Pure Spa

2021SSN BUBBLE Spa Control Base Repair Guide

Characteristic Feature			
Item #	**28426/28428/28476**	Control base #: 12836	Model #: SB-H20；SB-H20N
Panel Digital Cable		(new) hexagon type	
Control Panel		Power button on the panel	
Tub shape		Round & Octagon type	
Production date		Start from 2020-6-15	

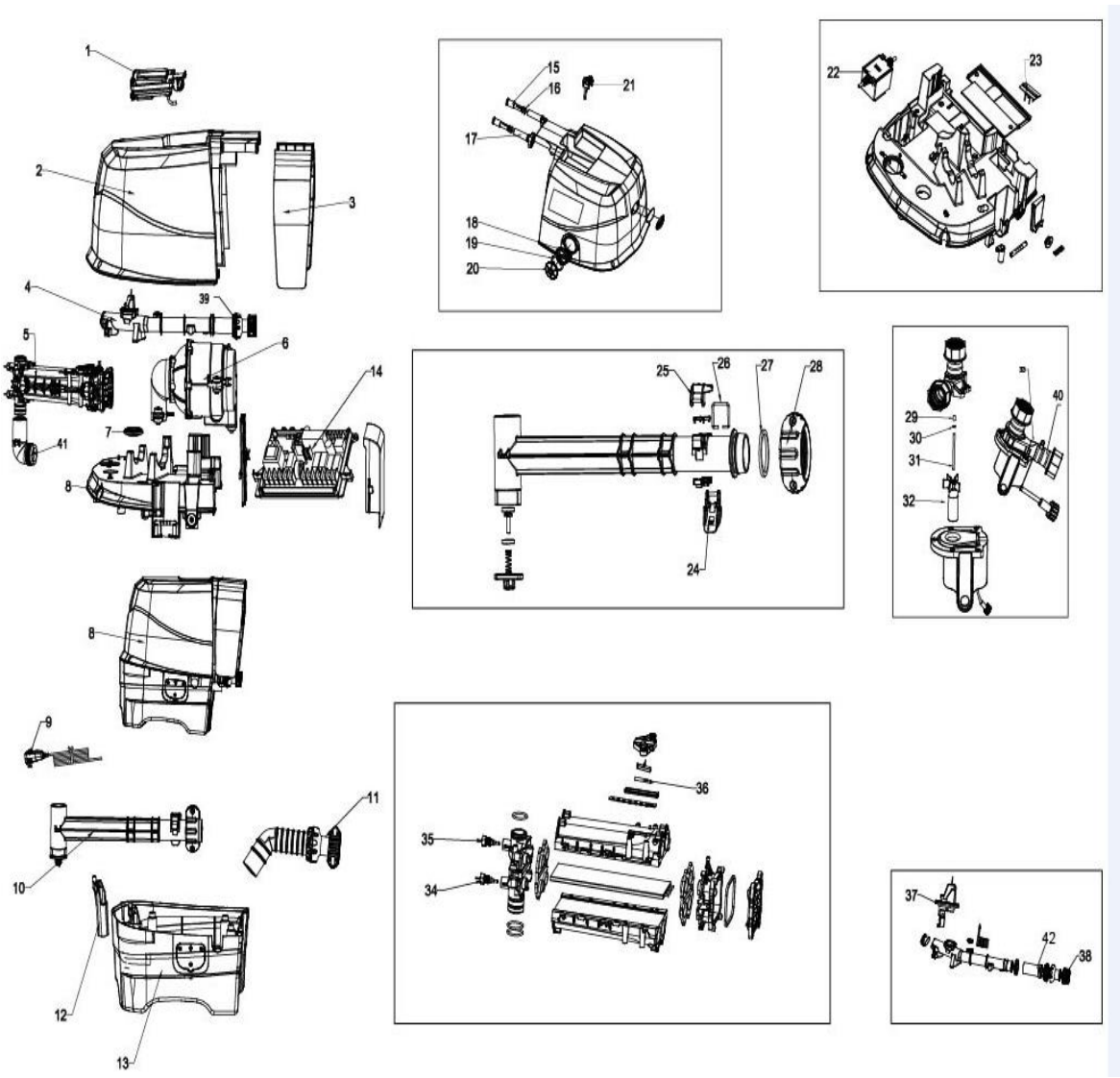
Introduction

The purpose of this guide is to help you understand how to repair the most common issues with the main heating and filtration unit. This includes problems with the various internal sensors, the internal computer (printed circuit board), water and air pumps.

IMPORTANT

Unplug the power cord before replacing spare parts.

28426 Internal Part

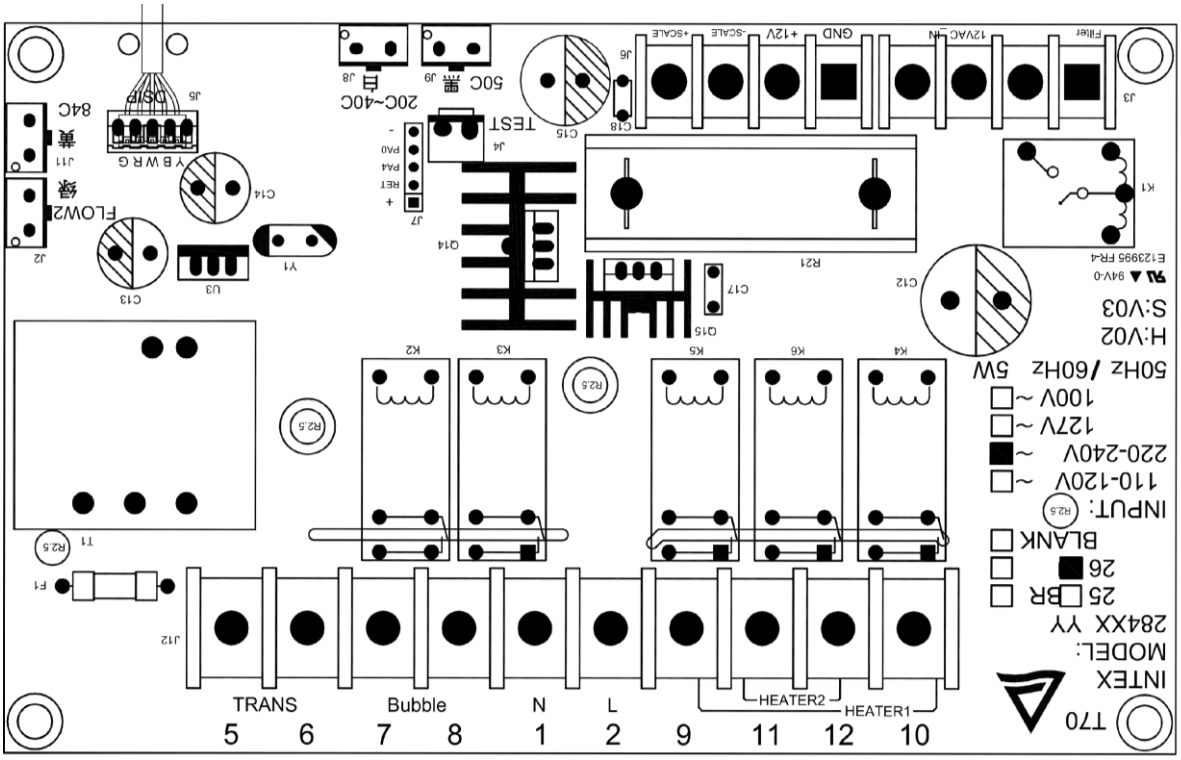


28426 Internal Part

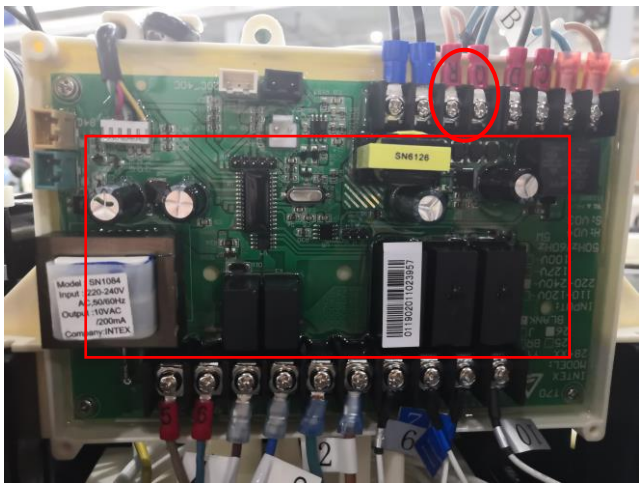
REF.	SP#	QTY	DESC
1	12840	1	SPA CONTROL PANEL FOR 28425/28426
2	12913	1	BUBBLE SPA CONTROL BASE BACK COVER-KHAKI
3	12770W	2	CONTROL BASE SIDE COVER
5	12846	1	PTC HEATER FOR 28442
6	12848	1	AIR BLOWER FOR 28442
8	12836	1	SPA CONTROL BASE FOR 28426/28428/28476
9	11998	1	SPA RCD
10	12914	1	AIR PIPE SET DOWNWARD FOR BUBBLE SPA-KHAKI
11	12915	1	WATER INLET TUBE FOR BUBBLE SPA-KHAKI
12	12916	6	SCREW FOR SPA BASE
13	12917	1	BUBBLE SPA BASE-KHAKI
14	13052	1	MAIN CIRCUIT BOARD FOR 28426
15	12772D	2	SIDE COVER FIXER
17	12771D	2	SIDE COVER BASE
20	12775W	1	DEFLATION OUTLET CAP
21	10064	1	SPA CONTROL PANEL FIXER-BROWN
22	12919	1	TRANSFORMER FOR SB-H20 BUBBLE SPA
~~23~~	~~12920~~	~~1~~	~~RECTIFIER BRIDGE FOR BUBBLE SPA~~（From 20201103 rectifier bridge built in main circuit board#13052）
27	11687	1	SPA CONTROL STATION AIR INLET O-RING
28	11746	1	AIR INLET CONNECTOR NUT FOR 28401/02/03/04
29	10836	1	RUBBER CAP FOR #03R/#638/#638R/638G/637R MOTOR
30	10840	1	RESISTANCE TO RUB WASHER FOR #03R/#638/#638R/638G/637R MOTOR
31	12077	1	CERAMIC BAR FOR 28401MW/28403/04/21/22/23/24/43/44/53/54 & 28402 MADE ON/AFTER 2013-12-10
32	12084	1	MAGNETIC ROTOR AND IMPELLER FOR 28404/28422/28444/28454 & 28402 MADE ON/AFTER 2013-12-10
33	12778	1	FILTER MOTOR FOR 28462
34	12580	1	20-40℃ TEMP. SENSOR FOR BUBBLE SPA MADE ON/AFTER OCT 1ST, 2016
35	12581	1	50℃ TEMP. SENSOR FOR BUBBLE SPA MADE ON/AFTER OCT 1ST, 2016
36	12029	1	84℃ TEMP. FUSE FOR 28402/28404 (14, 15 & 16 VERSION)
37	12310	1	OUTLET FLOW SENSOR FOR BUBBLE SPA (16 VERSION)
38	11745	1	WATER INLET/OUTLET CONNECTOR NUT FOR 28401/02/03/04 (KAKHI)
39	12918	1	WATER OUTLET TUBE FOR SPA-KHAKI
40	12006	1	SPA FILTER MOTOR CONNECTING TUBE
41	12751	2	FILTER MOTOR OUTLET O-RING FOR BUBBLE AND COMBO SPA
42	12601	1	BUBBLE SPA CONTROL BASE INLET HOSE W/ KAKHI NUT

Table of Contents

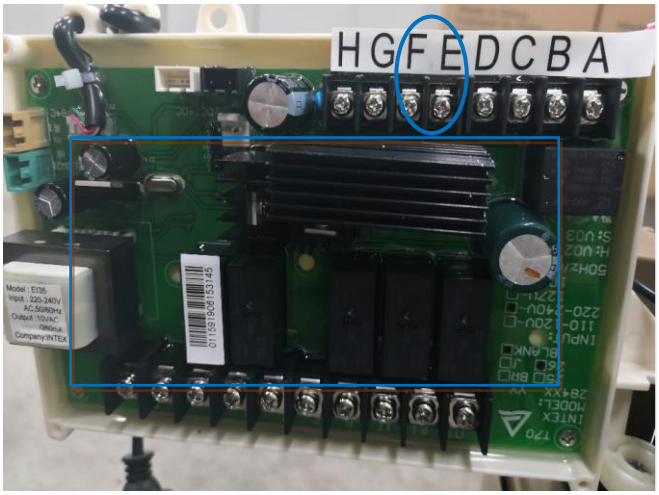
PCB Schematic



New



Old



Remark: From 2020-11-03, Rectifier bridge built in Main circuit board#13052, terminal block E&F change to Q&R. The PCB layout has been totally different with before.

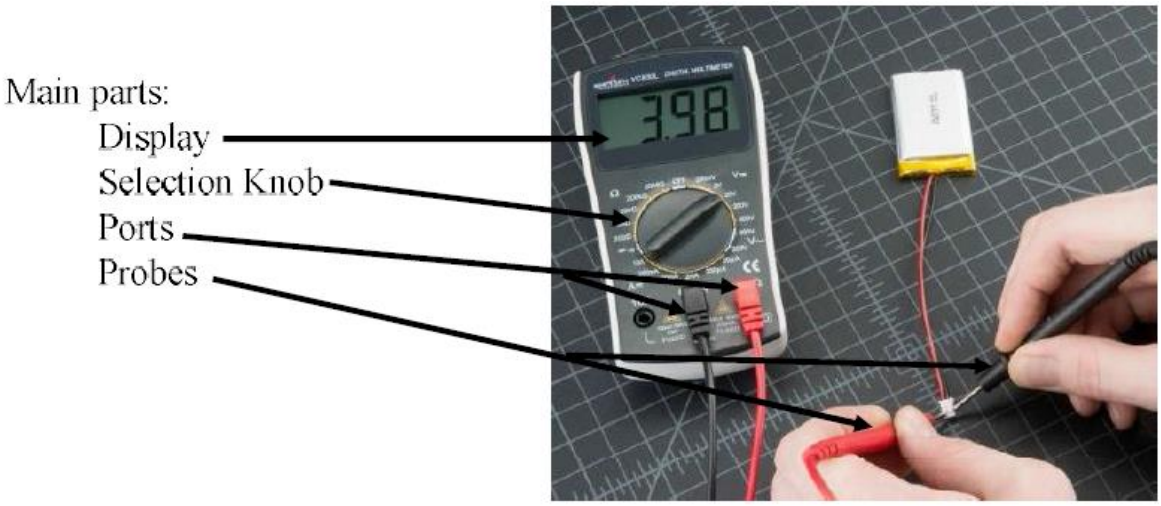
Basic Tools

This is a list of basic tools required to repair almost any problem encountered with a control base. Tools such as a digital multimeter and clip-on ammeter are used to test the electrical current of various components on the control base. Psophometers are used to test certain components based on the loudness of the sound they produce. Water thermometers check the temperature of the spa's water and to verify readings provided by the system's internal thermometers. Screwdrivers and wrenches will help you disassemble and reassemble the unit.

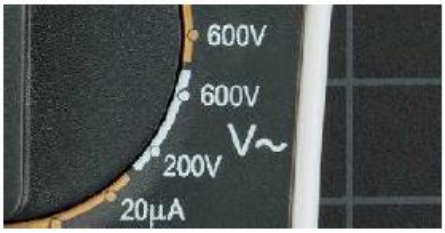
Tools required for spa control base repair

	NAME	SPEC.	PHOTO
1	digital multimeter	0.1mVac-1000Vac/0.1mVdc-1000Vdc, 0.1uAac-10Aac/0.1uAdc-10Adc	
2	clip-on ammeter	20A	
3	psophometer	30-130dB	
4	water thermometer	0-50◦C	
5	electric Phillips screw driver	5X100mm. 8X200mm.	
6	Phillips screw driver	5X100mm. 8X200mm.	
7	Slotted screw driver	3X100mm.	
8	Adjustable wrench	6", 8"	

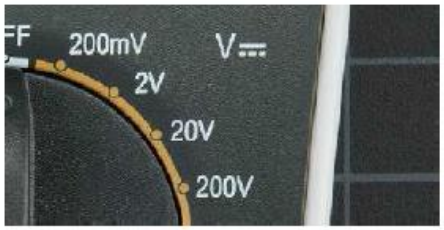
Understanding a Multi-Meter



The range with a V and a wavy line measures AC voltage



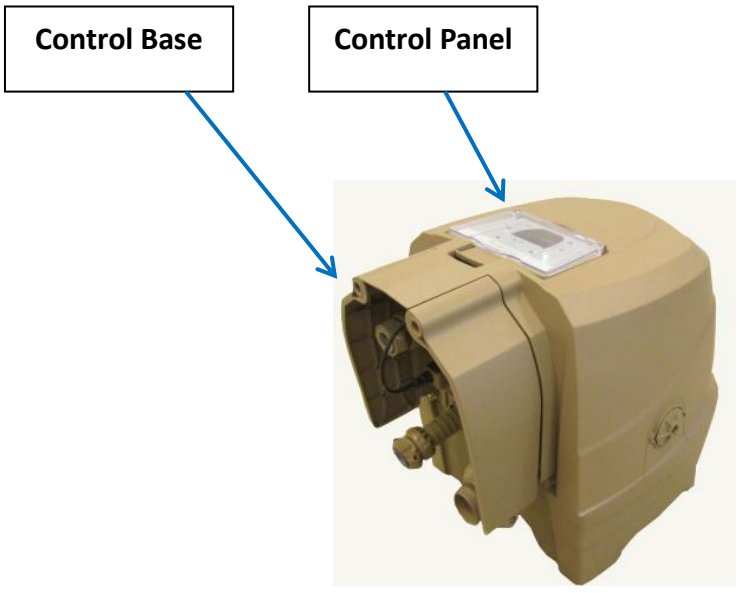
The range with a V and a straight line measures DC voltage



First determine whether you will be testing for AC or DC voltage based on this guide and adjust the meter to a range above the expected reading. For example, if we are looking for a DC voltage between 12 & 14, the knob should be set to 20V in the DC range.
The position of the black and red probes/ports makes little difference. A negative number will be displayed if the cables are swapped. Ignore this and the number displayed is the current reading.

Basic Spa Components

Control Base - This part houses the heater, water pump, and an air pump.
Control Panel- The Control Panel has a display used to adjust temperature and provide diagnostic information when there are problems with the Control Base
Spa Tub- Holds the water. The tub is different depending on spa's features. The inner structure features Dura-Beam construction for strength
Spa Cover – An inflatable safety cover
Important for insulating spa water
Ground Cloth - A cloth that goes underneath the spa tub and provides protection from the ground



21SB-H20***A0

INTEX® PureSpa™

Model / Modèle / Modelo /
Modell / Modello / Model SB-H20
220-240 V~, 50 Hz, IPX5
Water / Eau / Agua /
Wasser / Acqua / Water (20 °C): 2300 W

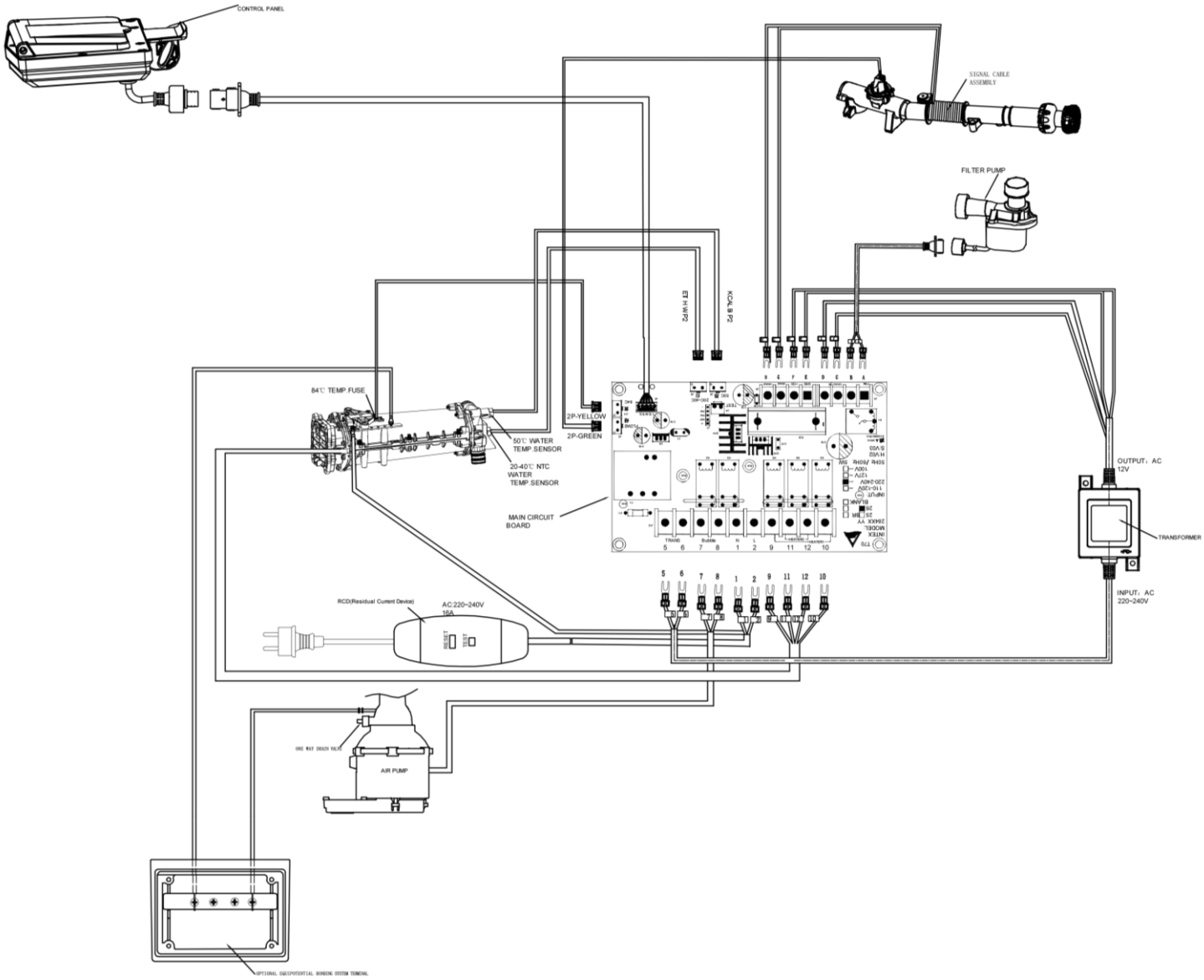



www.intexdevelopment.com/support/videos

Model # Code	SB-H20: (SB)n1-(H)n2(20)n3
n1	SB = Spa Bubble
n2	H = With Hard Water features
n3	20 = 220-240V working wattage

Wiring Schematic

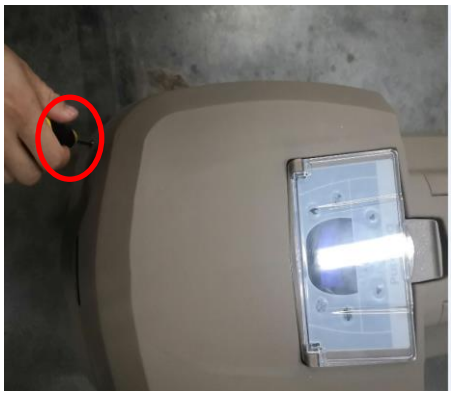
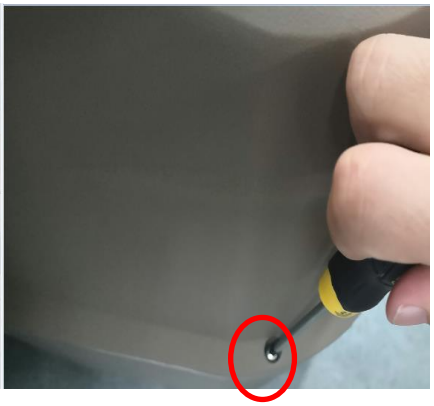
Main circuit Board



Opening the Control Base

Begin by removing 6 screws around the enclosure. Then take strength to pull out the connector. Open the deflation outlet cap with the included bolt wrench and unscrew the one screw that link the outlet cap to release it from the wire.

Removing 4 screws around the cover that hold enclosure

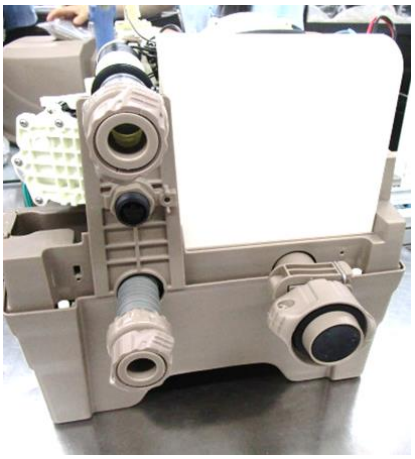



Removing 2 screws near on side, remove the panel from control bas


Release the screw and disconnect the black cord


The Control Panel connector is attached to the outer casing, lift the cover vertically carefully to ensure the cable is not pulled and connection between base and cover is not damaged.

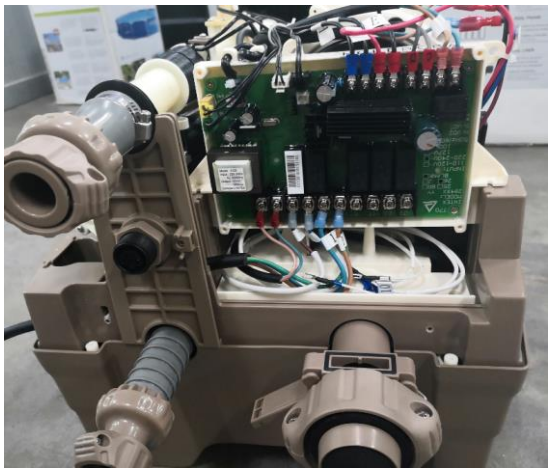
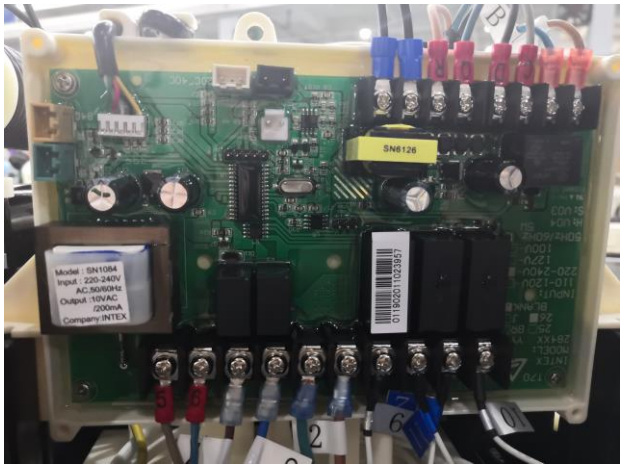




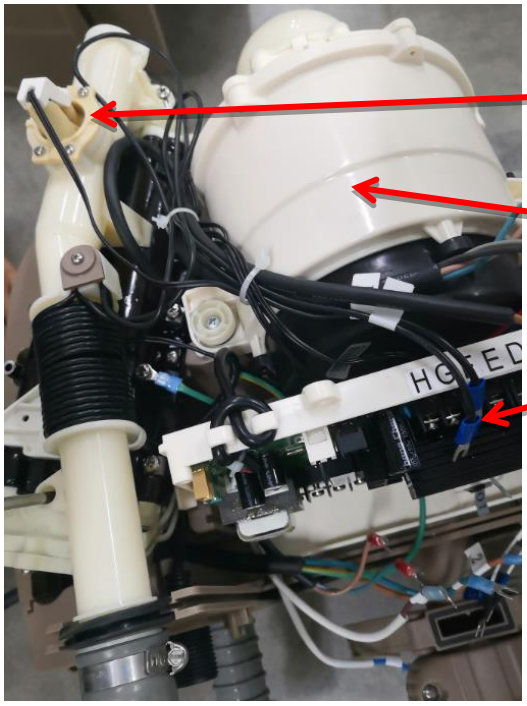
Accessing the PCB

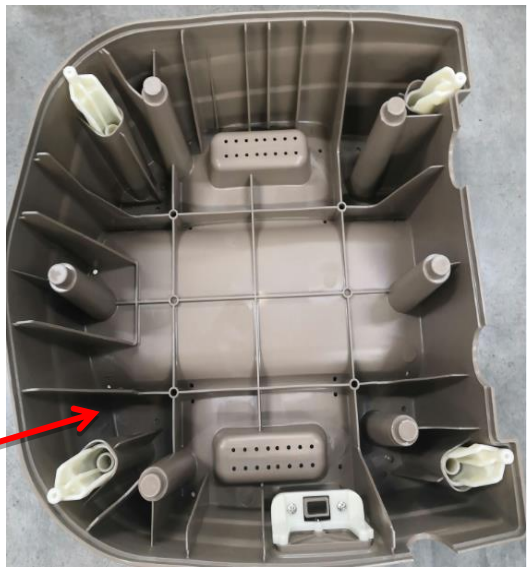
Remove the 2 screws that secure the white PCB cover to reveal the PCB. Unscrew the 2 screws on the holder to remove the PCB set from the Control Base.

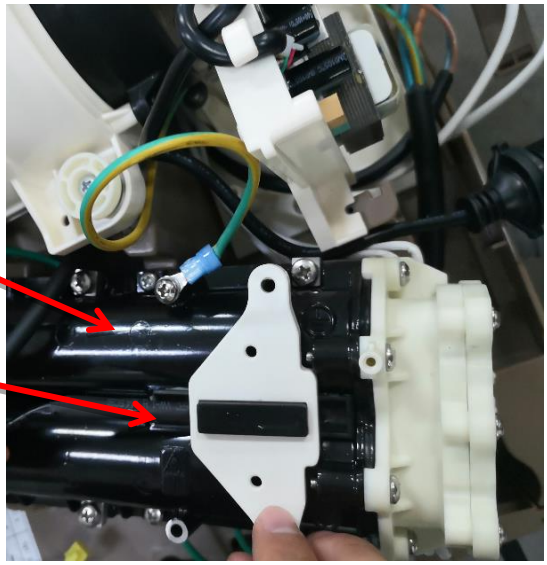


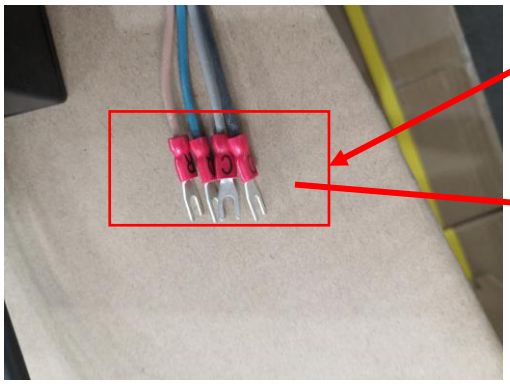



Internal Parts

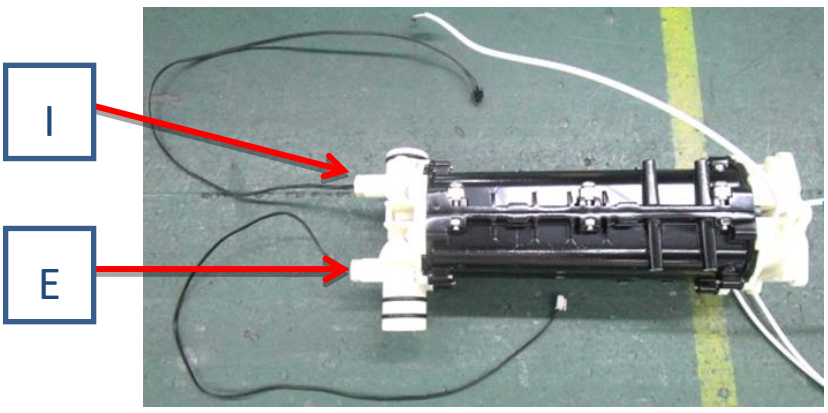






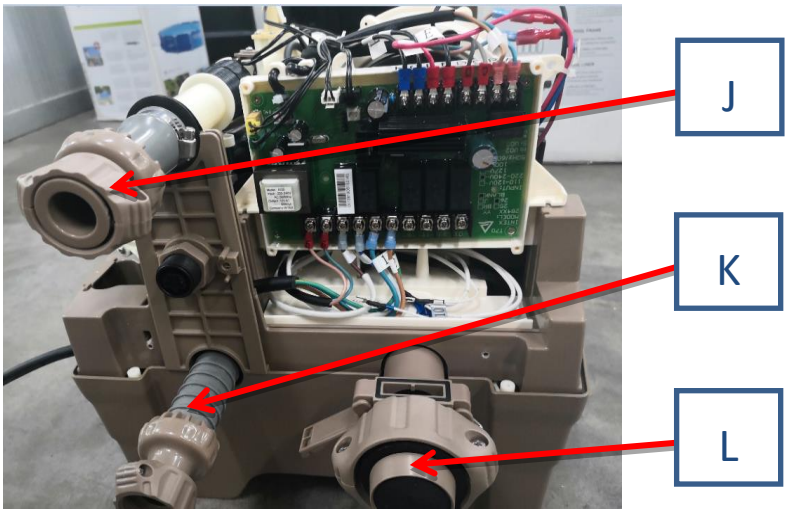


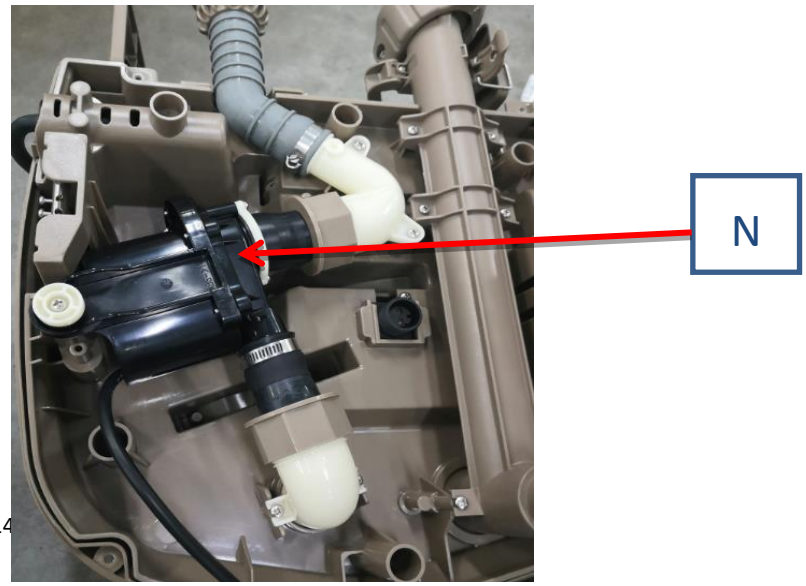
A: The terminal has been changed from Nov.03-2020, the indicate mark is **Q, R, C, D**



NO.	ITEM	Part #
A	Transformer	12919
B	Air Blower	12848
C	PCB (Main Circuit Board)	13052
D	Base	12917
E	20-40℃ Temperature Sensor	12025
F	Heating Element	12846
G	Flow sensor	12310
H	84℃ Temperature Sensor	12029
I	50℃ Temperature Sensor	12026

Internal Parts

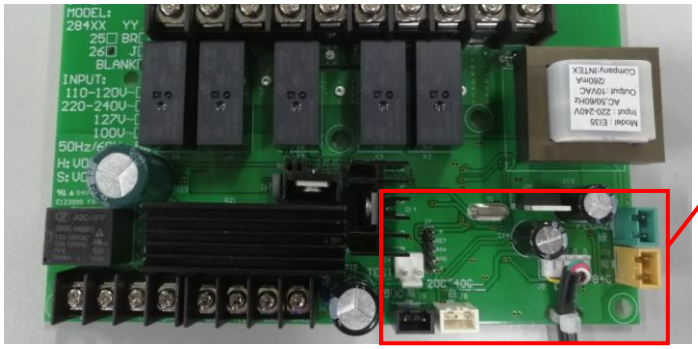




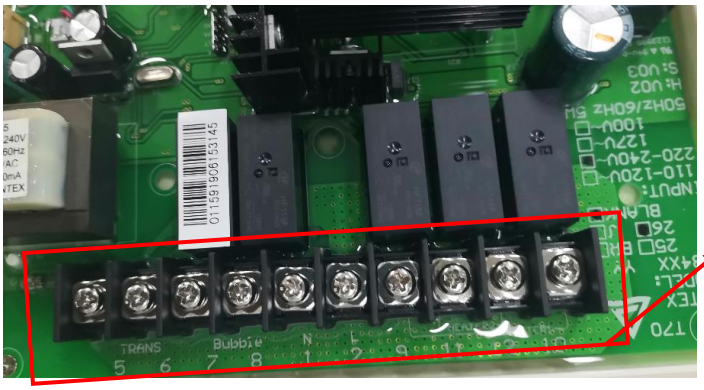
NO.	ITEM	Part #
J	Water Inlet for Tub	12601
K	Water Outlet for Tub	12915
L	Air Inlet nut	12914
M	Electrical Cord with RCD	11998
N	Water Pump (Filter)	12778

Internal Parts

Main circuit Board

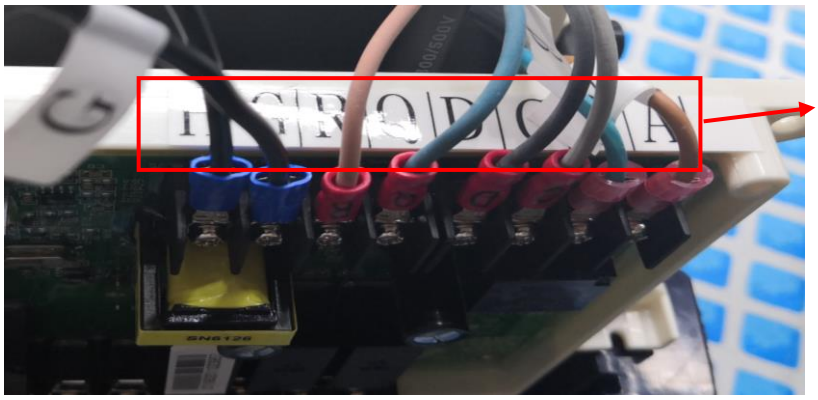


Black:"50C 黑" - Water Temperature Sensor
White:"20~40C 白" - Water Temperature
Green: "FLOW 绿" - Flow Sensor one (E90)
Yellow:"84 C 黄" - Dry Fire Protection (E97)



1 & 2 - Main power supply
5 & 6 - Transformer power input
7 & 8 - Air blower power
9 to 12 - Heating element power

H G R Q D C B A



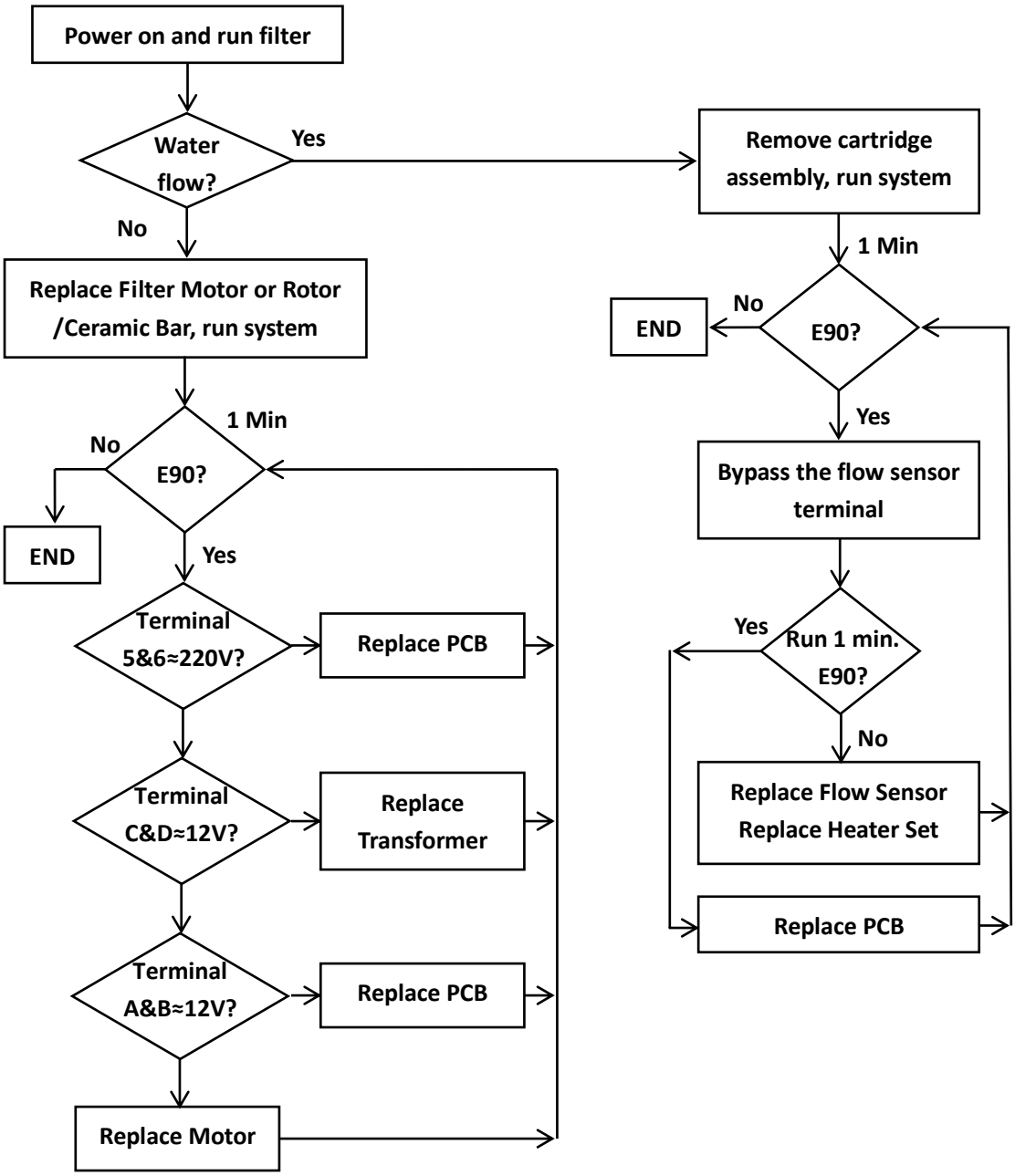
A & B - Filter pump power input
C & D - Transformer output for Filter Pump
Q & R – Input for control/Output of rectifier
G & H - Hardwater coil

Error Code E90

This code indicates low water pressure which could be due to an obstruction or a problem with an internal component.

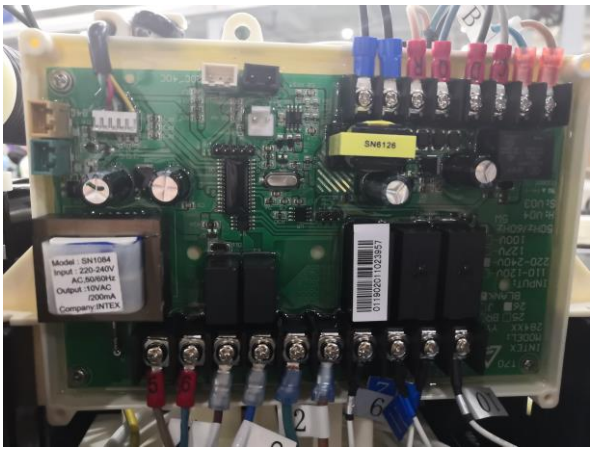
Ensure the correct connection between the control base and tub. The tub is filled with water to the recommended level. Ensure that all filter cartridges, filter housing & suction fittings are free from any obstruction. Turn on the spa control base.

Run the filtering function for 1 minute. If the spa display doesn't indicate an error code and the unit is circulating water without issue, no further troubleshooting is necessary. Remove the unit for further testing if Error Code 90 continues to appear on the panel. If the display indicates Code E90, please follow the logic diagram and instructions as below (E90 has two cases)：



Error Code E90 (Flow Sensor)

1. Check the connection of the flow sensor. Make sure connectors are in good contact. Ensure that the pins inside the connector are not broken or bent. Color and style of connector may be different from the one shown in the photo below. To ensure you are looking at the right cable, follow it back from the PCB terminal marked FLOW.
2. Proceed to testing the unit if the connection was bad to verify. Go to the next step if problem is not fixed.
3. Check the flow sensors. Short the terminal to simulate an inactivated flow sensor after turning on the system and run the filter function. Flow center is located near the air blower.



Replace the defective flow sensor if the system does not display Code 90 and turn off.–

a. Start by unscrewing the PCB cover to reveal the PCB. Disconnect the flow sensor terminal on the PCB as well as terminals H&G.
b. Release the screws for Flow sensor replacment.

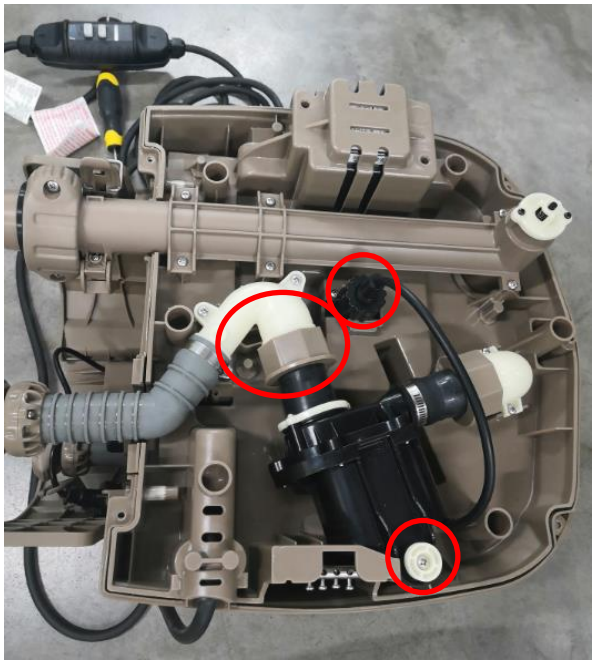
Error Code E90 (Water Pump)

If the display indicates Code 90 & there is no water flow;

1. If only a click can be heard from the pump when attempting to turn on the unit, there is likely a problem with the water pump. Check the water pump for any broken parts inside.

   a. Refer to the control base open procedure to open the enclosure and base opening procedure to open base

   b. Disconnect water pump power cable. Unscrew brown nuts by loosening. Release the screw. Disconnect the black power cord




   c. Unscrew 5 screws on the pump to reveal the impeller and ceramic shaft. The impeller is magnetic so pull it out carefully and make sure it doesn't come in contact with anything sensitive to magnetism. Check for broken parts.


   d. Replace any broken pieces and reinstall the shaft, impeller, washer and rubber caps. Place a rubber cap on the end of the shaft and add a washer over it. Insert the end with the rubber cap into the water pump.

e. Carefully drop the impeller into the pump and ceramic shaft. The magnetism from the impeller is strong so take care not to position your fingers between the impeller and the pump. Add a washer on the ceramic shaft and a rubber cap over the washer.

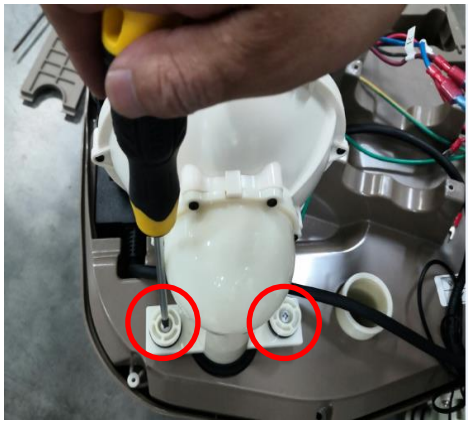
f. Reinstall the water pump cover. Check to see that the rubber cap fits into the corresponding opening on the cover. Screw down the cover using the 5 screws.

g. Install the reassembled water pump on the control base. Check to make sure the seal on the pump housing in in place before putting in the pump. Secure the motor cover with screws. Connect the water pump power cable.

Error Code E90 (Transformer)

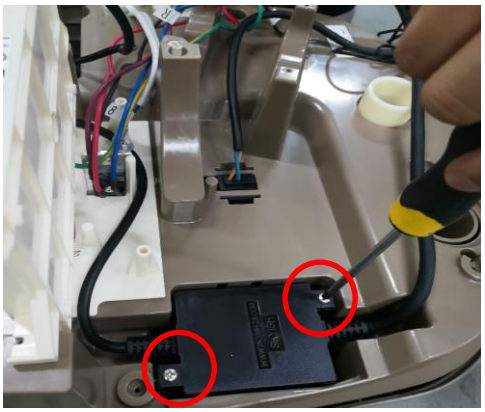
1. Test the voltage of the transformer with a multi-meter.
    a. Check terminals (1&2), (5&6), (C&D), and (Q&R). Set the multi-meter for AC current with a range that will measure 12-14 Vac. Turn on the system and run the filtering function. Touch each of the terminals with a multi-meter in pairs and see if the reading on the multi-meter is between 12&14 Vac. Terminals (1&2) and (5&6) is equal to the socket output which depends on the local power supply.
    b. The test should be completed in 5 seconds after activating the filter function.
        i. If (1&2) have a voltage reading and (5&6) do not, the PCB must be replaced
        ii. If (5&6) are ok, and (C&D) and (Q&R) are not ok, the transformer must be replaced. Proceed with the instructions below for replacing the transformer.

    c. Replacing the transformer
        i. Disconnect (C&D), (Q&R) and (5&6) on the PCB to disconnect the transformer. Then remove a single screw that holds the outlet jet to a plastic support. Disconnect (7&8) on the PCB to disconnect the air blower
        ii. Remove 3 screws that hold the bubble blower to the heating element support and disconnect the drain hose. Remove 1 screw that wired the blower to the heating element equipotential bonding system.



        iii. Remove screws holding air blower to the rest of the jet. Use wrench to disconnect the threaded nut of blower. Remove 3 screws holding the black part above the transformer

iv. Once the transformer has been exposed, remove 2 screws holding down the cover on the transformer. Take off the cover to expose the transformer. At the picture below, all parts taken from the jet spa are laid out for reference.



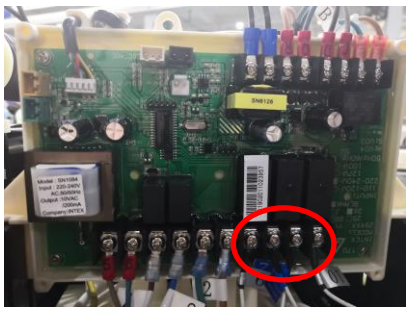
v. Once the transformer has been exposed, it can be taken out and replaced.

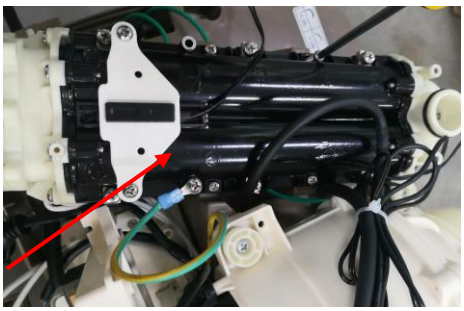
Error Code E90 (PCB)

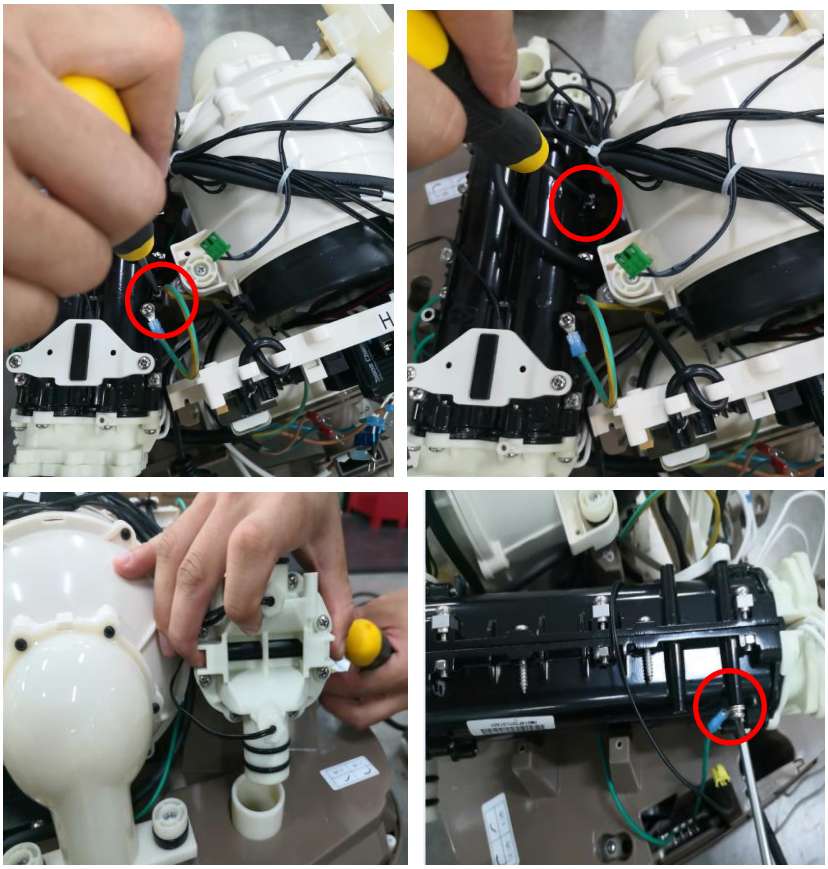
1. Test the voltage of the PCB
    a. Check terminals (A&B). Set the multi-meter for AC current with a range that will measure 12-14 Vac. Touch one of the multimeter's leads to A and the other to B. Turn on the system and run the filtering function. See if the reading on the multimeter is between 12 & 14 Vac.
    b. Replace the PCB if the unit fails to give a reading. Follow the PCP replacement instructions.

Error Code E90 (Heating Element / Heater Set)

To change the heating element, first disconnect the flow sensor cables, temperature sensor cables, power terminals (9 to 12). Remove the 4 screws holding the heating element. Release the water tube under the heating element by hand. Disconnect the external equipotential bonding conductors on the heating element. Ensure these equipotential cables are reinstalled.

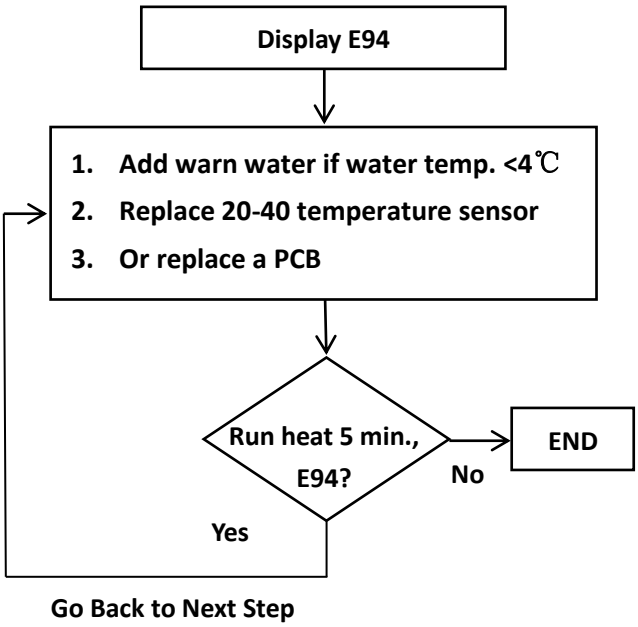






Error Code E94

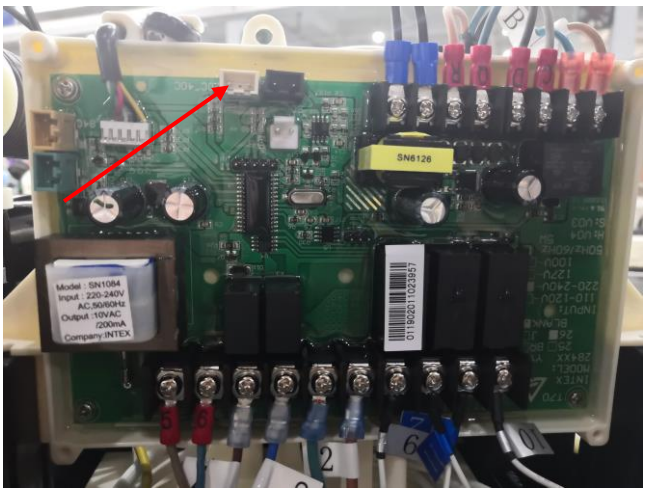
This code indicates very low water temperature which could be due to frigid water or a problem with the 20-40 C water temperature sensors. Please follow the logic diagram and instructions as below:



Begin the test by installing the spa control base and panel to a tub filled with water to the recommended level. Make sure that the water inside the tub is not colder than 4℃. Turn on the spa control base.

Run the filtering function for 1 minute. If the spa display does not indicate an error code and the unit is circulating water without issue, no further troubleshooting is necessary. Remove the unit for further testing if Error Code 94 is confirmed.

a. Begin by swapping out the 20-40℃ water temperature sensor. Disconnect the wire connector for the sensor and clip on a new replacement. Run the control base on a spa. Change the 20-40℃ water temperature sensor if E94 have been solved, then move on to the next step.
b. Disconnect the flow sensor 20-40℃ on the PCB. Remove screws that hold the heating element on the support base. Remove screw of equipotential bonding system.
c. Pull the pile out and use wrench to disconnect 20-40 ℃ water temperature sensor

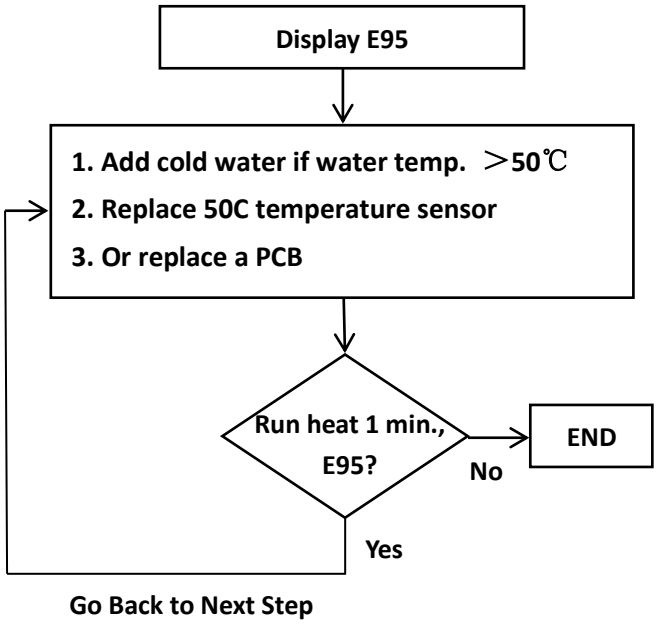


d. After exposing the heater, remove the 20-40℃ temperature sensor. It should be the lower temperature sensor.

2. If the problem still persists after changing the 20-40℃ sensor, the PCB must be replaced. Reference the chapter on replacing the PCB for more details.
   Remark: If the sensor of 20-40℃ has problem, it recommend to replace sensor of 50 ℃ together.

Error Code E95

This code indicates very high water temperature which could be hot water or a problem with the 50 ℃ water temperature sensor.



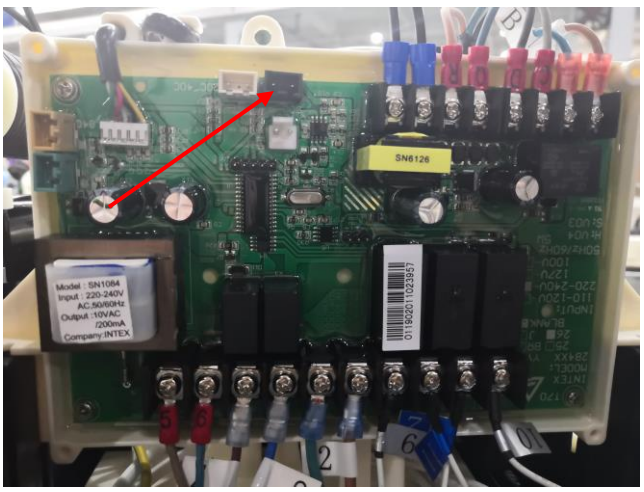
Begin the test by installing the spa control base and panel to a tub filled with water to the recommended level. Make sure that the water inside the tub is not hotter than 50℃. Turn on the spa control base. Run the heating function for 1 minute. If the spa display does not indicate an error code and the unit is circulating water without issue, no further troubleshooting is necessary. Remove the unit for further testing if Error Code 95 is confirmed.

1) Begin by swapping out the 50 ℃ water temperature sensor. Disconnect the wire connector for the sensor and clip on a new replacement. If E95 have been solved, reference E94 for more details on testing and changing the upper temperature sensor.

a. Disconnect the flow sensor 50℃ on the PCB. Remove screws that hold the heating element on the support base. Remove screw of equipotential bonding system.

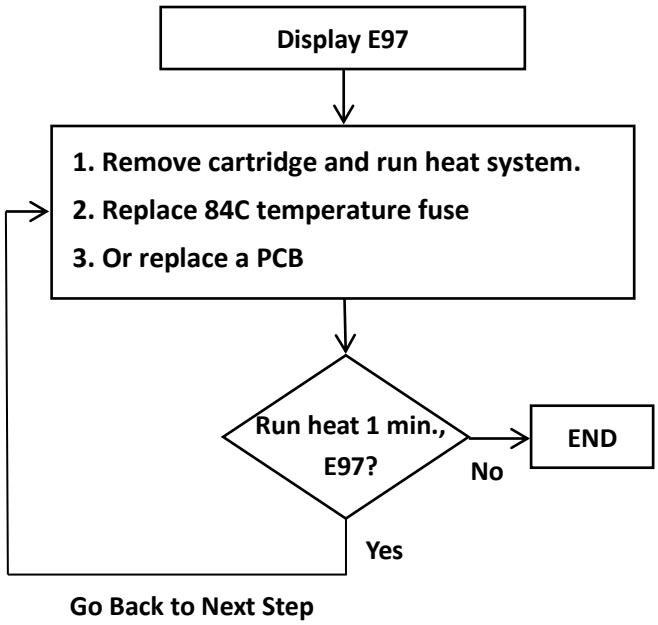
b. Pull the pile out and use wrench to disconnect50 ℃ water temperature sensor

If the error continues to persist, then the PCB must be replaced. Reference the PCB replacement chapter for more details.



Error Code E97

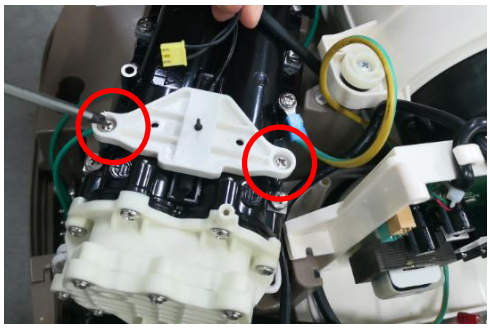
This code indicates dry--fire protection which could be due hot water or a problem with the 84C thermal fuse.

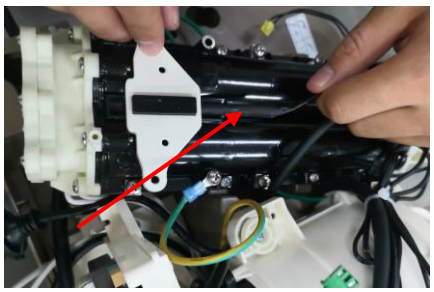


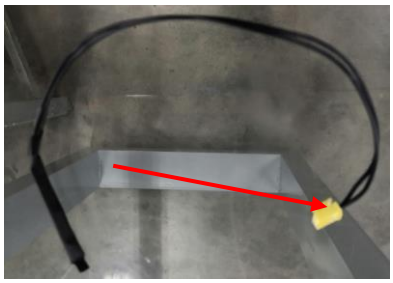
Begin the test by installing the spa control base and panel to a tub filled with water to the recommended level. Turn on the spa control base. Run the heating function for 1 minute. If the spa display E97 again, remove the unit for further testing.

1) Begin by swapping out the 84C thermal fuse. Disconnect the wire connector for the fuse. Test the 84 C temp fuse on the heating element next. Adjust the multimeter to test for resistance using the "Ω" function. It should near 0 resistance. Replace the temp fuse if the reading is "0 MΩ" or no reading. Ensure that the plastic covering over the fuse is intact.

Run the control base on a spa. Change the PCB if the problem is not resolved. Reference the PCB replacement chapter for more details.

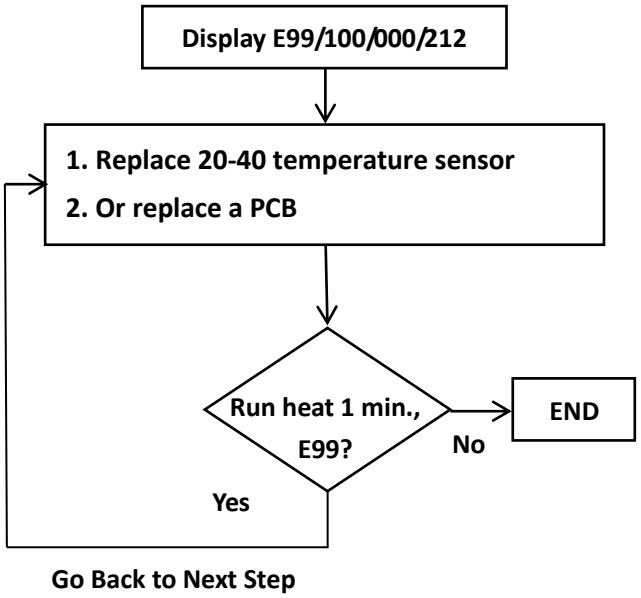






Error Code E99/ 100℃/ 000℃

This code indicates a bad 20-40 ℃ water temperature sensor.
Run the filtering function for 1 minute. If the spa display does not indicate an error code and the unit is circulating water without issue, no further troubleshooting is necessary.



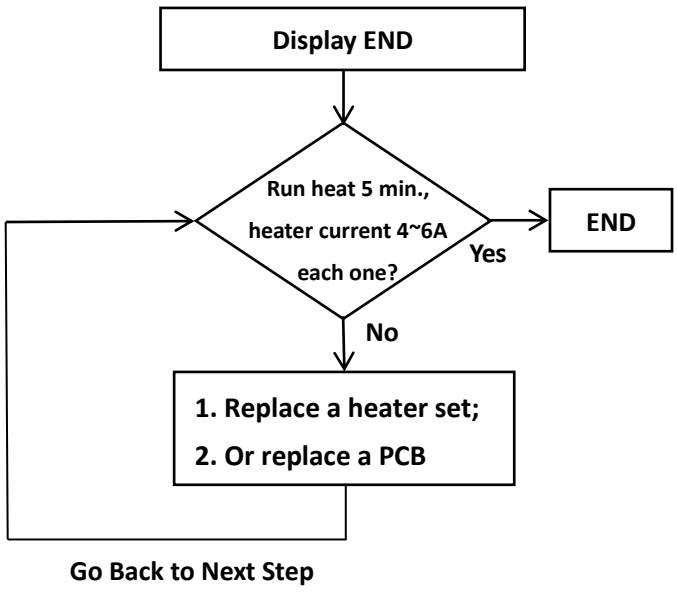
Remove the unit for further testing if Error Code 99 is confirmed.
Before beginning the test, ensure that the temperature sensor connectors are not loose.

1) Begin by swapping out the 20-40 ℃ water temperature sensor. Disconnect the wire connector for the sensor and clip on a new replacement

Run the control base on a spa. Change the PCB if the problem is not resolved. Follow the instructions on page 33 to do this.

END/ Heating problems

This code indicates if after 72 hours of continuous heating operation, the system will hibernate automatically. The defect reason could be heater or a problem with PCB.

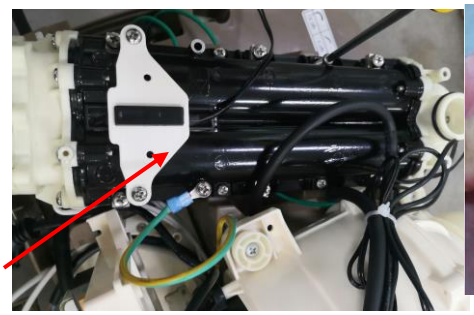


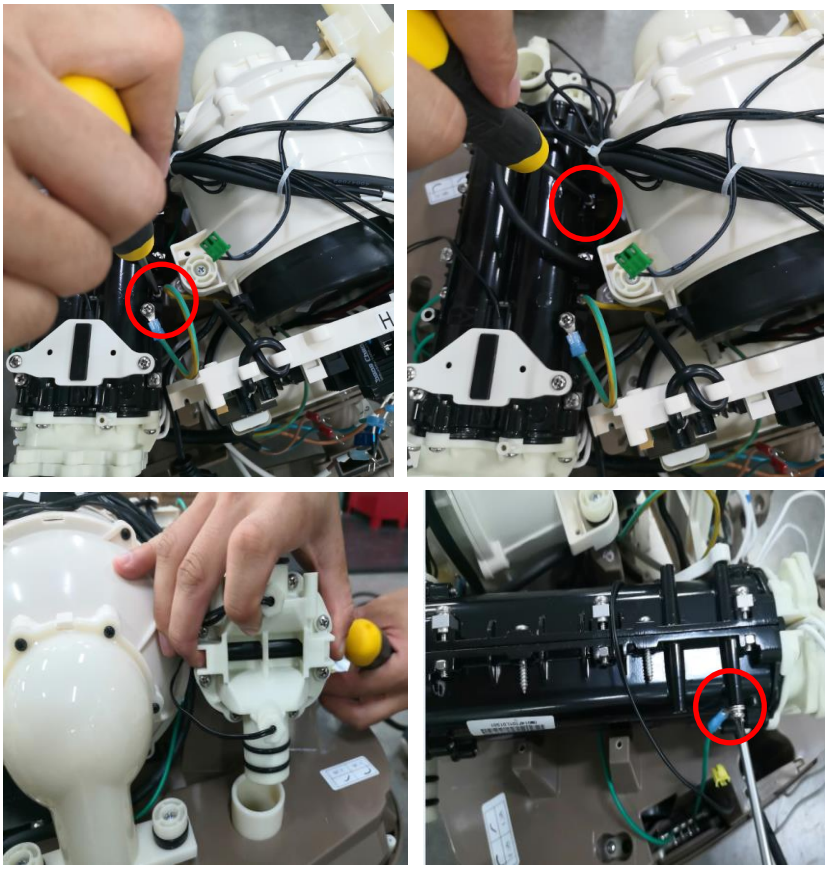
1) Before starting the test, ensure that the terminals (9&10) and (11&12) are properly paired up and not swapped with any other terminal. Test by measuring the AC voltage on the PCB with a multimeter. Set the multimeter, turn the power on and run the heater function for 20 seconds. Test terminals (9&10) then (11&12) and look for voltage reading equal the wall voltage.

2) If they do, proceed to testing the current using a clip-on ammeter. Proceed to step 3 if no power is detect

3) Turn on the Control Base and run the heater function. Test the wiring for terminals (9&10) and (11&12) and look for a reading between 4 – 6 Aac. Change the heating element if there is no reading.

To change the heating element, first disconnect the flow sensor cables, temperature sensor cables, power terminals (9 to 12). Remove the 4 screws holding the heating element. Release the water tube under the heating element by hand. Disconnect the external equipotential bonding conductors on the heating element. Ensure these equipotential cables are reinstalled.

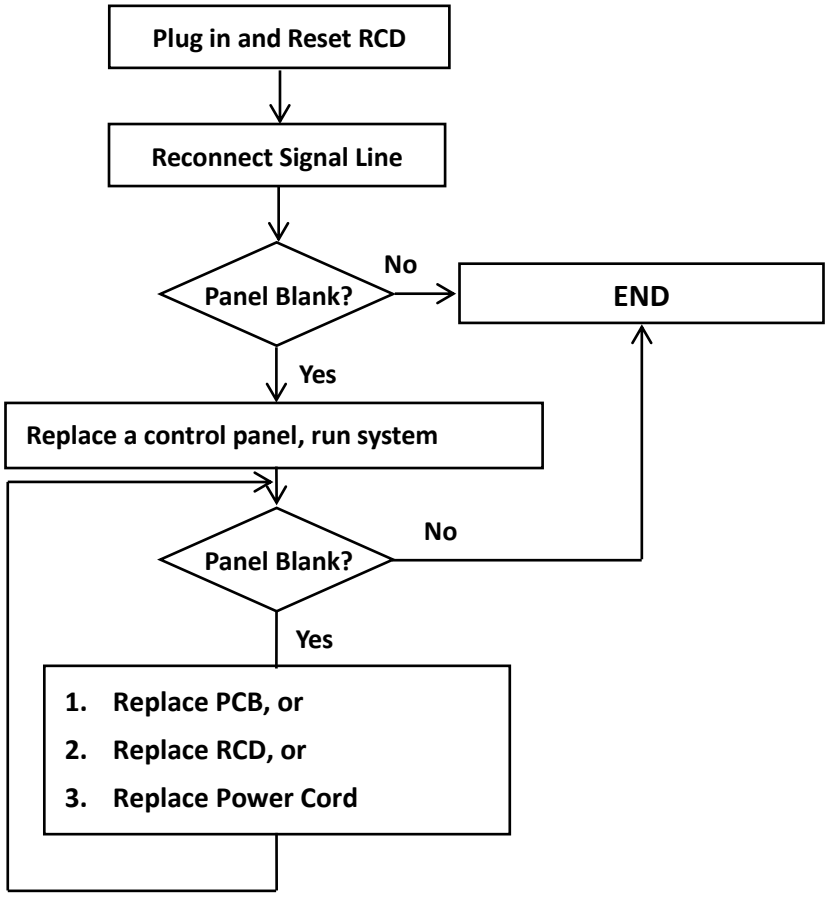




3) If no current was read from terminals (9&10) and (11&12), proceed to change the PCB.

Black blank

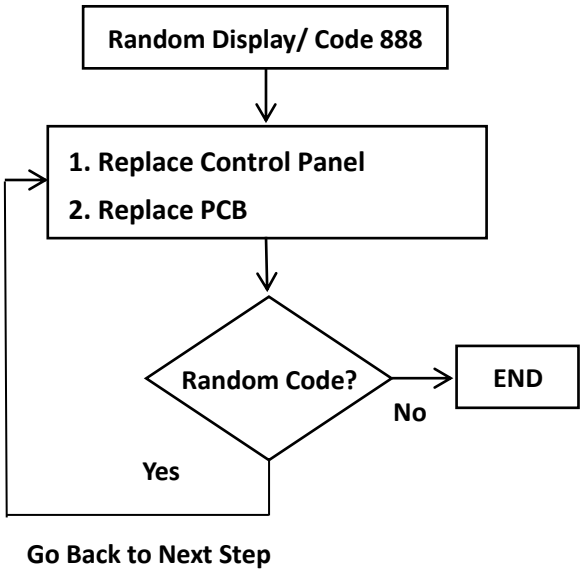
A blank reading on a spa Control Panel indicates components such as RCD failure, PCB failure or a connection issue between the Panel & Base.



1. Test the socket voltage, is the voltage is close to wall output?
2. Reconnect Signal Line, reference to Page 12 (Opening the Control Base) for signal connection.
3. Replace a control panel, and power on the system again.
4. If blank panel still persists, replace a new PCB or RCD, refer to the section replacing the PCB or RCD for more details.

Random Display or 888

If the display is showing random numbers or all the LEDs are lit up, it is possible that there is a connection problem.



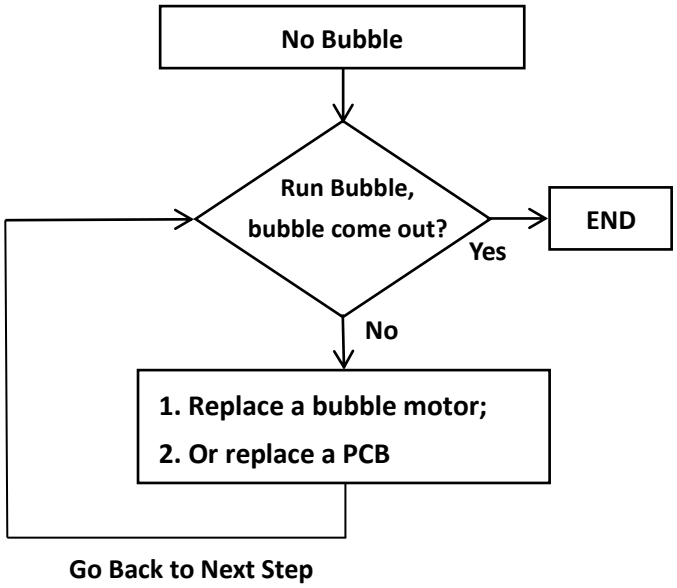
In addition, disconnect and reconnect the cable for the Control Panel.

If reconnecting the Control Panel doesn't work, try replacing the Control Panel with a new one.

If the above steps do not solve the issue, proceed with replacing the PCB. Refer to the section replacing the PCB for more details.

Air Blower Problems

Issues with the air can be due to a defective air pump, bad tub, and damaged or missing seals. Problems with the air pump could also be due to it becoming overheated.



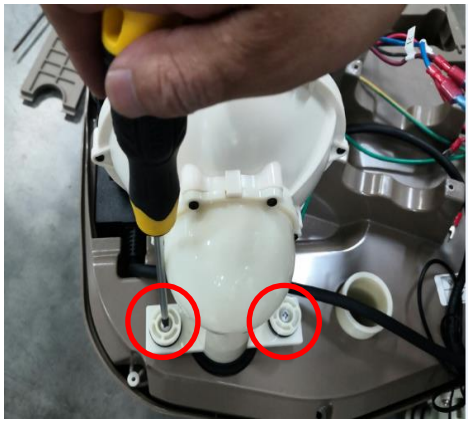
If the Air Blower has failed and no longer turns on:

Verify that the connections for the terminals are not swapped. For example, a Terminal that should be connected to #7 is connected to #9. Testing the air pump's voltage on the PCB next. Terminals (7&8) should be tested with a voltmeter for voltage reading equal the wall voltage. Do this by putting probes to the two terminals and run the air blower function on the spa.

If the reading on the terminals is ok, change the air blower.

If the reading is on the terminals is not ok, change the PCB

To change the air blower, first access the inside of the Control Base. Release terminals of 7&8 and the wire leading from the air blower to the grounding box. Release the screws that hold the blower



If the air blower is too noisy:

First check the sound the air blower is making with a psophometer. The Control Base should not be attached to a Tub. Run the air blower function and check for the noise level using the psophometer.

If the noise is less than 90 decibels, there is no problem with the air blower. If the noise is louder than 90 decibels, proceed to check the air blower.

Ensure that the air blower is securely attached to the inside of the spa and the seals between the Control Panel and Control Base are intact.

3) A loud noise could also be due to a bad check valve within the spa tub. This can be checked by disconnecting the spa tub from the control base and running it on a different tub.

Vertical air blower tube that heads to the Control Panel. Pull out the old air blower and install a new one.

4) Lastly, the problem could be due to a bad air pump OR an air pump that is beyond its lifetime. Air pumps have a life time of about 500 hours. Air pumps in this condition will make a very painful high pitched squeal sound or a low and deep sound.

Bad air pumps also have a lowered PSI. Normal PSI for an air blower is about 2.8 PSI. A PSI of 2 or less also indicates a bad air pump. Proceed to replace the air pump:

Access the inside of the Control Base. Release terminals 7&8 and the wire leading from the air blower to the grounding box. Unscrew the black cover behind the air blower and remove the screws that hold it down. Pull out the old air blower and install a new one.

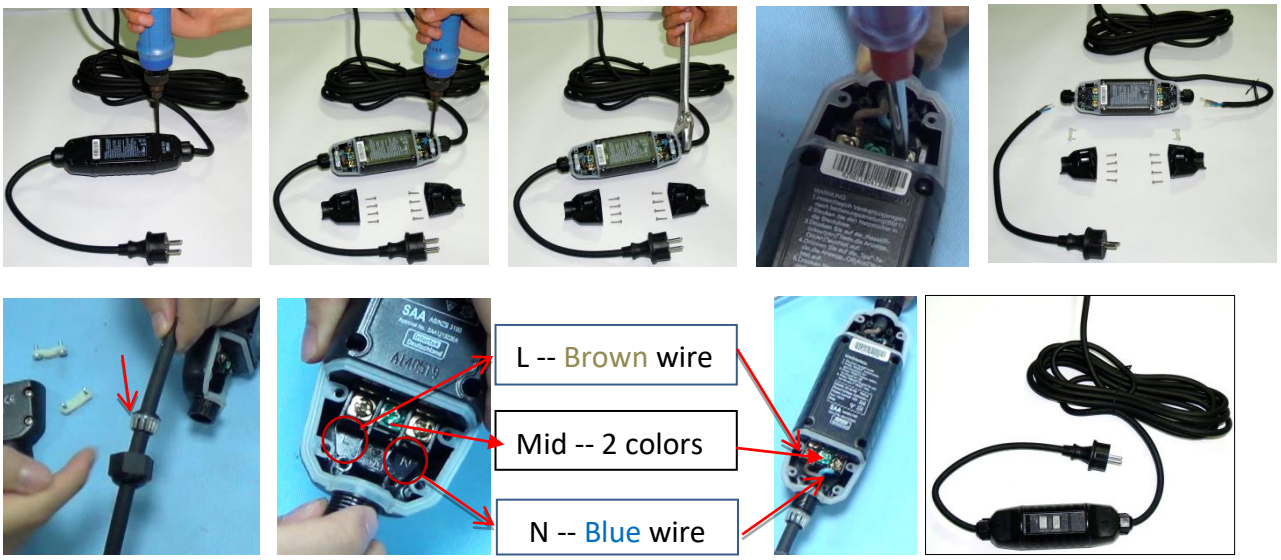
How to Replace RCD

1. Plug the in the Control Base and test the RCD “TEST” and “RESET” functions.

In the event the RCD fails, replace the RCD.

2. Change the Control Panel with a new one. Check terminals (1&2) for wall voltage.

If there is no voltage, check the electrical outlet and RCD. If the RCD is failing, replace a new one



3. Check rings in the caps face in the right direction to sure waterproof. Reinstall it by reversing the steps above.

Be careful to match power terminals to their corresponding wires on the RCD.

4. Change the Control Panel with a new one. Check terminals (1&2) for wall voltage.

If there is no voltage, check the electrical outlet and RCD. If the RCD is failing, replace a new RCD.

If the system is now operational, the problem was due to the panel or its wiring.

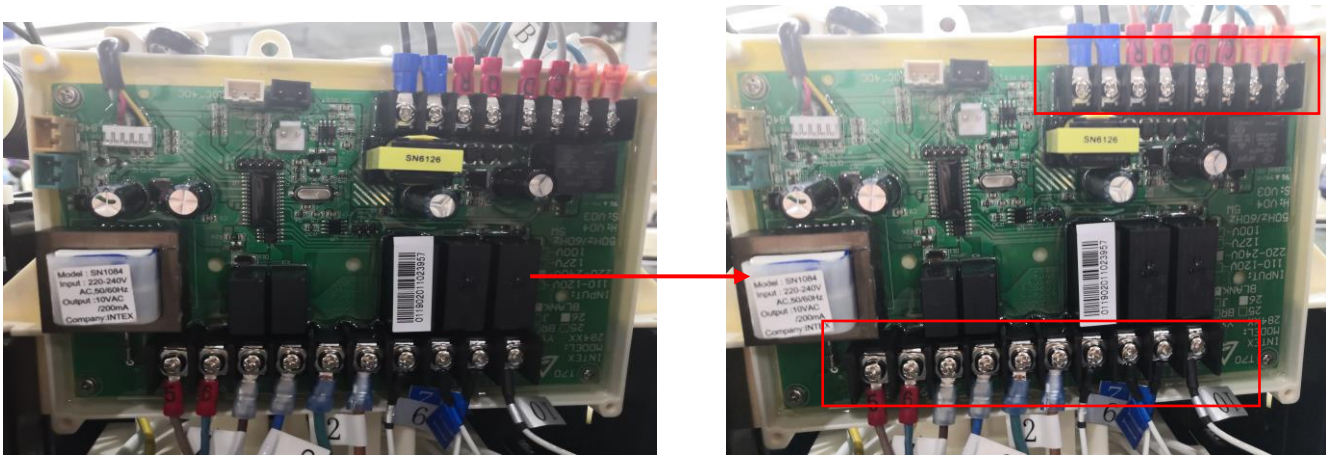
Continue the troubleshooting if the panel remains blank.

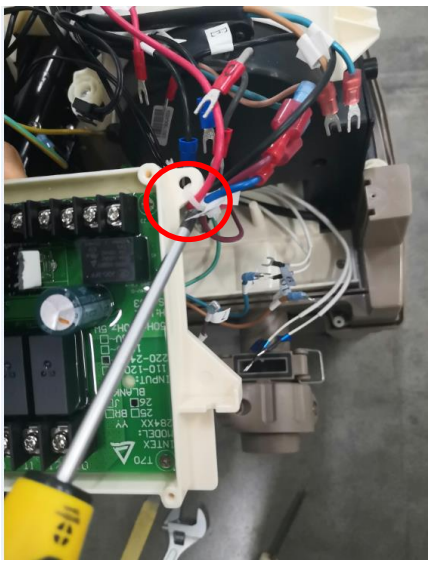
Check the terminals (1&2) for the wall voltage. If the voltage output is ok, proceed to replacing the PCB.

Reference the chapter on replacing the PCB for more details.

How to replace PCB

1. Refer to the instruction of Opening the Control Base to remove the screws and open the cover.
2. Remove the 2 screws that secure the white PCB cover to reveal the PCB. Once PCB internal layout is appearing. There are two screws to hold the entire PCB parts.
3. Disconnect all the sensors / input terminals and all the around the PCB. Cut off the nylon belt which secures the internal wiring to the board. Rotate the brown cover to detach the black cord.





How to replace the broken base of spa control

4. Refer to the instruction of Opening the Control Base to remove the screws.
5. Turn over the whole control base and remove the base.