



ZODIAC

LM2/LM3 Series Troubleshooting Manual



IMPORTANT SAFETY INFORMATION

READ AND FOLLOW ALL INSTRUCTIONS.

This manual is for use by licensed electricians or trained pool professionals only. No other person is to install, service or troubleshoot the LM Series Chlorinators.



WARNING

Failure to heed the following warnings can result in permanent injury, electrocution or drowning.

ELECTRICAL HAZARD

- To reduce risk of electrical shock
 - Make sure all power to pool equipment area is off prior to any installation or removal of Clearwater components.
 - Replace damaged power pack cord immediately.
 - Do not bury cord. Locate cord to minimize abuse from lawn mowers, hedge trimmers and other equipment.
- Severe shock or injury will likely occur as a result of a drill or drill cord coming in contact with water. Never allow electric drill or cord to come in contact with water. Only plug drill into a Class A (5 Milliampere Trip) protected Ground Fault Circuit Interrupter (GFCI) in accordance with the National Electrical Code Section 680 (USA only). Please see your drill owner's manual for further safety precautions.
- Install the power pack at least 10 feet from the inside walls of a pool to prevent any possibility of the unit coming in contact with water.
- Your Clearwater Chlorinator has been designed with an electronic flow switch. This device automatically switches the chlorinator 'OFF' when the water through the cell stops. To prevent cell damage and personal injury, do not in any way interfere with this system which has been designed for your protection.

CHEMICAL USE HAZARD

- To avoid personal injury when working with pool chemicals, always wear rubber gloves and eye protection and work in a well-ventilated area. Use caution when choosing a location to open and use chemicals as they may damage any surface in which they come in contact.
- The addition of certain chemicals can reduce the effectiveness of chlorine. Always make sure that proper residual chlorine levels are maintained to avoid personal injury.
- This product manufactures chlorine. Individuals with any type of chlorine sensitivity should take the appropriate precautions to avoid injury or illness.

EQUIPMENT WATER PRESSURE HAZARD

- Always turn pump off prior to installing or removing any Clearwater cell. Your pump/filter system is operated under pressure and the pressure must be released before you begin work. Please see your pump/filter owner's manual for further instructions.
- To avoid cell damage, water pressure in the cell must not exceed 29 psi (200kPa)

PREVENT CHILD INJURY AND DROWNING

- To reduce the risk of injury, do not permit children to operate this product.
- Do not let anyone, especially small children, sit, step, lean, or climb on any equipment installed as part of your pool's operational system. Unless otherwise stated, ALL components of your pool's operational system should be located at least 3 feet from the pool so children cannot use the equipment to gain access and be injured or drown.



CAUTION

Failure to heed the following warnings could cause damage to pool equipment or personal injury.

- Chlorinator must be installed and operated as specified.
- Scratching or bending plates in cell housing can reduce cell life.
- Power to the LM2 or LM3 should be turned off before unplugging the cell connectors to prevent cell damage and low voltage sparks.
- Keep the cell terminals protected with a light coating of silicone grease to allow for a positive electric connection. Use of any other type of grease may damage the terminal seals and 'o' rings. Do not immerse these terminals in acid wash solution, and avoid accidental contact with salt water.
- Water above the temperature of 104 degrees F (40 degrees C) flowing through the cell can cause plastic cell to discolor.
- Power pack must not be installed directly above any other heat source such as filter, pump or heater. It must be at least 1 Ft. (300 mm) from the ground to allow free circulation of air around it. It must not be installed in a closed box. If the power pack is to be installed on a post, then it must be centrally positioned on a flat panel of suitable waterproof material at least 10 inches (240mm) wide and 18 inches (440mm) high.
- Check the cell frequently to prevent the accumulation of pool debris that for any reason may have by-passed the pool filter.

Table of Contents

Safety Instructions	2	Calcium Build-up On Cell	12
Look /Feel.	3	Reversing Polarity	13
Circuit Breaker	4	Cleaning/Replacing Cell	13
Power Cord.	4	LM3 Interface Instructions	14
Testing Power Path	5	Touch Pad PCB	15
Chlorinator Not Operating.	6	PC Board Replacement for the LM2-15/LM3-15	16
No chlorine reading	7	PCB Replacement for LM2-24/3-24 or 2-40/3-40.	17
Output Lights will Not go to 100%	8	Triac Screws.	18
Output Lights will Not go Down	9	LM2 Exploded Diagram & Parts List.	19
Amber Output Light Blinking.	9	LM3 Exploded Diagram & Parts List.	20
Transformer	9		
No Flow Light Is On	10		
Add/Check Salt Light Is On	11		
Add Salt Light and Green Lights Are On	11		
Chlorine reading too high	12		

Look/Feel

Before removing chlorinator cover, check the following:

1. Is the pool pump on?
2. Is the chlorinator turned on?
3. Do the indicator lights function? (If NO, see Output Lights pg. 8-9)

If all of the above answers are “YES”, there is no problem with the chlorinator. Have the consumer bring a water sample to their dealer for analysis.

4. Is the circuit breaker tripped? (see Circuit Breaker pg. 4)
5. LM2 - Is the output cord attached to the cell & the blue sensor wire attached to the sensor post on the cell?
(see No Flow Light Is On. pg. 10)
LM3 - Is the plug cap attached to the cell?
6. Can you see the cell producing? (it looks like effervescence)
7. Is there calcium built-up on the cell? (see Calcium Build-up on Cell pg. 12)

After checking the above items:

1. Turn off power supply.
2. Remove chlorinator from wall if needed.
3. Remove screws (4) to remove cover and check the following:
 - Are there any visible burn marks?
 - Is there any visible water damage?
 - Are there any loose wires or screws?

Circuit Breaker

Reset Circuit Breaker

1. Turn off power supply.
2. Remove chlorinator from wall.
3. Find circuit breaker on bottom near power cord.
4. Push button in.
5. Replace chlorinator on wall.
6. Turn on power supply.

Replace Circuit Breaker

1. Disconnect power supply.
2. Remove chlorinator from wall.
3. Remove 4 screws to remove cover.
4. Disconnect ribbon wire connector from power PCB and set cover aside.
5. Remove 2 push-on wire connectors from back of circuit breaker.
6. Use pliers to squeeze base of circuit breaker and push through hole from the inside.
7. Push new circuit breaker through hole from the outside till it snaps in place.
8. Reconnect 2 push-on wires to back of circuit breaker.
9. Reconnect ribbon wire connector to power PCB.
10. Replace cover with 4 screws.
11. Replace chlorinator on wall.
12. Connect power supply.

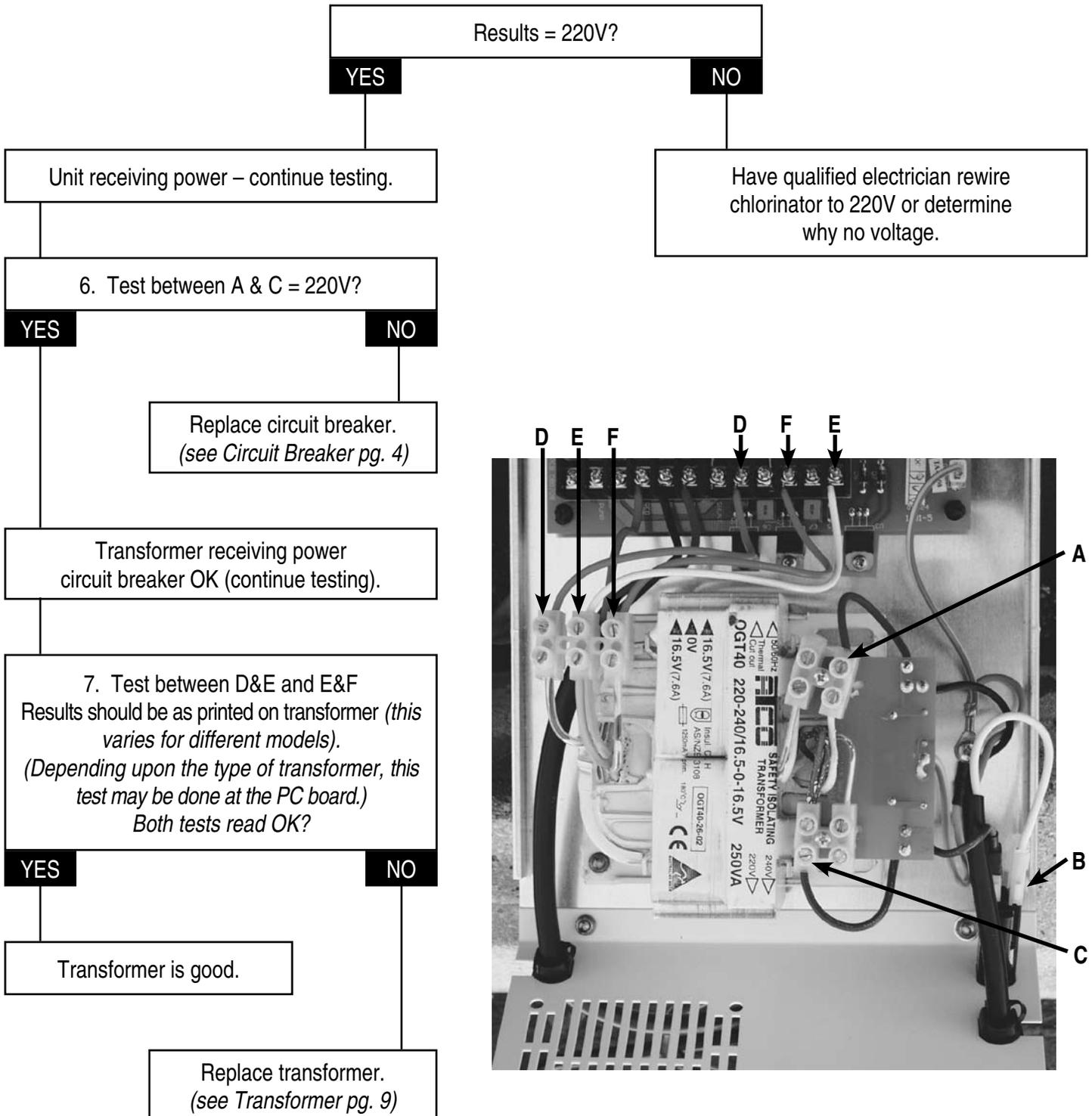
Power Cord

Power Cord Replacement

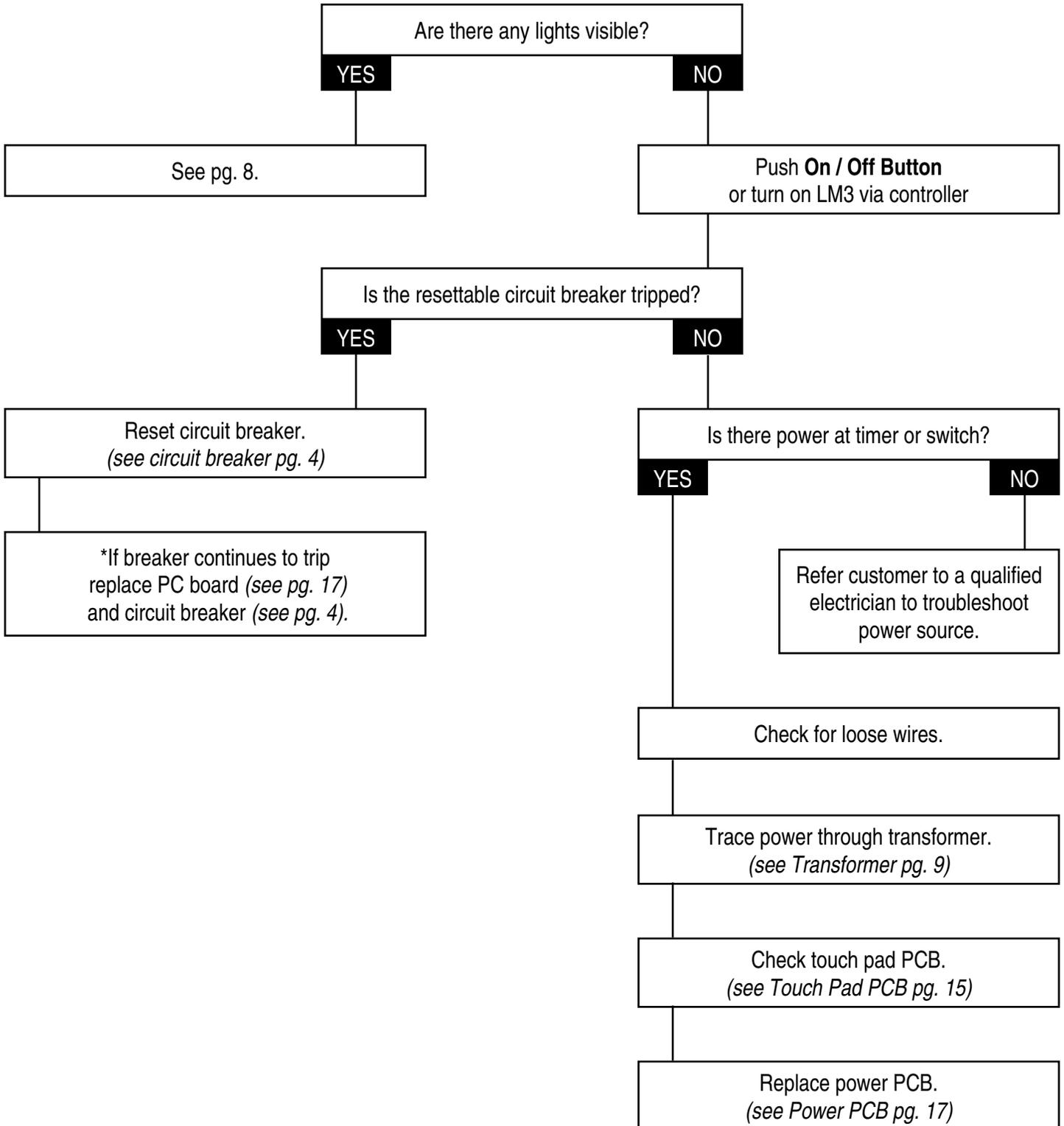
1. Disconnect power cord from power source.
2. Remove chlorinator from wall.
3. Remove 4 screws to remove cover.
4. Disconnect ribbon wire connector from power PCB and set cover aside.
5. Remove 3 Push-on wire connectors and unscrew ground wire from back.
6. Use pliers to squeeze base of power cord holder and push through hole from the inside.
7. Unclip power cord holder and transfer to new power cord.
8. Push power cord holder with new power cord through hole from the outside till it snaps in place.
9. Reconnect 3 push-on wire connectors and screw ground wire to back.
10. Reconnect ribbon wire connector to power PCB.
11. Replace cover with 4 screws.
12. Replace chlorinator on wall.
13. Connect power cord to power source.

Testing Power Path

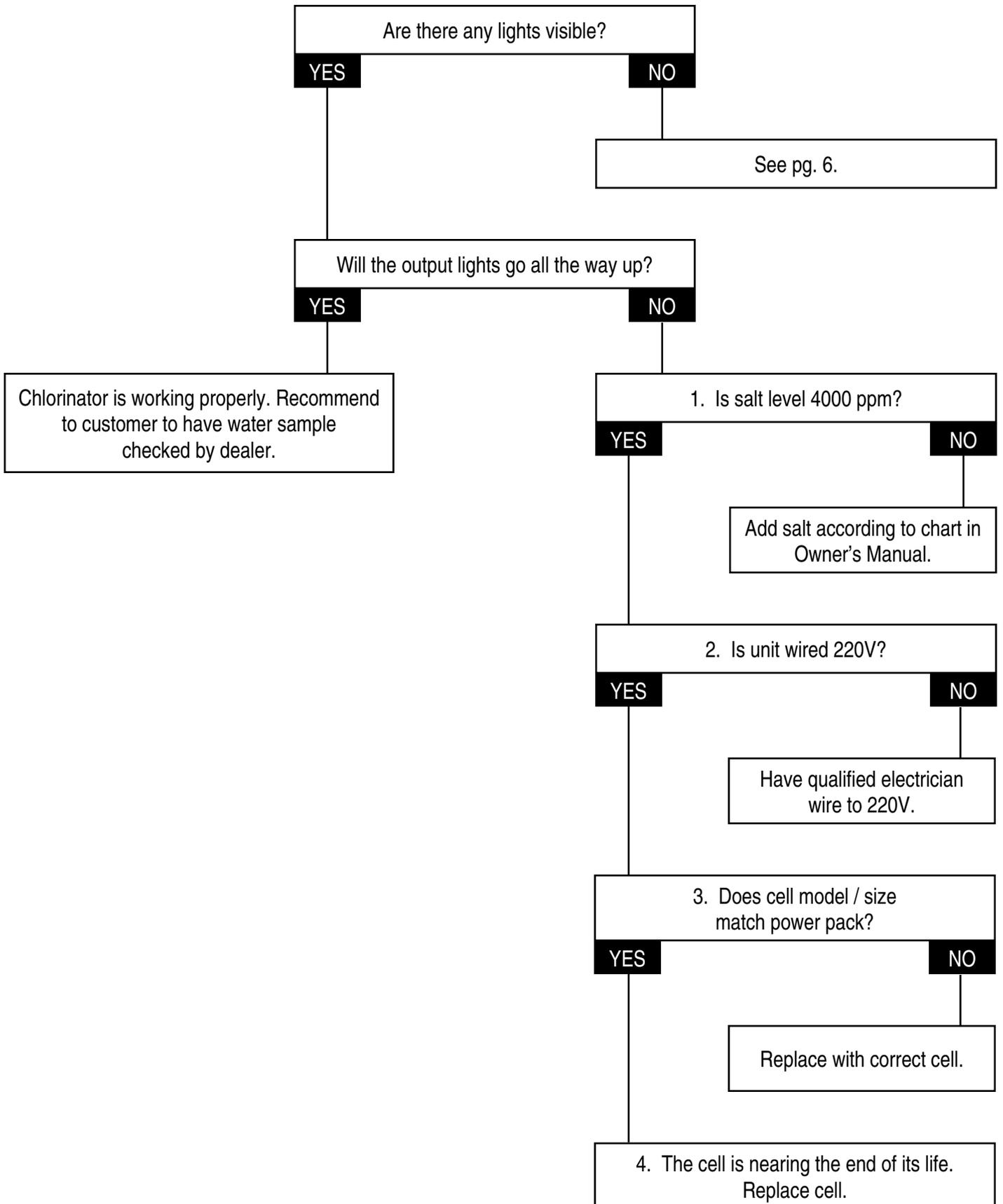
1. Turn off power supply.
2. Remove chlorinator from wall.
3. Remove 4 screws to remove cover (support cover and leave ribbon wire connected to power PCB).
4. Turn on power supply.
5. Use multimeter set on AC volts to test between A & B.



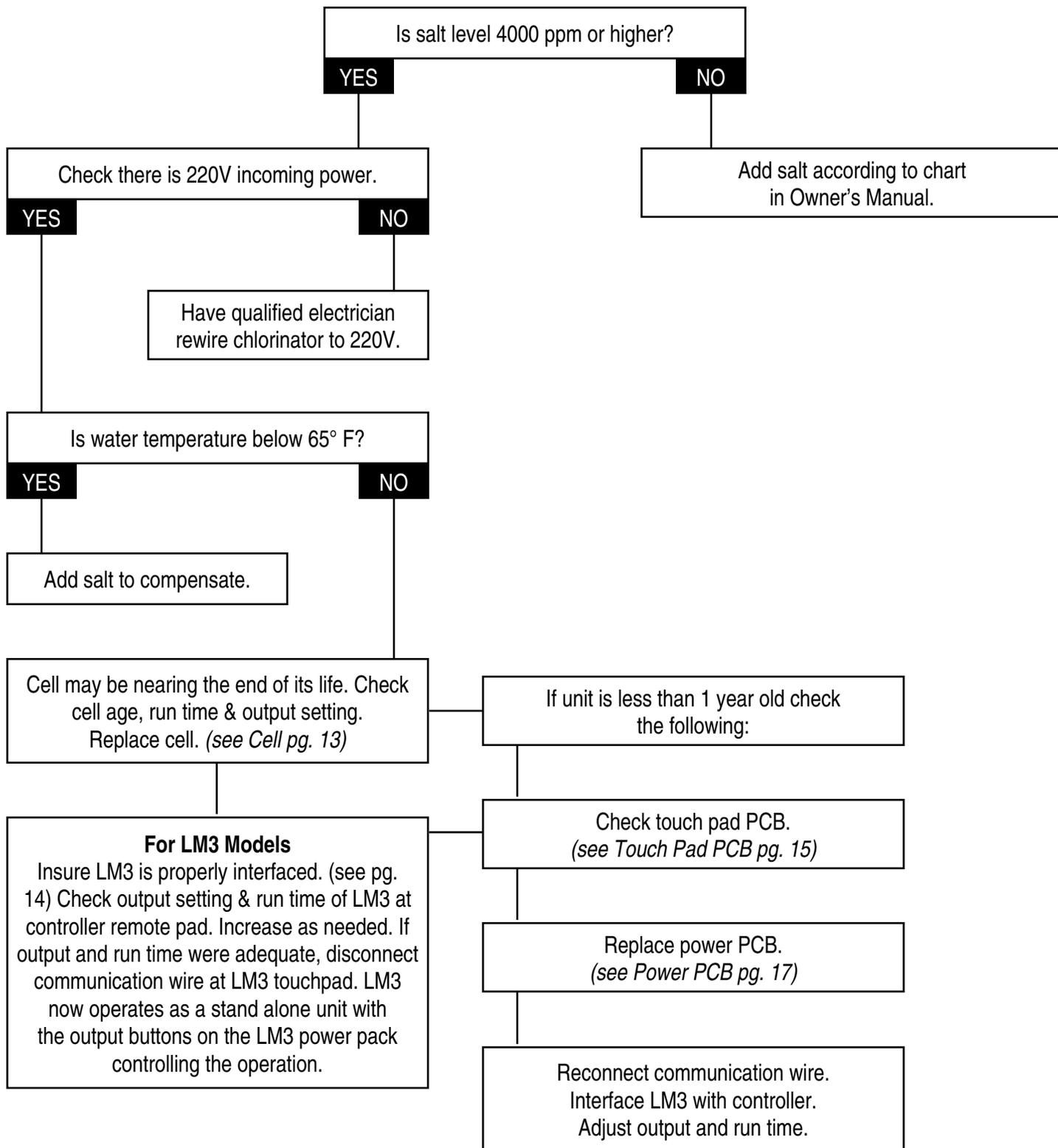
Chlorinator Not Operating



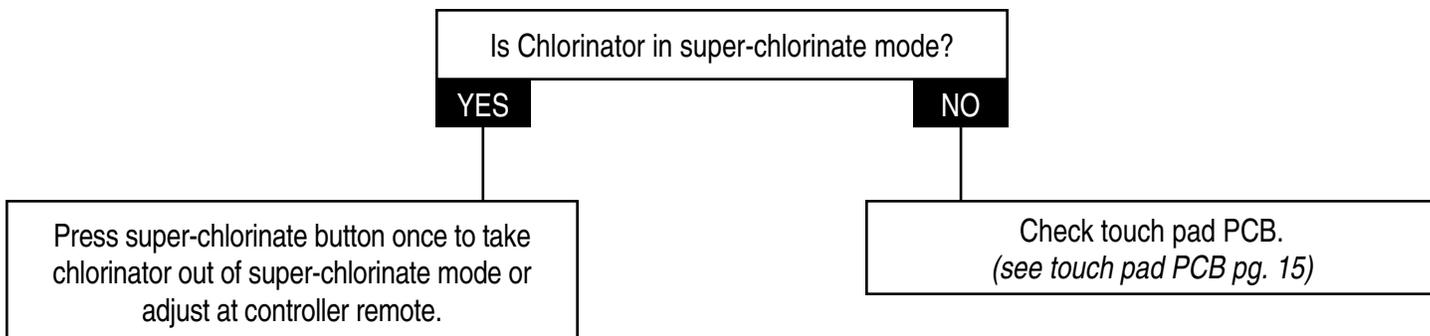
No Chlorine Reading



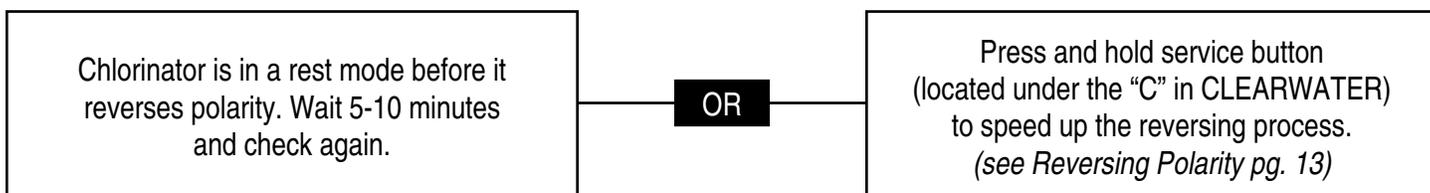
Output Lights Will Not Go to 100%



Output Lights Will Not Go Down



Amber Output Light Blinking



Transformer

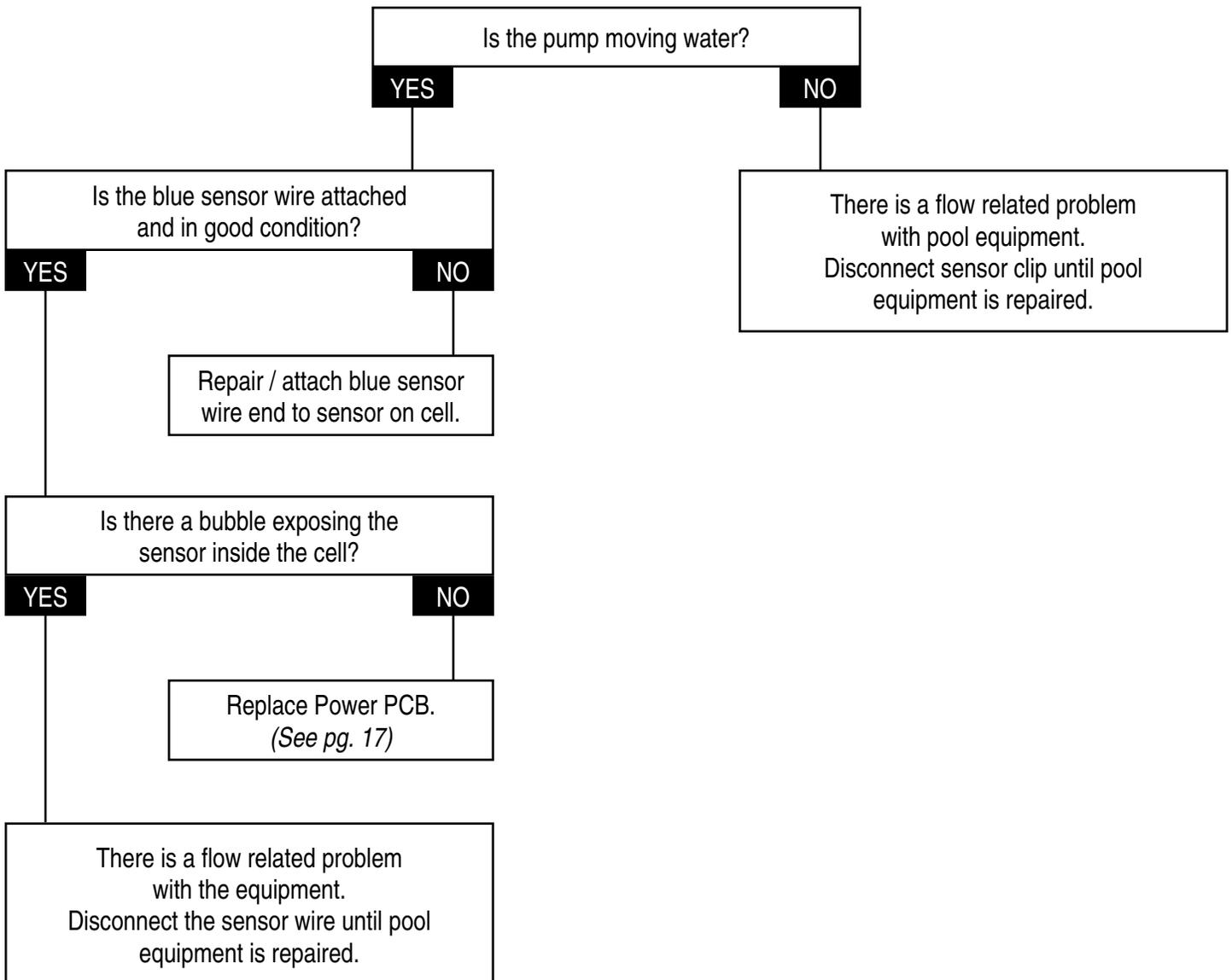
Testing

(see Testing Power Path pg. 5)

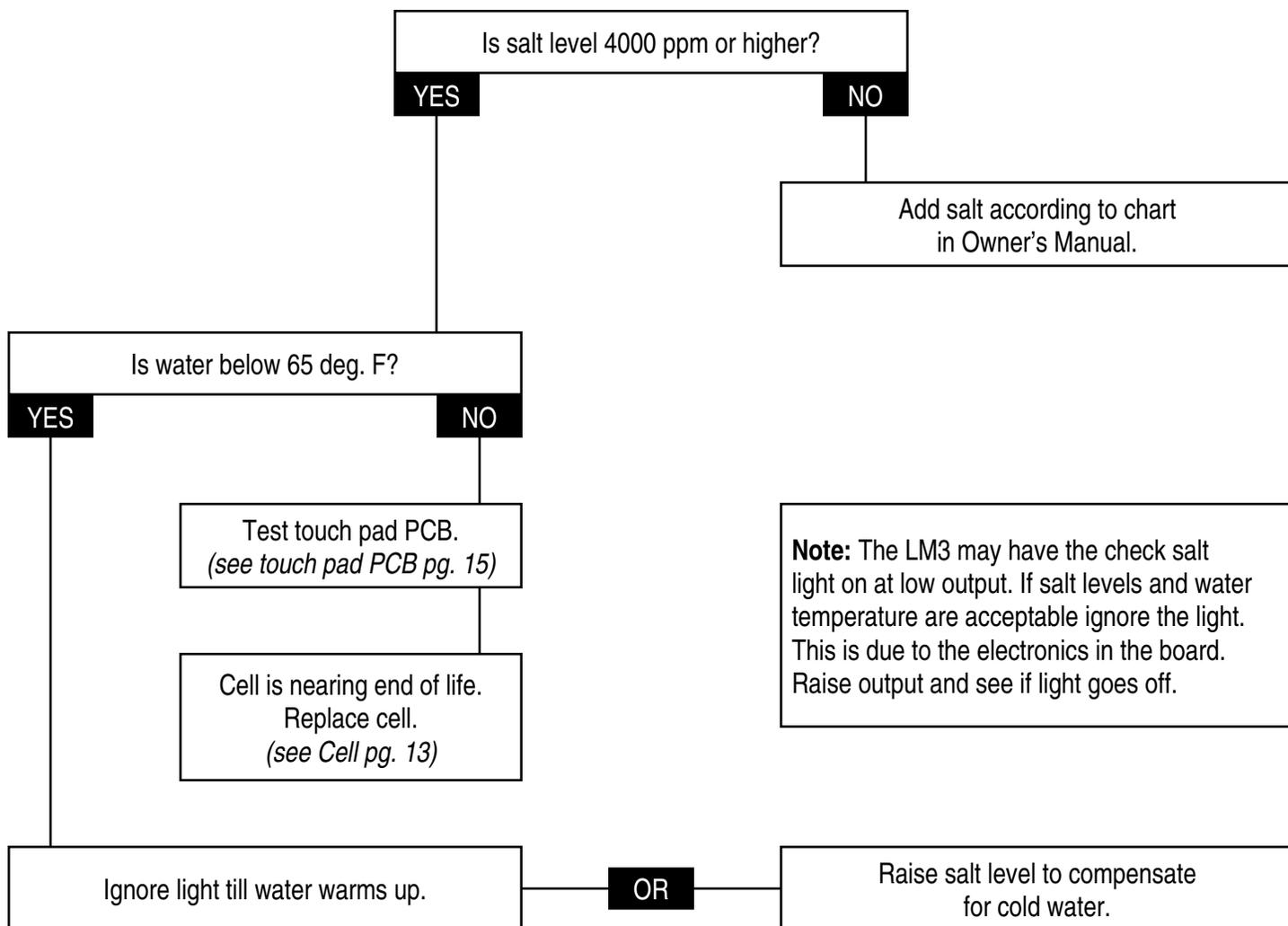
Replacement

1. Disconnect power supply.
2. Remove chlorinator from wall.
3. Remove 4 screws to remove cover.
4. Remove ribbon wire connector from power PCB and set cover aside.
5. Disconnect from the three white plastic terminals all wires that lead to the transformer (keep track of each wire location for reassembly).
6. Remove screw from the center of each 4-way terminal and pull the PCB to the side.
7. Remove the rivets holding the transformer in place.
8. Mount new transformer using new rivets.
9. Relocate PCB and both 4-way terminals to top of transformer and mount with screws.
10. Attach wires from new transformer to correct plastic terminals.
11. Attach ribbon wire connector.
12. Attach cover with 4 screws.
13. Replace chlorinator on wall.
14. Reconnect power supply.

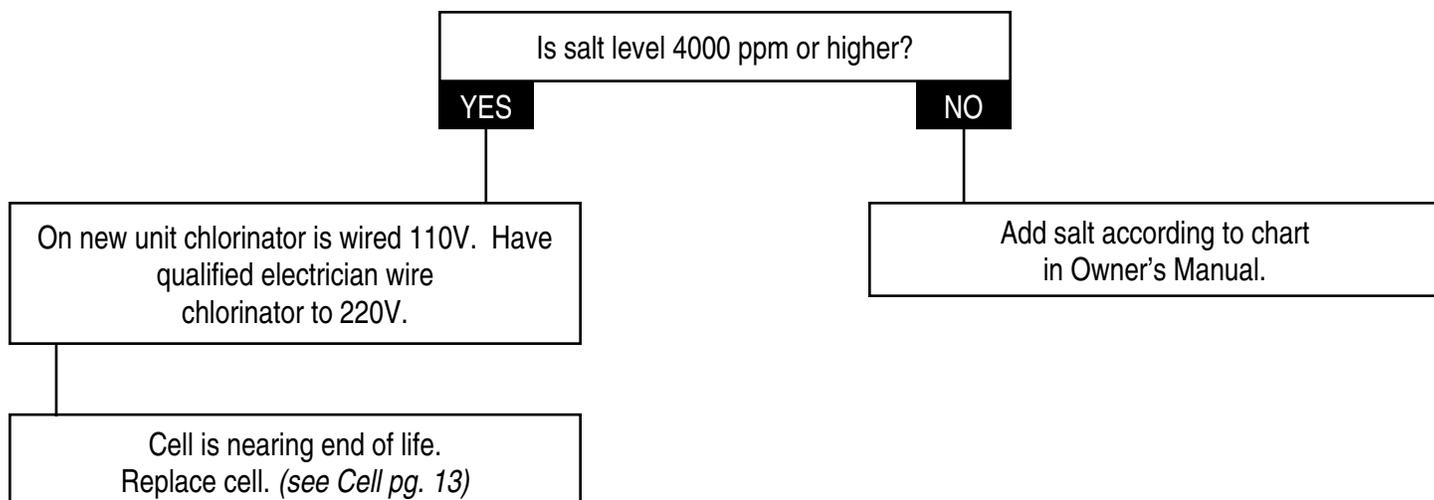
No Flow Light Is On



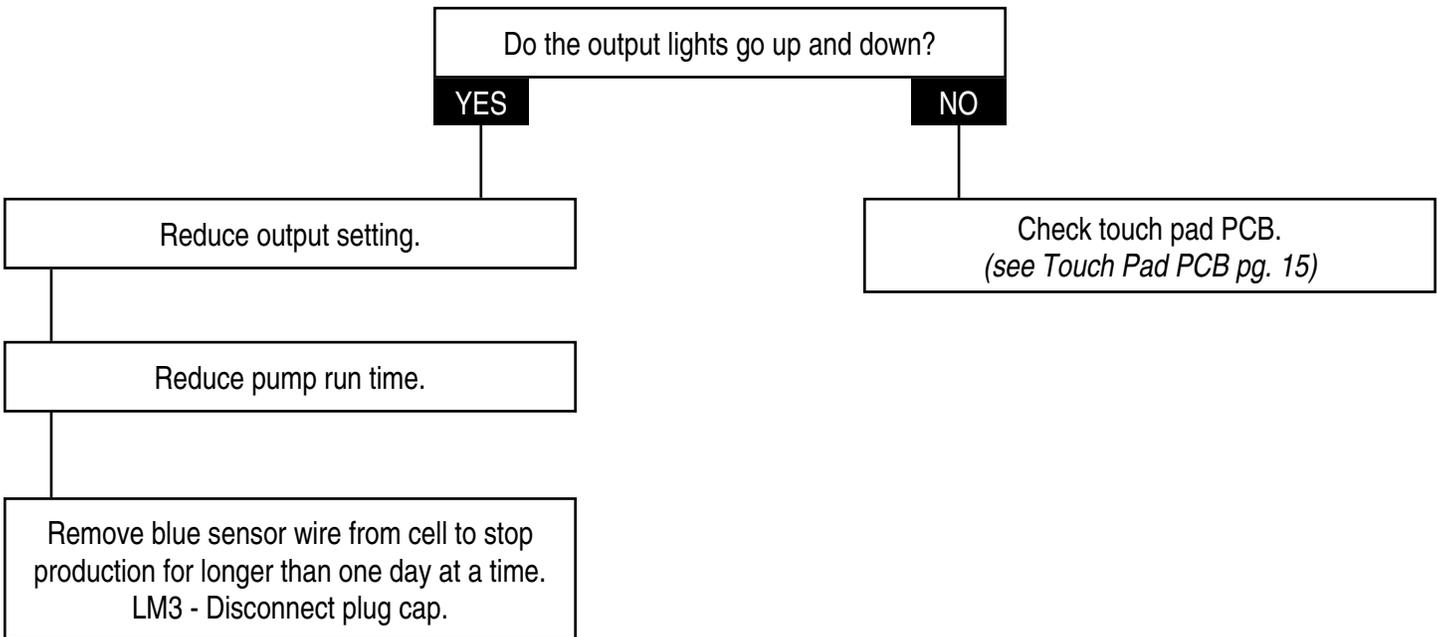
Add/Check Salt Light Is On



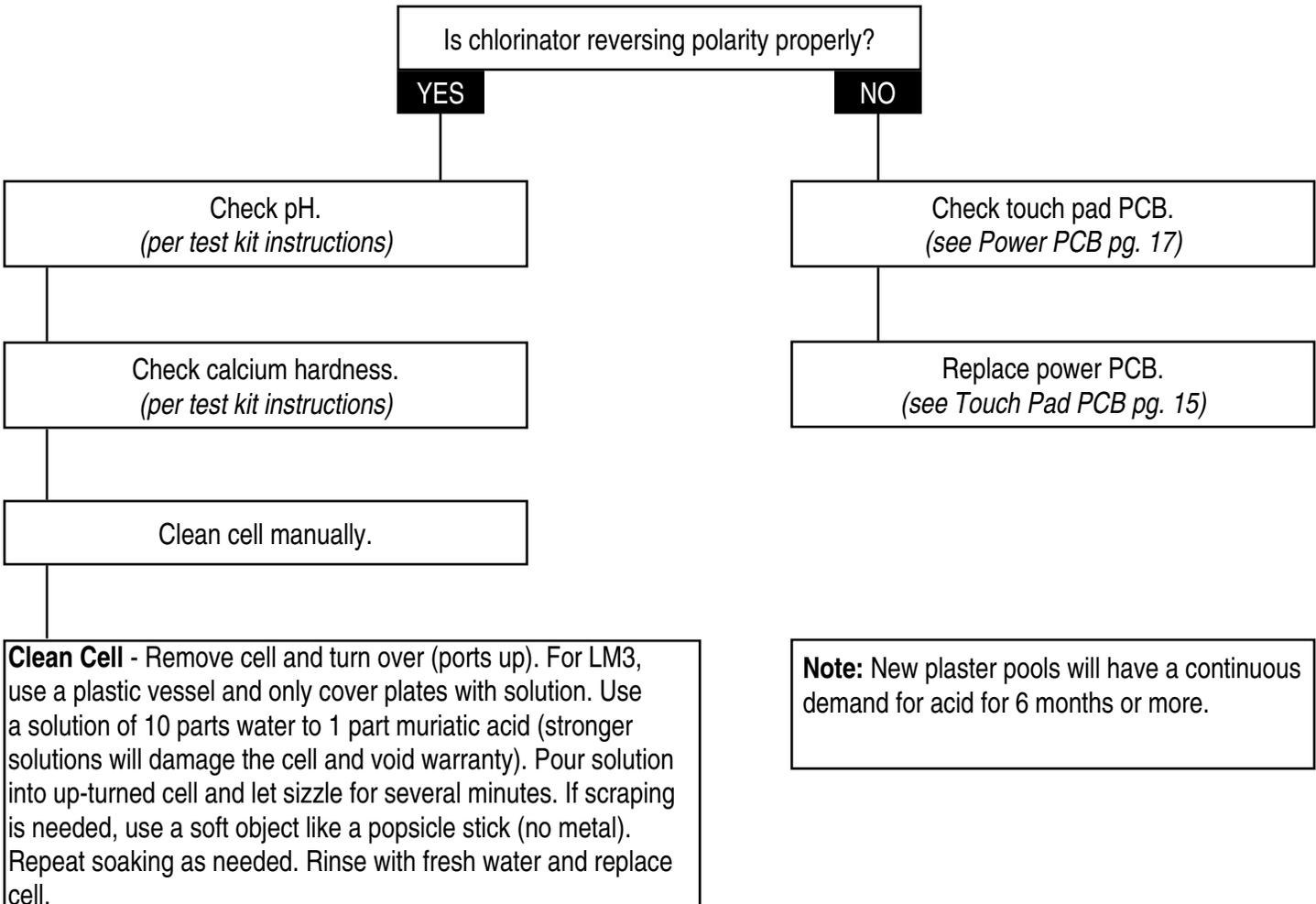
Add Salt Light, and 1 or 2 Green Output Lights Are On



Chlorine Reading too high



Calcium Build-up on Cell



Reversing Polarity

1. With power on, be sure chlorinator is NOT in super-chlorinate mode.
2. Locate service button under the CLEARWATER Logo on LM2 model or above the “3” of LM3 logo.
3. Press and hold service button down.
4. You should hear a click and see the output lights flash once within 5 seconds (this indicates the polarity has reversed).
5. If it does not switch polarity, check touch pad PCB (see pg. 15) or Replace power PCB (see pg. 17).

Note: For LM3, if the chlorinator is interfaced with a controller, holding the service button down continuously for 20 seconds will alter the interface mode (see pg. 14).

Cell

WARNING

Cell is under pressure! Make sure that the pump is off and that the pressure has been released by opening the air-bleed valve on top of the filter before removing the cell.

Clean the Cell

CAUTION: Always wear rubber gloves & eye protection when handling muriatic acid. Always pour acid into water, NEVER water into acid. Sodium bicarbonate (baking soda) neutralizes muriatic acid.

1. Turn off pump.
2. Close any applicable valves.
3. Remove output wires and sensor wire from cell or disconnect the plug cap.
4. Unscrew unions and remove cell or unscrew lock ring and remove cell.
5. Use a solution of 10 parts water to 1 part muriatic acid (stronger solutions will damage the cell and void the warranty). Pour solution into up-turned cell and let sizzle for several minutes. If scraping is needed, use a soft object like a popsicle stick (no metal). Repeat soaking as needed.
6. Rinse with fresh water and reattach cell.
7. Place cell over unions and hand tighten.
8. Attach output wires (interchangeable) and sensor wire to cell.
9. Open any applicable valves.
10. Start pump and check for leaks.

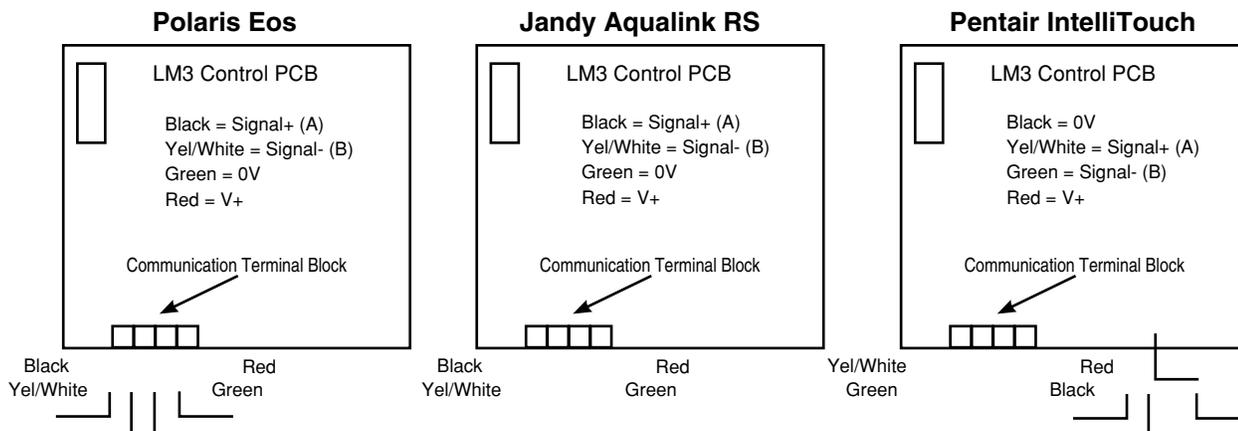
For LM3, use a plastic vessel and only cover plates with solution. Use a solution of 10 parts water to 1 part muriatic acid (stronger solutions will damage the cell and void the warranty). Pour solution into up-turned cell and let sizzle for several minutes. If scraping is needed, use a soft object like a popsicle stick (no metal). Repeat soaking as needed. Rinse with fresh water and replace cell.

Replace the Cell

1. Turn off pump.
2. Close any applicable valves.
3. Remove output wires and sensor wire from cell.
4. Unscrew unions and remove cell.
5. Lubricate o’rings in unions.
6. Place new cell over unions and hand tighten.
7. Attach output wires (interchangeable) and sensor wire to cell.
8. Open any applicable valves.
9. Start pump and check for leaks.

LM3 Interface Instructions

Remove the LM3 power pack cover and connect the 4-conductor communication wire to the “eos com” terminal block on the LM3 control PCB, mounted in the LM3 cover. The wiring configurations for various controllers are as shown below:



Note: The wiring configurations are the same for both Jandy revision ‘K’ and revision ‘L’ controllers.

Note: When connecting to the Jandy Aqualink RS controller with “Rev L” code the LM3 will appear in the settings menu as an “AquaPure” chlorinator.

Securing the Communications Wiring

Fit the communication wire into the slot beside the output cable cord grip and secure the communication wire to the Cell Output cable with cable ties.

Controller Interface

Because the LM3 chlorinator is capable of being connected to various controllers, it is necessary to select which controller the LM3 is to be connected to. This is done as follows:

1. Make a suitable cable connection.
2. Turn the power to the LM3 ‘ON’ via the controller.
3. Set the LM3 chlorine output to minimum (one Amber LED) via the OUTPUT button on the front panel.
4. Press the LM3 SERVICE button down for at least 20 seconds while observing the green SUPER CHLORINATE LED. The LED will flash momentarily, 1, 2 or 3 times, then will go out for approximately 5 seconds.
5. Continue to hold the SERVICE button down until the correct number flashes for the controller being used is observed.



LM3 Display Panel

either of

Controller Selection

Controller:	# of Flashes:	Off Time:
POLARIS Eos	1	Approximately 5 seconds
PENTAIR IntelliTouch	1	Approximately 5 seconds
JANDY AquaLink RS (rev K)	2	Approximately 5 seconds
JANDY AquaLink RS (rev L)	3	Approximately 5 seconds

After initialization for both the controller and the LM3, a software connection should have been made. A valid connection can be verified by observing the menu screen of the controller being used. If the chlorinator does not appear to have made a connection, try resetting both the LM3 and the controller.

When connected to a suitable controller the LM3 behaves as a “drone”, responding only to the controller, so NONE of the buttons on the LM3 will function.

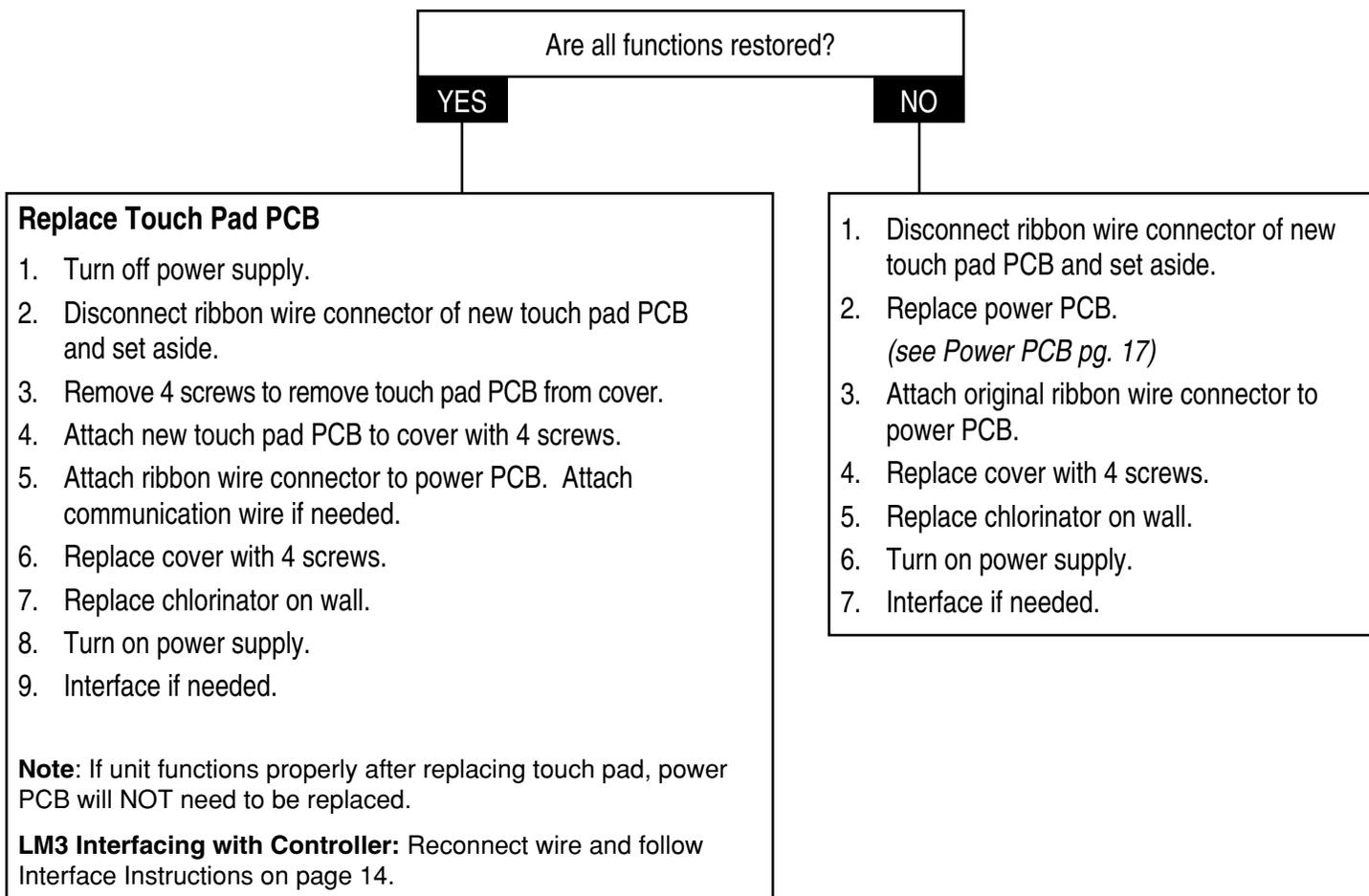
Controller Disconnection

If the communication link between the controller and the LM3 is lost, the LM3 will continue operation as it was before the controller lost connection. The chlorinator will then behave as a “stand alone” unit until the controller is reconnected or the user changes the settings.

Touch Pad PCB

Check / Replace

1. Turn off power supply.
2. Remove chlorinator from wall.
3. Remove 4 screws to remove cover.
4. Disconnect ribbon wire connector from power PCB (do NOT remove touch pad PCB from cover at this time). If interfaced with controller remove communication wire.
5. Plug ribbon wire connector from new touch pad PCB into power PCB.
6. While holding edges of touch pad PCB, turn on power supply.
7. Push buttons and check all light functions.



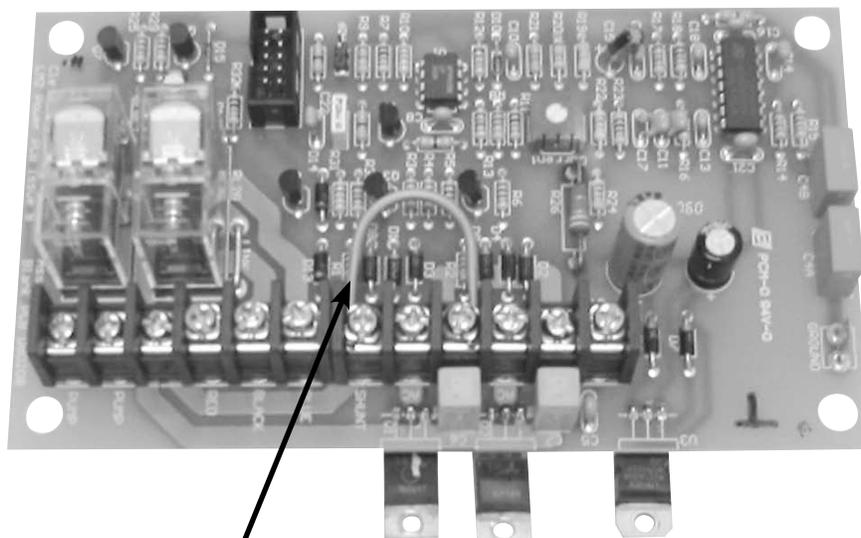
PCB Replacement for the LM2-15 / LM3-15

When replacing a Clearwater LM2 or LM3 series PC board, please note that there is a difference between the models 15 and 24/40. The LM2-15 or LM3-15 can be identified by either the label or the serial number.

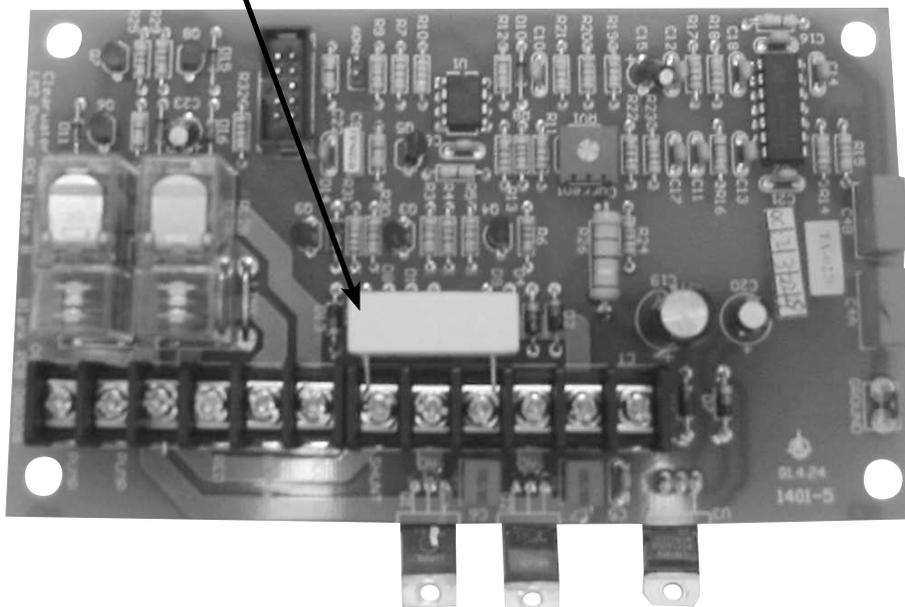
When repairing an LM2-15 or LM3-15, the PC board supplied in the LM repair kit is used but the shunt on the board must be changed. (The shunt limits the amount of current going to the cell. It can look like a U shaped wire or a ceramic block.)

After removing the failed PC board from the LM2-15 or LM3-15, disconnect the shunt from the failed board and exchange it with the shunt on the replacement board. This will insure the proper output for the unit.

For PC board replacement on the LM2-24/3-24 or the LM 2-40/3-40, use the PC board as is.



The shunt may look like a "U" shaped wire or a ceramic box.

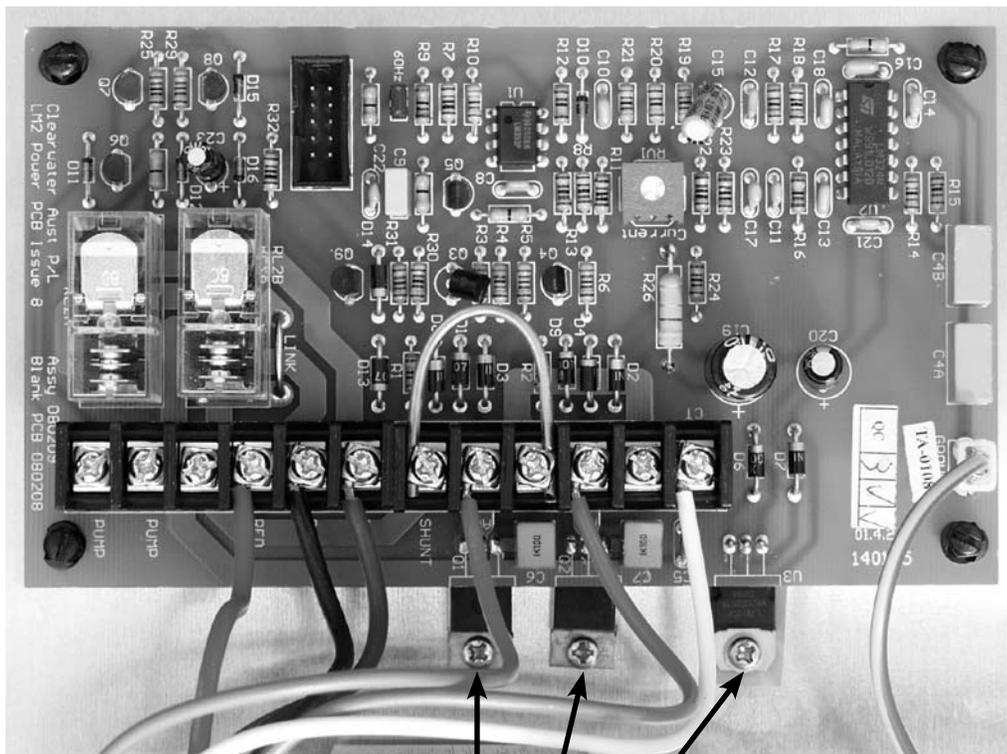


Triac Screws

The triac screws are the 3 screws at the base of the power PCB. It is imperative that these screws be tightened all the way. The triac tabs are used to transfer heat from the power PCB to the back panel of the chlorinator.

If the triac screws are NOT tight, the power PCB will overheat and be damaged.

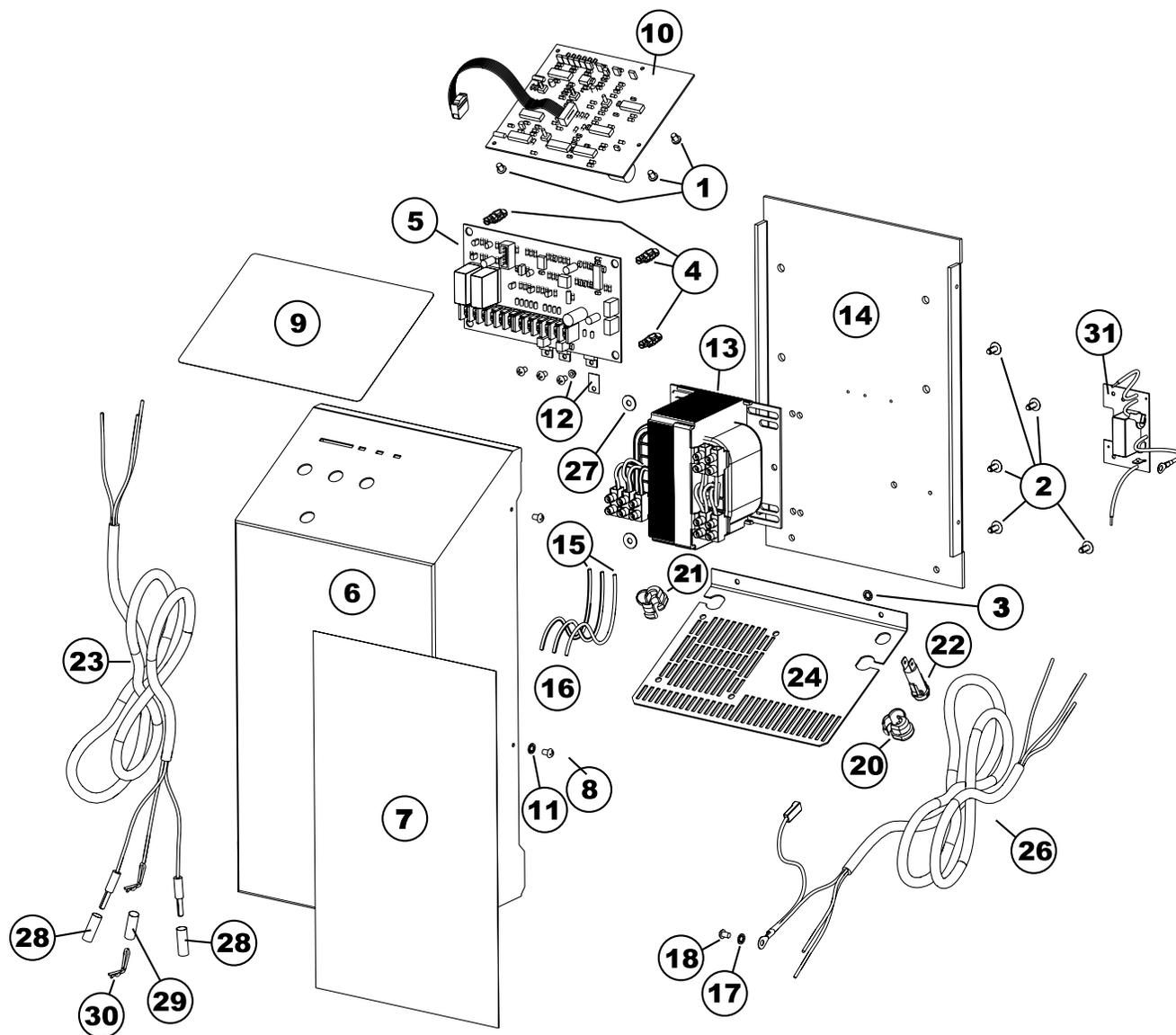
It is also imperative to have screw "C" insulated with the special washer and pad. This special washer and pad insulates this triac tab while still allowing heat to transfer.



Triac Screws A B C

Note that screw "C" has an insulating pad and washer that MUST be replaced when the PC board is changed. These screws must be tight in order to dissipate heat from the board.

LM-2 Series - S - USA



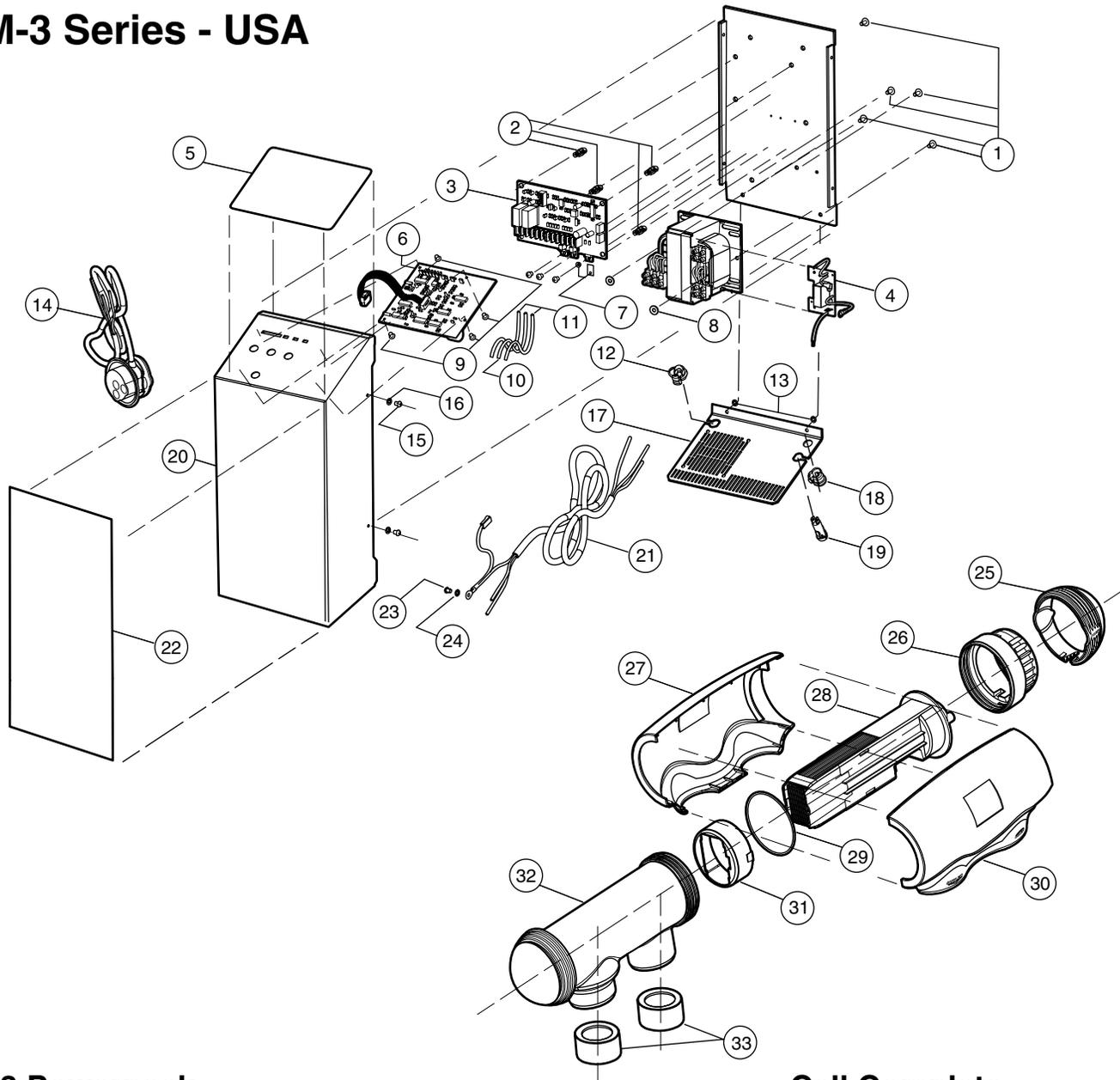
LM2 Powerpack

No.	Part #	Description	No.	Part #	Description
1	W000351	Screw	16	W052031	Transformer cables
2	W000131	Pop rivet	17	W000551	Washer s/proof
3	W000281	Washer s/proof	18	W000681	Earth screw
4	W001091	Black PCB standoff	20	W000021	Cord grip grommet
5	W222091	LM2 Power PCB assy.	21	W000661	Cord grip grommet
6	W012101	LM2S cover	22	W111071	Circuit breaker
7	W171581	LM2 cover label	23	W193201	Output cable
8	W000351	M3 x 8mm screw	24	W012161	Mains panel
9	W171911	LM2S control label	26	W051411	Input cable
10	W222111	LM2S control PCB	27	W001161	Flat washers, transformer
11	W000261	Washer s/proof	28	W050021	Heatshrink black
12	W000651	Insulation kit	29	W051181	Heatshrink blue
13	W130401	LM2-24 transformer	30	W140101	Sensor clip
	W130421	LM2-40 transformer	31	W082241	Filter PCB
14	W012091	LM2 chassis			
15	W052021	Transformer cables			

Cell Complete

Part #	Description
W200891	LM2-24 complete cell (Packed)
W200911	LM2-40 complete cell (Packed)
W040931	Union set
W050041	Heatshrink - black
W051081	Heatshrink - blue

LM-3 Series - USA



LM3 Powerpack

No.	Part #	Description
1	W000131	Pop Rivet
2	W001091	Black PCB Standoff
3	W222091	LM2 and LM3 PCB assembly
4	W082241	Filter PCB For Transformer
5	W175981	LM3S Control Label
6	W082641	LM3S Control PCB
7	W000651	Insulation Kit
8	W001161	Flat Washers, Transformer
9	W000351	M3 X 8mm Screw
10	W052031	Transformer Cable (white)
11	W052021	Transformer Cables (orange)
12	W000661	Cord Grip Grommet
13	W000281	Washer S/Proof
14	W052341	LM3 Output Cable Standard 6'
15	W000351	M3 X 8mm Screw
16	W000261	Washer S/Proof
17	W012161	Main Panel
18	W000021	Cord Grip Grommet
19	W111071	Circuit Breaker
20	W012101	LM2 and LM3 Cover
21	W221411	LM3 Input Cable
22	W175961	LM3 Cover Label
23	W000681	Earth Screw
24	W000551	Washer S/Proof

Cell Complete

No.	Part #	Description
25	W042342	LM3 Terminal Cover
26	W042462	LM3 Locking Ring
27	W042312	LM3 Shroud Left
28	W196562	LM 3-15 Replacement Electrode
	W196582	LM 3-24 Replacement Electrode
	W196602	LM 3-40 Replacement Electrode
29	W150181	LM3 Cell O-Ring
30	W042322	LM3 Shroud Right
31	W042331	LM3 Adaptor
32	W042302	LM3 Cell Housing
33	W041101	Reducing Bush (white)



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