



ZODIAC

LM3 Series Saltwater Chlorinator



Professional Installation Manual
Owner's Manual
& Warranty Information

 **CLEARWATER®**
World's leading salt water chlorinators

Congratulations on your purchase of a Clearwater Chlorinator. You have made a wise decision and will benefit from your Clearwater for many years to come. Please take a moment to read through the entire manual before installing your new unit. Your chlorinator must be installed and operated as specified.

IMPORTANT SAFETY INSTRUCTIONS. READ AND FOLLOW ALL INSTRUCTIONS. SAVE ALL INSTRUCTIONS.



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 Milliamper 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 40 psi.

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 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 guarantee an 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 the 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 bypassed the pool filter.

How your Clearwater Chlorinator Works

Common salt (sodium chloride) is made up of two elements, sodium and chloride. When your Clearwater LM3 is installed, a measured quantity of salt is dissolved in the pool water to create a mild saline solution. As part of the daily filtration cycle, the pool water is passed through the Clearwater electrolysis cell to produce chlorine which is dissolved instantly into the water. Your Clearwater LM3 also produces ozone in the cell as a by-product.

In simple, non-technical terms, the chlorine instantly starts to destroy bacteria, viruses and algae, and in doing this reverts to dissolved salt. This cycle continues with more new chlorine being produced from the salt water in the electrolysis cell, sanitizing the pool and changing once more back to dissolved salt.

Everyday, when the Clearwater unit and the filtration system are switched on, dust and debris are trapped by the filter and the Clearwater sanitizes the water to make it safe and sparkling clean.

Important

To ensure your LM3 works at maximum efficiency, regularly check and maintain the chemistry of your pool.

Preferred Water Chemistry Readings

Salt concentration	4,000 ppm
pH	7.2 to 7.6
Chlorine stabilizer (Cyanuric acid)	40 to 100 ppm depending on regional climate
Total alkalinity	80 to 120 ppm
Total hardness	200 to 400 ppm
Free chlorine	1 to 3 ppm

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CLEARWATER LM SERIES PRODUCT SPECIFICATIONS

Salt Level: 4000 ppm

**Maximum chlorine output/hour
(gas chlorine equivalent)**

LM3-15: 15 grams/hour
LM3-24: 24 grams/hour
LM3-40: 40 grams/hour

Minimum Flow rate: 20 gallons/minute

Plumbing: 1 1/2" or 2" Schedule 40 PVC

**Maximum water temperature
through the cell:** 104 F

Maximum operating pressure: 40 psi

Maximum salt level: 13,000 ppm

Power requirements: 220 volt
3 amp draw

Dimensions

Cell: 15 1/2" x 5 3/4" x 6 1/2"
Power pack: 7 5/8" x 14 3/4" x 4 7/8"

Limited warranty

Cell: 3 years
Power pack: 3 years

**Clearwater LM3 Series chlorinators
should be installed on residential pools only.**

Salt level in your Clearwater pool should never exceed 13,000 ppm.

**Salt levels above 6,000 ppm may damage other
components or metal items of your pool equipment.**

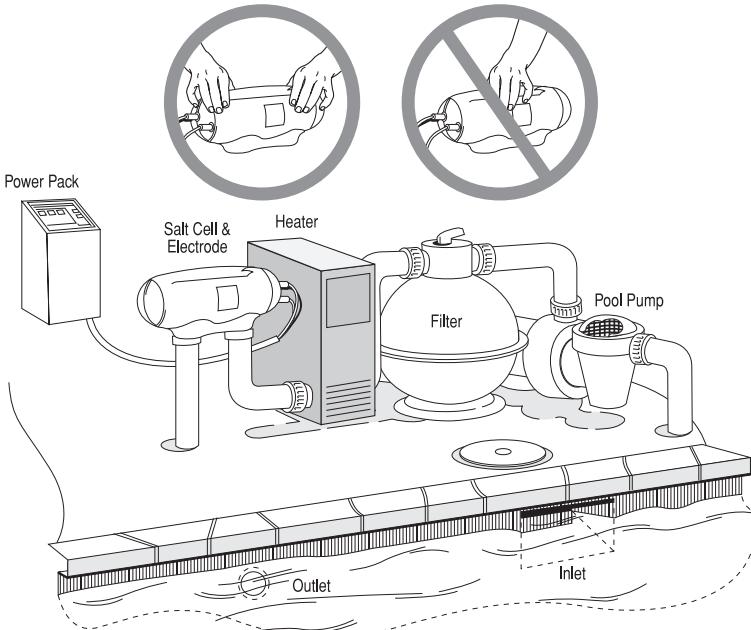
Clearwater LM3 Installation

Clearwater saltwater chlorinators must be installed by a qualified swimming pool professional or certified electrician. If you need assistance in finding a qualified installer please contact our customer support department at 1-888-537-6657.

Plumbing the cell

The Clearwater cell **MUST** be installed horizontally, with the ports down, as the last piece of pool equipment in line. (The design of the cell forms a natural gas trap. Even though the LM unit has an internal flow sensor, this installation provides a secondary safety feature to prevent gas build-up within the system.) **Note: There is a specific inlet and outlet labeled on the cell.** There are no height restrictions or requirements. The cell should be installed within 6' of the power pack. An output cable extension kit is available, see page 8. The ports are 2" and require sch 40 rigid PVC only. 1 1/2" PVC bushings are provided. Any standard PVC cement may be used. Allow adequate drying time before turning on the chlorinator.

Note: If you have to apply pressure to the top of the shroud, apply with hands on either end ONLY as illustrated.



Note: Zodiac Pool Care, Inc. does not recommend installing a salt water chlorinator on a pool using a stainless steel filter.

Flooded Plumbing Installation

This occurs when the water level of the pool is above the height of the pool equipment. Some pool systems may have valves that will isolate the equipment. If not, one ball valve should be installed on the inlet side of the cell and a one-way check valve should be installed on the outlet side of the cell. This will eliminate the possibility of having a gas build-up and possible cell damage and allow the cell to be removed for cleaning if needed.

Multiple Installations

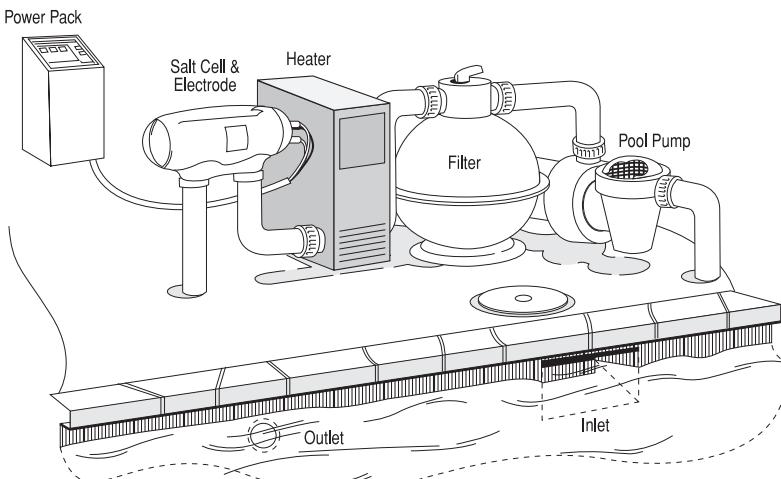
If conditions require multiple installations the LM series chlorinator may be plumbed in either series or parallel providing that the header or manifold is balanced, providing equal flow to each chlorinator.

Installing the Power Pack

The Power Pack can be mounted on a wall or a post. If mounting the Power Pack on a post, it must be centered on a flat panel of waterproof material at least 10" x 18". Do not enclose the Power Pack in any box. Do not install it above any heat source. Install the Power Pack a minimum of 10 feet from the pool edge. See your local building codes for requirements.

The Power Pack is hard-wired to 220V ONLY. It should be wired to the "LOAD" side of the pump timer, so that the Clearwater chlorinator is powered only when the pump is powered. Attach the yellow plug cap to the cell and replace the blue end cover.

In the event the cell can not be located within 6' of the power pack, contact Zodiac Pool Care, Inc. for an output extension kit.



Wiring to a controller

The LM3 Saltwater Chlorinator can be connected to a Pool Automation System, via two methods.

I. Via an Auxiliary relay at the Pool Automation Controller

Using this method the LM3 mains power is connected to an auxiliary relay in the Pool Automation System. The LM3 unit is switched on and off as determined by the Pool Automation System settings for the Auxiliary relay.

The “Output Setting” and the selection of “Super Chlorinate” must be selected at the LM3 control panel initially and the LM3 will retain these settings when switched on by the Pool Automation System until they are manually changed.

NOTE: The Super Chlorinate function will remain active for a total of 24 operating hours after being selected.

IMPORTANT: The LM3 should only have power when there is water flow and actuator valves should never block the flow when power is on. Refer to the controller’s installation guide for additional information.

2. Via a Communications Link

The LM3 has the capability of being connected to a number of controller units:

- Polaris EOS
- Jandy Aqualink RS* (REV “K” and “L”)
- Pentair IntelliTouch**

Using this method mains power is supplied to the LM3 via the controller’s ‘PUMP’ output and a communications link is made between the LM3 and the Pool Automation system.

When the communication link is connected, the Pool Automation system becomes the master control for the LM3 enabling the pool owner to control all settings of the LM3 via the Pool Automation system control panel, and warning messages for low salt and no flow will be displayed on the Pool Automation system control panel.

When the communication link is removed, control of the LM3 settings returns to the LM3 control panel.

NOTE: After a change is made at the controller, it may take several seconds for the change to be reflected on the LM3 front panel, this delay depends on the controller being used.

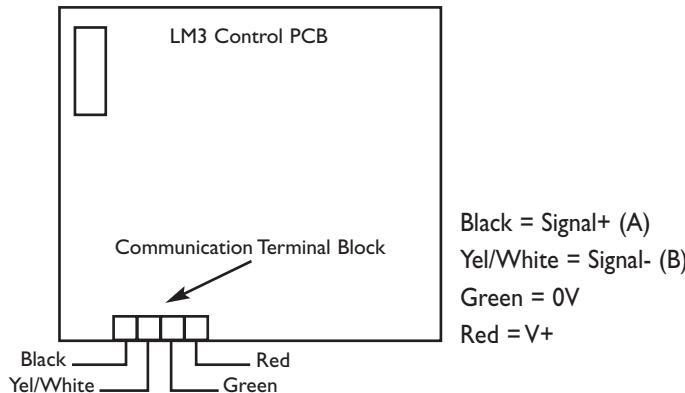
*Jandy Aqualink RS is a Registered Trademark of Water Pik Technologies, Inc.

**Pentair IntelliTouch is a Registered Trademark of Pentair Pool Products

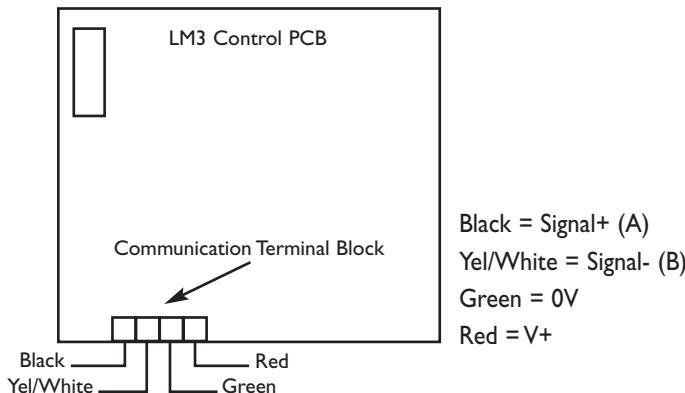
CLEARWATER LM3 INSTALLATION

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:

Polaris Eos



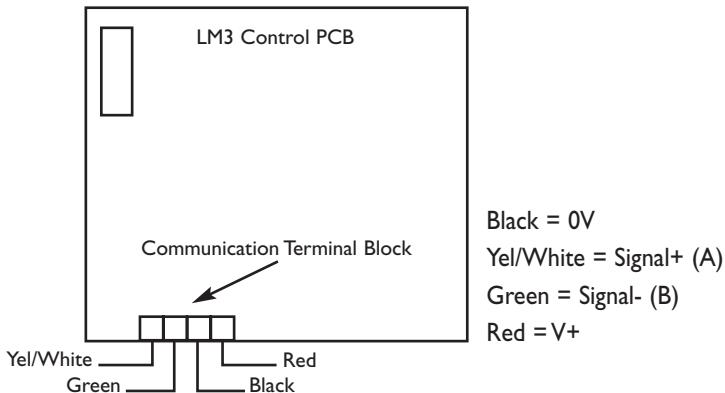
Jandy Aqualink RS



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

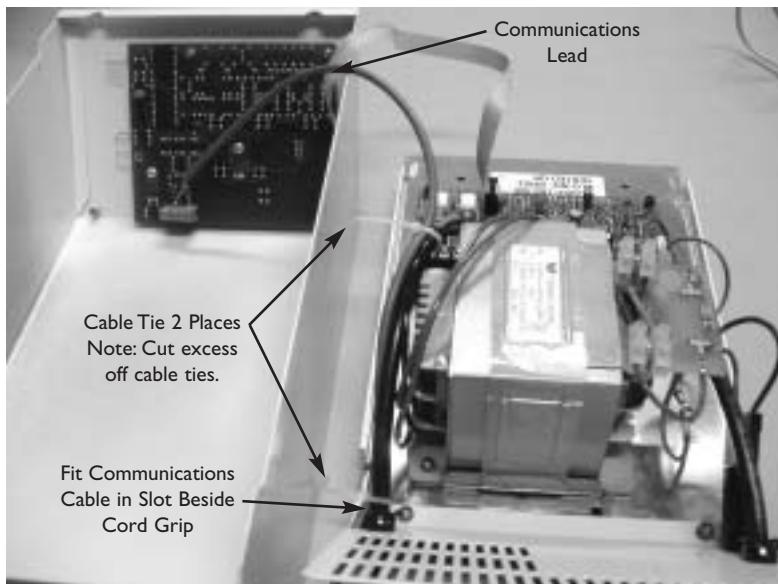
Note: When connecting to the Jandy Aqualink RS controller with "Rev L" code the LM3 will appear in the settings menu as an "AquaPure" chlorinator.

Pentair IntelliTouch



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 as shown below.



Note: After completing the installation to the controller refer to page 16 for interface instructions.

Clearwater Model LM3 Operation

The chlorine production of the Clearwater LM3 is controlled by the number of hours the LM3 and filtration system are ON, as well as the chlorine output setting. Power to this unit must be controlled by the pump timer. The chlorinator functions may only be set when the filtration system is running.

The Clearwater LM3 includes a Super Chlorinate feature which automatically super chlorinates the pool for an approximated 24 hour period of pool pump operation.

The Clearwater LM3 is also fitted with 3 indicator lights that monitor the operation of the chlorinator, the concentration of salt in the pool, and the water flow.

The LM3 is designed to require minimum operator maintenance using reverse polarity technology to minimize the scaling of the cell, however depending upon how well the pool water chemistry is maintained, it may be necessary to manually clean the cell.

Control Panel Functions When Wired to Pool Timer

On / Off Button

This button switches the LM3 ON and OFF. One yellow or a series of green lights appear in the chlorine output indicator window when the unit is ON.

Output Button

The output button is used to set the chlorine output of the LM3.

Chlorine output is selected by repeatedly pushing this button until maximum is reached on the chlorine output indicator. An extra push of this button will reset the output to minimum.

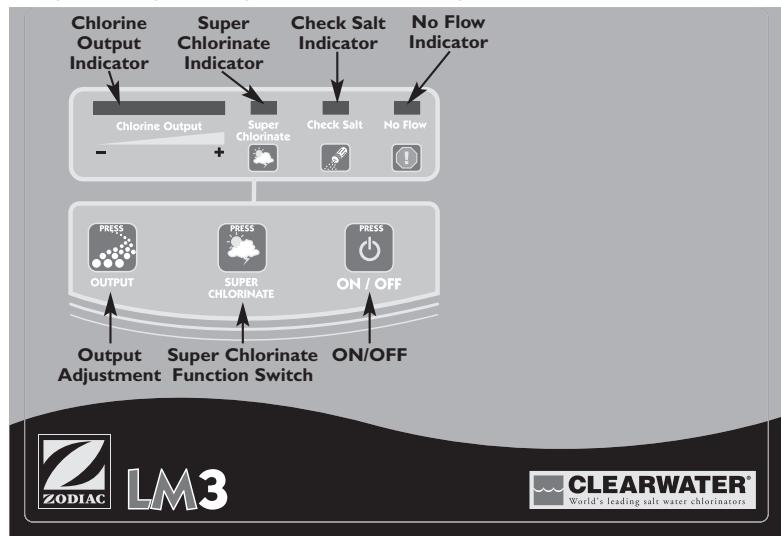
Super Chlorinate Button

The Super Chlorinate function is used to rapidly add chlorine to the pool.

This feature automatically super chlorinates your pool for approximately 24 hours of pool pump run time.

Backup Battery

The LM3 is fitted with a rechargeable battery. If the power is removed, the LM3 will retain the Chlorine Output settings and Super Chlorinate settings.



LM3 Display Panel

Indicator Lights: What They Mean

Chlorine Output

A series of six lights indicates the chlorine output setting of the power pack – more lights equals greater chlorine production. **Note:** This setting does not show the actual chlorine reading in the pool. Use of a test kit is required to confirm the Free Chlorine reading of the pool water. **Note:** The output lights will not increase if the salt level is too low (below 2900ppm) and/or the water is too cold (below 65°).

Chlorine Output - Yellow Light Flashing

The yellow (low output) light flashes for a few minutes when reversing polarity to self clean, indicating no output during this time. The LM3 will revert back to its previous output setting after the unit has reversed polarity.

Super Chlorinate - Light ON

This light indicates that the Super Chlorinate feature has been selected, it will turn OFF when the Super Chlorinate period has ended.

Super Chlorinate - Light OFF

Function not selected.

Check Salt - Light ON

The Check Salt light will come on at any salt level between 3000ppm and 4000ppm depending on mains voltage, water temperature (below 65°) & the salt level. This is not a fault but a precaution to ensure the salt level is never too low. (See ‘Salt: When And How To Add It’).

Note: Operating the LM3 at reduced salt levels may shorten the life of the cell. The Check Salt light may also come on if the cell is scaled, indicating manual cleaning is required.

Check Salt - Light OFF

Indicates that the salt level in the pool is correct.

No Flow - Light ON

This indicates no water flow in cell. The chlorine output will also turn off at this time.

All Lights OFF

All lights OFF indicates the LM3 is turned off.

Controller Operation

There are a number of subtle differences in operation between the LM2 and the LM3 chlorinator. These are outlined below:

Startup

When switched on, the chlorinator must go through an initialization sequence; this is indicated by the amber LED being illuminated. After a short period the LED will switch off and the chlorinator will begin 'normal' operation.

First time startup

When the chlorinator is connected to the mains for the first time and the initialization sequence has been completed the chlorinator defaults to the 'zero output' state. The user can then select the desired output level.

Output Settings

The battery backup will hold the output settings in memory when the unit is turned off, unless the setting was changed less than one minute before turning off.

Reversing Polarity

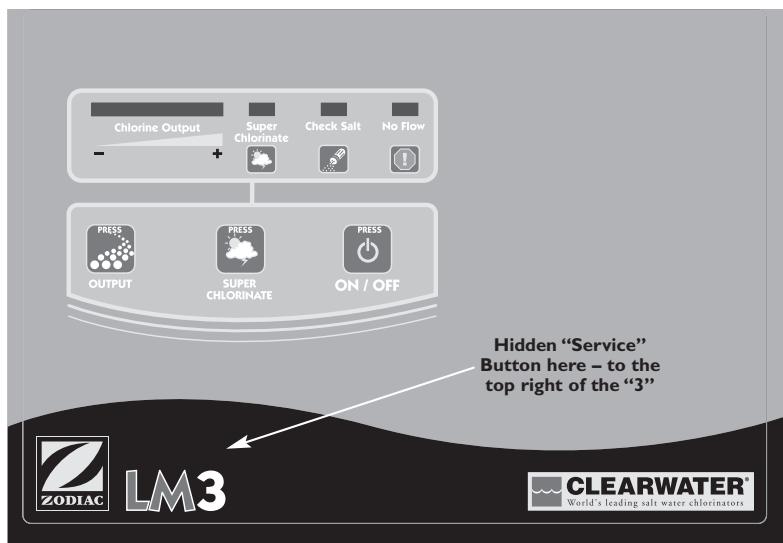
The battery backup will remember the polarity reversal time.

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. HOLD the LM3, "service" button down for at least 20 seconds (shown in fig 1.) while observing the GREEN SUPER CHLORINATE LED the SUPER CHLORINATE LED will 'flash' momentarily, either 1, 2 or 3 times, then will go out for around approximately 5 seconds.
5. Continue to hold the "service" button down until the correct number of flashes (for the controller being used) is observed (see page 17).

Figure 1.



LM3 Display Panel

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.

Low Salt / No Flow Warnings to Controllers

“Low salt”

Polaris Eos: When a ‘low salt’ condition occurs, the LM3 sends a message to the Eos, which flashes the error code (“Check Chlorinator”) on the screen, as well as displaying a salt level of 2900ppm, indicating to the user that the salt level in the pool should be checked.

Jandy Aqualink RS (REV "K"): When a ‘low salt’ condition occurs, the LM3 sends a message to the Aqualink RS, which displays a salt level of 2900ppm, indicating to the user that the salt level in the pool should be checked.

Jandy Aqualink RS (REV "L"): When a ‘low salt’ condition occurs, the LM3 sends a message to the Aqualink RS, which displays a salt level of 2900ppm, as well as a "LOW SALT" warning message, indicating to the user that the salt level in the pool should be checked.

Pentair IntelliTouch: When a ‘low salt’ condition occurs, the LM3 sends a message to the IntelliTouch, which displays a salt level of 2900ppm, as well as a "LOW SALT" warning message, indicating to the user that the salt level in the pool should be checked.

**NOTE: The “Check Salt” light will also be illuminated on the LM3 powerpack.
Always test the salt level before adding additional salt.**

“No Flow”

In a genuine ‘No Flow’ situation the LM3 red “No Flow” light will be illuminated on the LM3 powerpack in addition to the following screen displays:

Polaris Eos: “Check Chlorinator” “0ppm Salt”

Jandy Aqualink RS (REV "K"): “0ppm Salt”

Jandy Aqualink RS (REV "L"): “No Flow”

Pentair IntelliTouch: “Check Flow/PCB”

Test button

Due to the “service” button being used for selecting the controller as well as to test the polarity reversal, it is important (if using a controller) to avoid holding the “service” button for more than 15 seconds when testing or the controller selection may be altered. If this occurs the controller selection can be reset by following the procedure outlined under “Controller Selection” on page 17.

Operating Tips

A. Filtration and chlorination system operating periods

Run your filtration and chlorination system for at least 6 to 8 hours per day.

During very hot weather it might be necessary to run the system for additional hours, but in winter where pools remain open, it is only necessary to run the filtration system for around 4 hours per day. Shorter periods will help lengthen the life of the cell electrodes.

B. Chlorine output settings

After the correct amount of salt has been added to the pool (see page 17-18 on How & When to Add Salt) start the operation of the LM3 at maximum output.

C. Free (residual) chlorine reading

The free chlorine residual in the pool should be between 1 - 3 ppm. Increasing the daily operating period of the system increases the free chlorine reading, and a shorter operating period reduces the chlorine reading. Likewise, operating the chlorinator at maximum output will produce a higher chlorine reading than operating the chlorinator at a lower setting.

D. Chlorine stabilizer (Cyanuric acid) level

The Chlorine stabilizer (cyanuric acid) reading should be between 40-100 ppm. This will vary depending on your regional climate. Chlorine stabilizer helps to keep a satisfactory free chlorine reading in hot sunny climates. Extremely hot and sunny climates will require readings at the higher end of the given range. Refer to 'Stabilizer Chart' on page 19.

E. pH readings

It is ABSOLUTELY ESSENTIAL that the pH of the pool be maintained in the range of 7.2 - 7.6. The effectiveness of chlorine as a sanitizer is significantly reduced as the pH rises. At a pH of 8.0, nearly all of the chlorine being added to the pool is wasted, and it will be almost impossible to maintain a satisfactory free chlorine reading. Additionally, pH readings at 8.0 and higher increase scale formation which may require manual cleaning of the cell.

F. Regular maintenance checks.

Weekly:

- Visually check the cell electrodes. Only if necessary, remove the cell and flush with a garden hose to remove any debris that may have passed through the filter and lodged in the cell housing. Avoid inserting objects into the cell which can scratch or bend the cell plates.
- Check the free chlorine.
- Check the total alkalinity. Adjust if necessary.
- Check the pH of the water. Adjust if necessary.
- Check the pressure gauge on the filter to see if backwashing is necessary.

Monthly:

- Check the salt concentration of the pool (see 'Salt: When And How To Add It').
- Check the chlorine stabilizer reading. Adjust if necessary.

Salt: When And How To Add It

When to add salt

Test the salt level at start-up or when the 'Check Salt' light comes on. The light marked 'Check Salt' functions automatically when additional salt is needed.

The salt concentration should normally be around 4000 ppm, but should never be allowed to fall below 3000 ppm, as this can reduce the life of the cell electrodes.

Salt is not lost through evaporation. Salt is lost with the water splashed out of the pool or during backwash. Adding fresh water or rainfall to the pool dilutes the salt concentration. Adding salt may be needed from time to time to maintain an optimum salt level.

NOTE: The 'Check Salt' light may switch on if the salt level is low, the water temperature is below 65° or if the cell is badly scaled. Always test the salt level before adding additional salt. When the 'Check Salt' light is on, the chlorine output light may not reach maximum. Adding more salt will correct this situation.

How much to add

Use a salt test strip or test meter to determine the salt level in pool water prior to adding any salt. Capture water from elbows depth in a container, then use a test strip in this water sample. Previous regular usage of sodium hypochlorite (liquid chlorine) creates residual salt within the pool and may bring your salt level close to the required 4000 ppm concentration. Only 99.5% pure refined salt (sodium chloride) should be used with the Clearwater chlorinator. Avoid using salt containing YPS (yellow prussate of soda). Add enough salt to obtain a 4000 ppm concentration.

- In a pool of approximately 13,200 gallons, one (1) 50 lb. bag of salt will increase the salt concentration by 500 ppm.
- In a NEW pool (where there is no salt residual) of approximately 13,200 gallons, eight (8) 50 lb bags of salt are required to reach a 4000 ppm concentration.
- Refer to 'Salt Chart' on page 18.

IMPORTANT: To avoid damage to your Clearwater chlorinator, never allow salt level to exceed 13,000 ppm. Other components of your pool equipment may be damaged if the salt level is kept above 6000 ppm. Refer to the manufacturers operation manual for warranty exclusions.

How to add salt

Evenly disperse the proper amount of salt around the perimeter of the pool and brush to spread evenly. Run filter for 4-6 hours. Allow 24 hours for salt to fully dissolve. If the CHECK SALT light is on after 24 hours, test salt level and add necessary salt to obtain a 4000 ppm concentration. Even if the salt level is maintained at 4000 ppm, but water temperature drops below 65°, the CHECK SALT may come on. This is not cause for concern. For further assistance, consult your pool professional or call 1-888-537-6657.

Note: Do not add salt to the skimmer box.

Adding Salt to Your Pool

Pounds and (KG) of salt needed to raise level to 4000 PPM

Current Salt Level ppm	Gallons and (Liters) of Pool/Spa Water							
	10,000 (37854)	15,000 (56781)	20,000 (75708)	25,000 (94635)	30,000 (113562)	35,000 (132489)	40,000 (151416)	45,000 (170344)
0	334 (151)	501 (227)	668 (303)	835 (379)	1001 (454)	1168 (530)	1335 (606)	1502 (681)
250	313 (142)	469 (213)	626 (284)	782 (355)	939 (426)	1095 (497)	1252 (568)	1408 (639)
500	292 (132)	438 (199)	584 (265)	730 (331)	876 (397)	1022 (464)	1168 (530)	1314 (596)
750	271 (123)	407 (185)	542 (246)	678 (308)	814 (369)	949 (431)	1085 (492)	1221 (554)
1000	250 (114)	376 (170)	501 (227)	626 (284)	751 (341)	876 (397)	1001 (454)	1127 (511)
1250	229 (104)	344 (156)	459 (208)	574 (260)	688 (312)	803 (364)	918 (416)	1033 (468)
1500	209 (95)	313 (142)	417 (189)	522 (237)	626 (284)	730 (331)	835 (379)	939 (426)
1750	188 (85)	282 (128)	376 (170)	469 (213)	563 (256)	657 (298)	751 (341)	845 (383)
2000	167 (76)	250 (114)	334 (151)	417 (189)	501 (227)	584 (265)	668 (303)	751 (341)
2250	146 (66)	219 (99)	292 (132)	365 (166)	438 (199)	511 (232)	584 (265)	657 (298)
2500	125 (57)	188 (85)	250 (114)	313 (142)	376 (170)	438 (199)	501 (227)	563 (256)
2750	104 (47)	156 (71)	209 (95)	261 (118)	313 (142)	365 (166)	417 (189)	469 (213)
3000	83 (38)	125 (57)	167 (76)	209 (95)	250 (114)	292 (132)	334 (151)	376 (170)
3250	63 (28)	94 (43)	125 (57)	156 (71)	188 (85)	219 (99)	250 (114)	282 (128)
3500	42 (19)	63 (28)	83 (38)	104 (47)	125 (57)	146 (66)	167 (76)	188 (85)
3750	21 (9)	31 (14)	42 (19)	52 (24)	63 (28)	73 (33)	83 (38)	94 (43)
4000	Optimum	Optimum	Optimum	Optimum	Optimum	Optimum	Optimum	Optimum

Adding Stabilizer to Your Pool

**Pounds and (KG) of stabilizer (Cyanuric Acid)
needed to raise level to 80 PPM**

Current CYA Level ppm	Gallons and (Liters) of Pool/Spa Water							
	10,000 (37854)	15,000 (56781)	20,000 (75708)	25,000 (94635)	30,000 (113562)	35,000 (132489)	40,000 (151416)	45,000 (170344)
0	6.7 (3.0)	10.0 (4.5)	13.4 (6.1)	16.7 (7.6)	20.0 (9.1)	23.4 (10.6)	26.7 (12.1)	30.0 (13.6)
10	5.8 (2.6)	8.8 (4.0)	11.7 (5.3)	14.6 (6.6)	17.5 (7.9)	20.4 (9.3)	23.4 (10.6)	26.3 (11.9)
20	5.0 (2.3)	7.5 (3.4)	10.0 (4.5)	12.5 (5.7)	15.0 (6.8)	17.5 (7.9)	20.0 (9.1)	22.5 (10.2)
30	4.2 (1.9)	6.3 (2.8)	8.3 (3.8)	10.4 (4.7)	12.5 (5.7)	14.6 (6.6)	16.7 (7.6)	18.8 (8.5)
40	3.3 (1.5)	5.0 (2.3)	6.7 (3.0)	8.3 (3.8)	10.0 (4.5)	11.7 (5.3)	13.4 (6.1)	15.0 (6.8)
50	2.5 (1.1)	3.8 (1.7)	5.0 (2.3)	6.3 (2.8)	7.5 (3.4)	8.8 (4.0)	10.0 (4.5)	11.3 (5.1)
60	1.7 (0.8)	2.5 (1.1)	3.3 (1.5)	4.2 (1.9)	5.0 (2.3)	5.8 (2.6)	6.7 (3.0)	7.5 (3.4)
70	0.8 (0.4)	1.3 (0.6)	1.7 (0.8)	2.1 (0.9)	2.5 (1.1)	2.9 (1.3)	3.3 (1.5)	3.8 (1.7)
80	Optimum	Optimum	Optimum	Optimum	Optimum	Optimum	Optimum	Optimum

The above chart is for general reference only. The recommended stabilizer reading is between 40-100 ppm and will vary dependent on geographic climate. Warm, sunny climates will require a stabilizer reading at the higher end of the given range. Consult your local pool professional for your optimum level. Always add stabilizer according to manufacturer's instructions.

Some Tips On Water Chemistry

How to adjust pH

A pH range of 7.2 - 7.6 is ideal for maximum comfort and minimum chlorine demand. **Always adjust total alkalinity before adjusting pH.**

Low pH (acidic water) leads to stinging eyes and corrosion of open metal fittings. Raise the pH by adding sodium bicarbonate or soda ash. Consult your pool professional regarding which chemical is best for your situation and the proper amount to use. Check the pH after 4 hours of circulation, adjusting as necessary to achieve the proper range.

High pH (alkaline water) leads to clouding of the water and reduces the amount of active chlorine. This means algae and germs can grow. Lower the pH by adding muriatic acid to the pool water. The acid demand indicated by your 4-in-1 test kit will show the amount of acid to use.

If your pH remains inconsistent, check your total alkalinity.

Total alkalinity affects pH

Total alkalinity is a measure of the alkaline chemicals in your pool water (eg. Bicarbonates, carbonates, and hydroxides). It can be thought of as the buffering system necessary to control pH. Low alkalinity can be compared to weak shock absorbers on a car, allowing pH to fluctuate. The pH will be difficult to maintain and staining of pool surfaces may occur when total alkalinity is too low.

Total alkalinity should be in the range of 80 - 120 ppm. Total alkalinity is often confused with pH, which it affects.

To raise total alkalinity, add pH buffer (sodium bicarbonate) at the rate shown in the manufacturers instructions to achieve a reading in the 80 - 120ppm range. 1.5 lbs. of sodium bicarbonate raises 10,000 gallons of pool water by 10 ppm.

To lower the total alkalinity, use muriatic acid. The acid demand chart in your 4-in-1 test kit will indicate the necessary amount to add. Adjust as needed until the reading (taken at least 24 hours later) is in the 80-120 ppm range. When total alkalinity is correct, you may need to adjust pH.

Use of algaecides

Although not normally needed, algaecides may be used in conjunction with a Clearwater chlorinator. Consult your pool professional regarding the presence of phosphates in your local area and always follow manufacturers instructions for treatment.

The chlorine residual level automatically maintained by a Clearwater chlorinator is the best defense against algae and is usually all that is necessary. If algae is observed however, brush spot thoroughly, adjust pH, super-chlorinate with your Clearwater chlorinator or manually shock pool water with either liquid or granular chlorine. A chlorine residual should be measurable within 24 hours. If not, repeat shock treatment (see pages 22-23 for additional water balance instructions). After shocking, check to ensure that the Clearwater chlorinator is maintaining a residual chlorine level to prevent future algae growth. With extreme algae conditions, manually shocking the pool is the best option.

Note: Overuse of algaecides can lead to a reduction in chlorine residual because algaecides can negatively react with the chlorine produced by the Clearwater chlorinator. When using algaecides, always follow manufacturer's instructions and adjust the output of the Clearwater chlorinator to maintain a residual chlorine level.

The addition of certain chemicals can reduce the effectiveness of chlorine. Always make sure that proper residual chlorine levels are maintained to avoid illness.

Use of sequestering agents

In some areas the total hardness of your source water may be unusually high. High total hardness contributes to scale formation in the pool. Sequestering agents will help keep minerals in solution, preventing this from happening. Consult your pool professional about the use of a sequestering agent.

Use of phosphate removers

High phosphate levels in your pool water can reduce the amount of chlorine in your pool. Consult your local pool professional for phosphate testing and removal.

Troubleshooting

NOTE: If the chlorinator and pump are running, it is normal for a cloud of small bubbles to be produced in the cell, indicating chlorine is also being produced.

Problem A

Water looks clean but no chlorine residual reading

To test for chlorine residual, switch on the filtration system and adjust the Clearwater to maximum output. After a few hours take a water sample from the pool. Test this water with your test kit. Chlorine residual should measure between 1 and 3 ppm.

REMEDY:

- Adjust total alkalinity to 80 - 120 ppm.
- Adjust the pH within the range 7.2 - 7.6.
- Make sure your cell is clean.
- Check cyanuric acid levels.
- Increase the setting of the output control.
- Increase the running time of the filter and chlorinator. Make sure that the filter is clean and functioning properly.
- Add salt if indicated by 'Check Salt' light.

Use chlorine stabilizer (cyanuric acid) to protect chlorine residual

This chemical acts as a sun-screen for chlorine and prevents chlorine from being too quickly destroyed by the sun. Chlorine stabilizer is essential to prolong the life of chlorine in the pool water. It should be added following the manufacturer's instructions to achieve a level of 40 - 100 ppm., depending on the geographical climate. Refer to the stabilizer chart on page 19.

Use of algaecides

Although not normally needed with a Clearwater chlorinator, algaecides may be used. Always follow manufacturer's instructions for treatment. Overdosing the pool with any type of algaecide may reduce residual chlorine measurements/reading. If this occurs, you must manually shock pool water with granular or liquid chlorine until a measurable free chlorine residual reading is obtained.

Problem B

Pool green and no chlorine reading

Chlorine is still considered the most effective way of destroying algae and bacteria in your pool water. A chlorine residual of 1 to 3 ppm is considered desirable.

REMEDY:

Superchlorinate or manually shock the pool. This will raise the chlorine residual to a very high level for a short period of time and reduce chlorine demand.

1. Superchlorinate using a Clearwater LM3 chlorinator:

- i) Backwash the filter.
- ii) Adjust the pH to within the range 7.2 - 7.6. See 'Tips on Water Chemistry' on pages 20-21.
- iii) Press the button marked 'Super Chlorinate'. The Clearwater automatically increases its output and runs for approx. 24 hours of pool pump time.
- iv) After 24 hours, backwash the filter.
- v) Re-adjust the pH to 7.2 - 7.6.
- vi) Check the chlorine reading.
- vii) If the chlorine reading is too low, repeat steps (iii) to (vi) until the chlorine reading is satisfactory.

2. Manually shock with chlorine or oxidizing agents:

- i) Backwash the filter.
- ii) Adjust the pH to within the range 7.2 - 7.6 (See 'Tips on Water Chemistry' pages 20-21).
- iii) Add 1 lb. granular chlorine or 1 gallon liquid chlorine or 1 lb. non-chlorine oxidizer per 10,000 gallons of water.
- iv) After shock dosing, re-adjust the pH to within the range of 7.2 - 7.6 and check the chlorine level before using the pool. The chlorine residual should be 1-3ppm..

Problem C

Chlorine odor

CAUSE: Not enough free chlorine.

Surprisingly, the problem here is not too much chlorine as many imagine. Chloramines form by the bonding of chlorine with amines from sweat and other sources. These chloramines can create a chlorine odor and can also cause eye and skin irritation. Free chlorine does not smell (up to 10 ppm concentration).

REMEDY:

Same as problem B.

Problem D

Slimy walls of pool or spa

CAUSE: Combined algae and bacteria growth.

REMEDY:

Brush down the affected walls and follow remedy for Problem B, manually shocking pool.

Problem E

Eye and/or skin irritation

CAUSE: Incorrect pH.

REMEDY:

Adjust the pH to within the range 7.2 - 7.6 (See 'Tips on Water Chemistry' pages 20-21).

Problem F

Scale formation on pool equipment

To clean the deposit (scale) from the cell, see Chlorinator Maintenance section.

CAUSE 1: Incorrect pH and hard water.

REMEDY:

Adjust the pH to within the range 7.2 - 7.6 (See 'Tips on Water Chemistry' pages 20-21).

CAUSE 2: High total hardness.

REMEDY:

Dilute pool with fresh water. Consult your pool professional regarding use of a sequestering agent.

Problem G

Chlorine Output will not reach maximum - Check Salt light may also be on

CAUSE 1: Low incoming voltage.

REMEDY:

Confirm Clearwater is wired to 220V. If wired to 220V but incoming voltage is less due to location (rural areas for example), raising the salt level will compensate.

CAUSE 2: Salt level below 4000ppm or water temperature is below 65°.

REMEDY:

Add salt. (See Salt: When and How to Add it)

CAUSE 3: Cell reversing (self clean).

REMEDY:

If the cell is reversing the yellow light on the Chlorine Output indicator will flash. Wait approximately three minutes and the output should return to normal.

CAUSE 4: Cell may need manual cleaning.

REMEDY:

Follow directions for manually cleaning the cell (See page 27).

CAUSE 5: Insufficient water flow through the cell.

REMEDY:

Empty strainer baskets. Clean pool filter.

REMEDY:

Ensure valves are properly set.

Problem H

No Flow light on

CAUSE 1: No water flow through the cell.

REMEDY:

Ensure sufficient water flow through chlorinator cell. Verify that the filter pump is on. Flow may be restricted if the filter needs backwashing.

REMEDY:

Ensure valves are properly set.

Problem I

Chlorinator stops working, all lights OFF

CAUSE 1: Unit turned off.

REMEDY:

Push ON/OFF button. A yellow light in the Chlorine Output indicator window is present when the unit is "ON".

CAUSE 2: Mains power removed or blown fuse.

REMEDY:

Check mains power source and fuse.

Resetting the Fuse

Turn off all power to the Clearwater power pack. The resettable fuse is located above the powercord on the bottom rear of the LM3 unit. If the fuse is blown (popped with white area exposed), push to reset. Restore power to unit.

Mains power supply

Your Clearwater chlorinator must be connected to a properly grounded electrical power socket, or power source.

Problem J

Chlorine level is too high

CAUSE 1: Chlorinator is manufacturing too much chlorine.

REMEDY 1:

Use the output button to reduce setting. Retest chlorine daily until proper level is attained.

REMEDY 2:

Manually turn chlorinator off. The LM3 Series uses a smart switch that turns the chlorinator on automatically with each pump cycle. If longer periods of zero (0) chlorine output are required, disconnect the yellow plug cap from the cell. (Red NO FLOW light will illuminate once chlorine production has stopped.) Plug cap must be reconnected for chlorine production to begin.

Any type of electrical troubleshooting should be handled by a qualified pool professional or certified electrician.

Chlorinator Maintenance

How to clean your cell

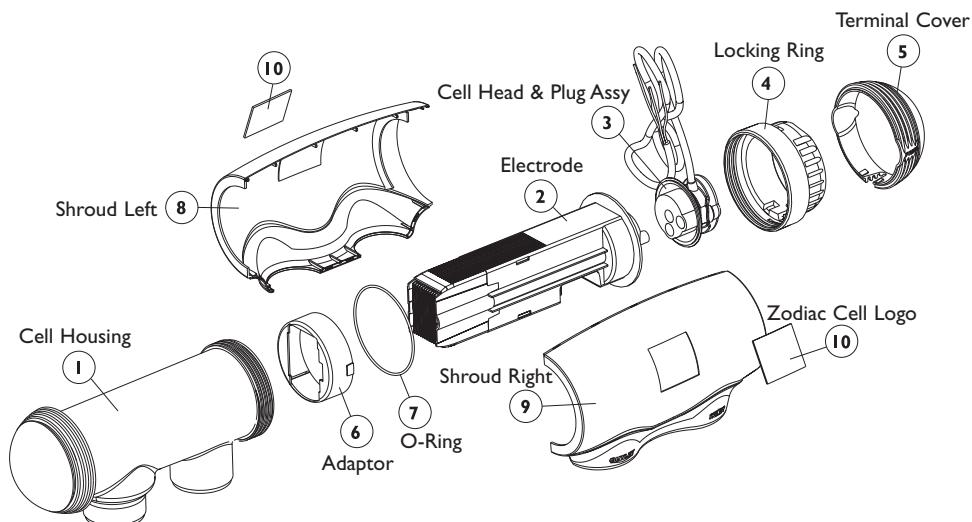
In unusual situations, the self cleaning electrodes may benefit from occasional manual cleaning to remove scale build-up as the result of having very "hard" water or continuously high pH conditions, which can occur with new plaster finishes.

1. Turn off the filter pump and chlorinator, close necessary valves.

Note: Always turn pump off prior to installing or removing any Clearwater Cell.

Your pump/filter system is operated under pressure and pressure must be released before you begin. Open the air relief valve on your pool filter to release the pressure in the system.

2. Remove the blue terminal cover by pressing at both sides.
3. Unplug plug cap assembly
4. Unscrew locking ring.
5. Remove electrode, if scaled follow cleaning instructions in step 6.

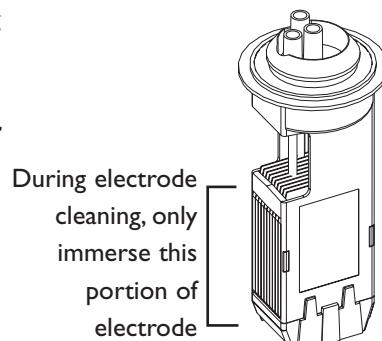


Chlorinator Maintenance

(Continued on next page)

CHLORINATOR MAINTENANCE

6. Mix cleaning solution in a suitable plastic vessel by adding one (1) part of Hydrochloric (muriatic) acid to ten (10) parts water. **Note: To avoid splash, always ADD MURIATIC ACID TO WATER rather than water to muriatic acid. Solutions stronger than 1:10 will damage cell and void warranty.** Allow the cleaning solution to dissolve the calcium deposits for approximately 5 minutes. When the electrodes are clean, pour the cleaning solution and the calcium residue into a bucket of water. This can now be disposed of down a drain.



Note: Never mix chemicals together. Always rinse bucket and drain area after cleaning cell.

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.

7. Clean o-ring and face of electrode. Apply a film of silicone lubricant to o-ring (just enough to make it shiny).
8. Refit electrode into housing.
9. Tighten locking ring.
10. Insure output cable is aligned with the hole in the terminal cap and snap on terminal cap.
11. Reset valves, turn on pump and chlorinator.
12. Confirm output settings.

Your Clearwater Chlorinator has been designed with an electronic flow switch. This device automatically switches the chlorinator “OFF” when water through the cell stops. To prevent cell damage and personal injury, do not in any way interfere with this system that has been designed for your protection.

Damage caused by insects

The case of the Clearwater power pack has small vents to allow internal components to remain cool in hot weather. Sometimes small insects may enter the case of the power pack, and this can cause damage to the internal electrical components. To avoid this, spray some insect repellent on surfaces around the power pack.



The limited warranties contained within this document are the only warranties given with your Clearwater LM Series Chlorinator and supersede any prior warranties. All other warranties, expressed or implied, including the implied warranty of merchantability or the implied warranty of fitness for a particular purpose are hereby disclaimed. Our sole obligation under this warranty, and the purchaser's sole remedy, is limited to the repair or replacement of the Clearwater Chlorinator, or one of its parts. This Clearwater Limited Warranty applies to the original owner only.

CHLORINATOR AND CELL ELECTRODE WARRANTY

- The manufacturer warrants this Clearwater Chlorinator to be free of defects in materials and workmanship for a period of one (1) year from the date of purchase*.
- In addition to the one (1) year warranty, the manufacturer further warrants the power pack for an additional two (2) year period (parts only) **.
- In addition to the one (1) year warranty, the manufacturer further warrants on a pro-rated basis the cell electrode (parts only)**. (In the second year the cell electrode will be replaced for a payment of 33% of current list price; in the third year the cell electrode will be replaced for a payment of 66% of the current list price).

* If no proof of purchase date is supplied, the warranty period begins on the date of manufacture as encoded on the product.

** The cost of field service calls and/or freight cost to return goods for repair are not covered by this warranty after the one (1) year unconditional period has expired.

EXCLUSIONS FROM WARRANTY

The Clearwater Chlorinator is designed for residential use only and any commercial application voids all warranty. If the unit is used in any application other than as a chlorinator in a swimming pool, the purchaser and/or end-user releases the manufacturer from any and all claims related to the use of the Clearwater Chlorinator and agrees to indemnify the manufacturer from any claims related to improper or non-authorized use.

This warranty does not cover problems arising from whole or in part from purchaser's or user's negligence, misuse or abuse, improper maintenance or installation, accident, improper application, failure to follow all safety instructions or precautions, Acts of God, abnormal weather conditions, damage from plants or animals and improper use of chemicals.

This warranty specifically excludes all incidental or consequential damages, except where state law requires them to be paid. This warranty gives you specific rights. You may have other rights that vary from state to state.

TO SUBMIT A CLAIM

Report claims to Zodiac Pool Care, Inc. by calling 1-888-537-6657. Only the original purchaser may submit a claim under this limited warranty. All claims must be accompanied by an original purchase receipt.

For more information consult your pool care professional or call 1-888-537-6657.

Due to constant developments and improvements, specifications may change without notice.

ZODIAC POOL CARE, INC.

2028 NW 25th Avenue
Pompano Beach, Florida 33069
1-800-YES-PURE
1-877-550-5262



RECORD YOUR CLEARWATER CHLORINATOR PURCHASE DETAILS HERE:

Model No.: LM3-15 LM3-24 LM3-40

Serial No

Serial No. **W**

Date of Purchase: _____

Purchased From: _____

City: _____ State: _____ Zip: _____

Keep this part with your manual for your records

IMPORTANT - MAIL THE WARRANTY REGISTRATION TODAY

Clearwater Warranty Registration Card



Serial No

Serial No. **W**

Please check the Clearwater Chlorinator you have just purchased: LM3-15 LM3-24 LM3-40

Consumer Name: _____ First _____ Middle _____ Last _____

Mailing Address: _____

City: _____ State: _____ Zip: _____

Tel: (_____) _____ Purchase Date: ____ / ____ / ____ Installation Date ____ / ____ / ____

E-mail: _____

Purchased From: _____ Store or Builder Name _____ City/State/Zip _____

Type of Installation New Retrofit Renovation

Type of Pool: Vinyl Fiberglass Plaster Painted Other

Do you have an automatic pool cleaner? No Yes Brand/Model _____

Do you have a Nature² Natural Mineral Sanitizer for your pool? No Yes Model _____

YOUR WARRANTY CERTIFICATE FOR YOUR



LM3 Series



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 293 FT. LAUDERDALE, FL

POSTAGE WILL BE PAID BY ADDRESSEE



CLEARWATER WARRANTY
ZODIAC POOL CARE INC
2028 NW 25TH AVE
POMPANO BEACH FL 33069-9906

