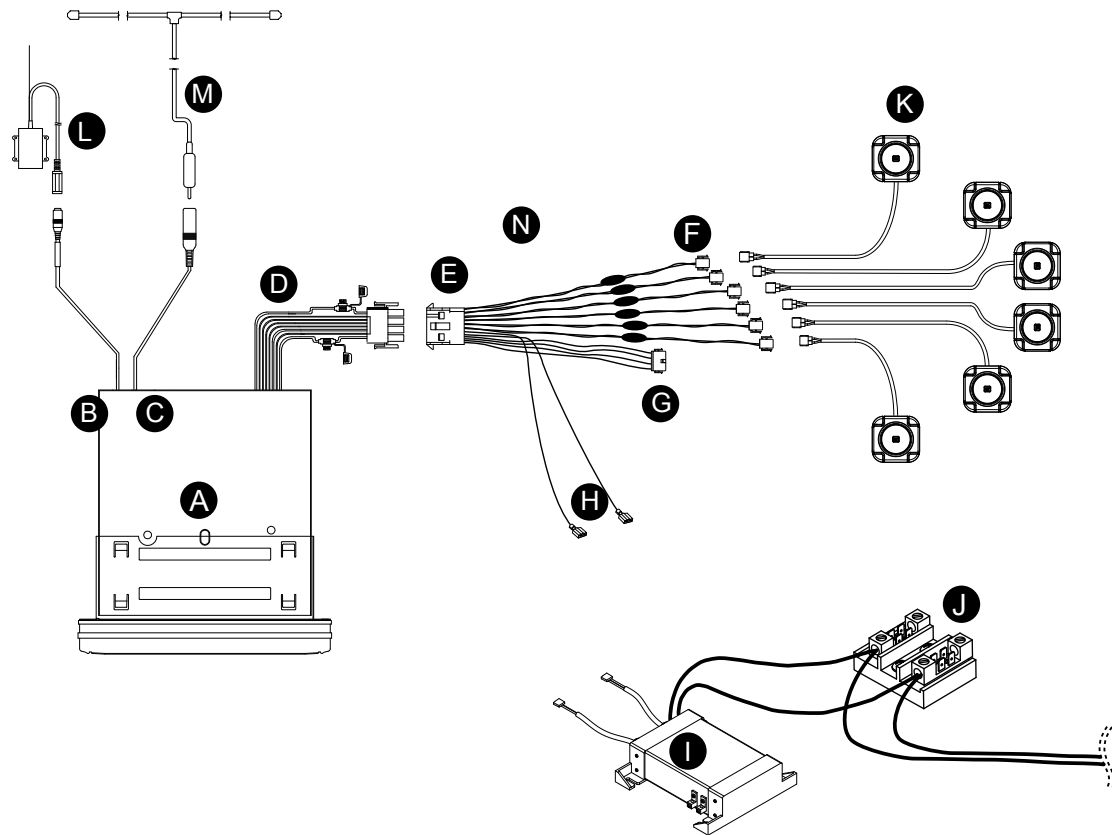
The optional Stereo System provides a stereo receiver with high quality hot tub engineered speakers for superior sound quality. If the stereo deck does not turn on, refer to the following test procedure.

I. BLUEWAVE stereo diagram (follow the testing procedures for the Aquatic stereo)



A	BLUEWAVE stereo with connections	H	Spade connectors (connect to the power supply)
B	Control Panel connection	I	Power supply (located in equipment bay)
C	Antenna connection on stereo	J	TB1 terminal (located in control box)
D	Stereo harness (connects to wiring harness "E")	K	Spa speakers (connect to wiring harness)
E	Spa wiring harness (connects spa components to stereo)	L	Stereo antenna
F	Spa harness speaker connectors	M	Crossovers for the speakers
G	Subwoofer connector (connects to spa wiring harness)		

II. Aquatic stereo diagram



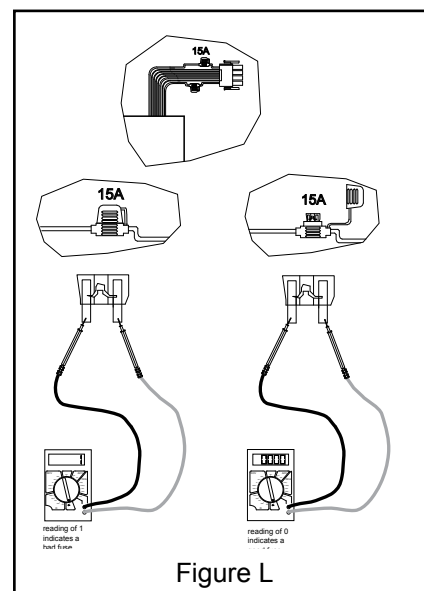
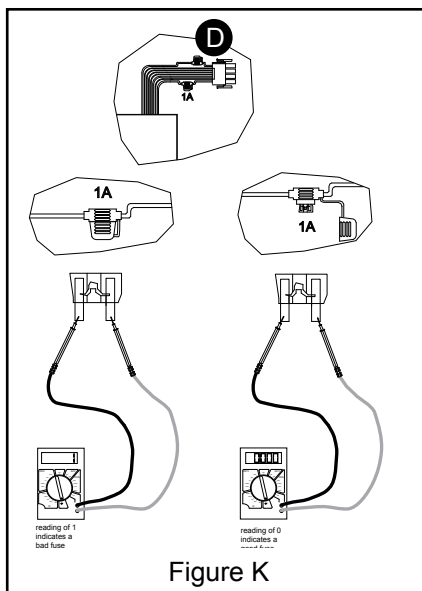
A	Aquatic stereo with connections	H	Spade connectors (connect to the power supply)
B	Remote sensor connection (connects to remote sensor unit)	I	Power supply (located in equipment bay)
C	Antenna connection on stereo	J	TB1 terminal (located in control box)
D	Stereo harness (connects to wiring harness "E")	K	Spa speakers (connect to wiring harness)
E	Spa wiring harness (connects spa components to stereo)	L	Wireless remote sensor unit
F	Spa harness speaker connectors	M	Stereo antenna
G	Subwoofer connector (connects to spa wiring harness)	N	Crossovers for the speakers

B. Testing power to stereo

1. Set voltage meter to 750 VAC.
2. Test across the TB1 terminal block (**J**) for 230 VAC.
3. If voltage is present, proceed to step C. If no voltage is present, check the breaker.

C. Testing the fuses

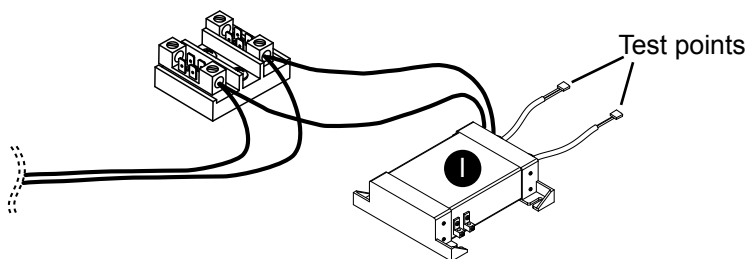
1. Turn power to the spa OFF.
2. Locate the red fuse wire on the stereo wiring harness (**D**), Figure K. Not found on the BLUEWAVE system.
3. Open the black casing that encloses the fuse and remove the 1A fuse.
4. Set your meter to test for continuity.
5. Test across the fuse.
 - A. A reading of "1" indicates a bad fuse. Replace the fuse and retest.
 - B. A reading of "0" indicates a good fuse. Proceed to testing the 10A fuse.
6. Locate the yellow fuse wire on the stereo wiring harness (**D**), Figure L. The BLUEWAVE system will only have this fuse.
7. Open the black casing that encloses the fuse and remove the 15A fuse.
8. Set your meter to test for continuity.
9. Test across the fuse.
 - A. A reading of "1" indicates a bad fuse. Replace the fuse and retest.
 - B. A reading of "0" indicates a good fuse. Proceed to testing the power supply.



D. Testing the power supply

1. Turn power to the spa OFF.
2. Disconnect the spade connectors between the power supply (**I**) and the spa wiring harness (**H**).
3. Turn power to the spa back ON.
4. Set your meter to 20 VDC.
5. Test across the spade connectors for the power supply (**I**) for 12-15 VDC, Figure M.
6. If voltage is good then the stereo unit is bad. If voltage is bad then the power supply is bad.

Figure M



A20 Glossary of Terms

Circuit Board:	Printed circuit board assembly that distributes voltage to selected components.
Control Panel:	Component that allows user to access functions provided by the circuit board.
Ammeter:	Device which measures electrical current conducted through a wire or electrical device.
Micro Chip:	Chip on circuit board that stores hot tub software.
Flow Switch:	Switch that informs circuit board there is sufficient water movement to activate heater. This switch identifies water flow.
Hi-limit Sensor/Disk:	Sensor that monitors water temperature inside heater.
Jumper:	Device on circuit board that mechanically connects (bridges) two points together.
Ohmmeter:	Device that measures the resistance in ohms (Ω) of a component or temperature sensitive device (e.g. temperature sensor, heater element etc).
CD Ozonator:	A device that produces ozone gas by passing air through a corona discharge (high voltage arc) chamber. 2011-2013 J300/J200 Models (with circ pump): Introduce ozone 24 hours a day until a JETS button is pressed. Both filter cycle and ozone production is canceled after a JETS button is pressed and then turn back on approximately 5 minutes after jets turn off. J-LX/J200 Models: Introduce ozone only during a filter cycle or a heat call.
Pin Assignments:	Locations identified by numbers on circuit board.
Pressure Switch:	J200 Models Only - Switch that informs circuit board there is sufficient water movement to activate heater. This switch identifies water pressure.
Sensor Connector:	Plug in connector containing the temperature sensor and hi-limit sensor device connections.
Summer Logic:	Deactivates Circulation Pump, CLEAR RAY and/or optional ozone generator when hot tub water reaches 2°F (1°C) above the set temperature. Hot tub water must be 95°F (35°C) or higher for summer logic to activate.
Temperature Sensor:	Sensor that monitors hot tub water temperature.
Transformer:	Device that converts primary high voltage AC signal to a secondary low voltage AC signal.
Voltage Meter:	Device that measures AC or DC voltage potentials across components or from a specific test point to ground.

Troubleshooting Data Collection Form

Customer Name _____
Address _____ Phone () _____

Before troubleshooting, collect the following:

1. Model # of Hot Tub _____
2. Serial Number _____
3. Operating Voltage _____ Input Voltage _____

Before calling Technical Support, collect the following:

4. Low Speed Pump Amps _____
5. Pump with Heater Amps _____
6. High Speed Pump Amps _____ Pump #2 Amps _____
7. High Speed Pump + Heater Amps _____
8. Circuit Board Rev. _____ Eprom Rev. _____

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