



CHLORINATION SYSTEM REPLACEMENT SALT CELL



INSTALLATION AND OPERATION MANUAL

READ AND FOLLOW ALL INSTRUCTIONS
SAVE THESE INSTRUCTIONS

Thank you for your purchase of a CaliMar® replacement salt cell. The CaliMar® CMARCIC series salt cells are compatible with Pentair® IntelliChlor® saltwater chlorination systems.

CaliMar® Salt Cell Part Numbers	Volume in Gallons	Warranty	Compatible with Pentair® Salt Cell Part Numbers	Compatible with Pentair® Saltwater Chlorination Systems
CMARCIC20-1Y	20,000	1-Year*	520554 EC-520554	Pentair® IntelliChlor® IC20
CMARCIC40-1Y	40,000	1-Year*	520555 EC-520555	Pentair® IntelliChlor® IC40
CMARCIC60-1Y	60,000	1-Year*	521105 EC-521105	Pentair® IntelliChlor® IC60P

*See warranty documentation for details.

IMPORTANT SAFETY INSTRUCTIONS

When using electrical equipment, please take basic safety precautions, including the following:



Please note, the total working hours for the salt cell should be less than 8 hours total per day. If you are using a variable speed pump for 24 hours a day, be sure to adjust the chlorine output to 25-30%. If the pump is only running 10 hours per day adjust the chlorine output between 60-80%. You can use this equation to calculate the appropriate chlorine output for your pool, suggesting 6 hours per day.

Pump running 24 (Hours a day) *25% (Chlorine Output) = 6hr (cell run time per day at 25%).
 Pump running 20 (Hours a day) *30% (Chlorine Output) = 6hr (cell run time per day at 30%).
 Pump running 15 (Hours a day) *40% (Chlorine Output) = 6hr (cell run time per day at 40%).
 Pump running 12 (Hours a day) *50% (Chlorine Output) = 6hr (cell run time per day at 50%).
 Pump running 8 (Hours a day) *75% (Chlorine Output) = 6hr (cell run time per day at 75%).
 Start the VS pump on a low speed and kick the speed up until the salt system works.

NOTE: CaliMar® CMARCIC salt cells are not produced, manufactured, or sold by Pentair® Pool Products. Neither CaliMar® nor its CMARCIC salt cells are affiliated with Pentair® Pool Products. The use of such trademarks herein is for informational purposes only. Model and system compatibility designations are included for informational purposes only.

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Important Safety Instructions

- Please disconnect all AC power supplies during installation.
- Do not let children use this product.
- To reduce the risk of personal injury, the power pack must be installed and wired to the load side of the clock or the load side of the relay.
- To reduce the risk of electric shock, the power pack must be grounded.
- All metal parts installed on site, such as railings, ladders, drainage pipes, or other similar hardware located within 10 feet (3 meters) of swimming pools, spas, or hot baths, should be connected to the equipment grounding bus, American AWG/ Canadian 6 AWG, with a copper conductor not less than 8.
- Please consult professional swimming pool service personnel to provide you with correct use suggestions, especially material selection, installation suggestions and swimming pool maintenance. Because salt is an inherently corrosive substance, CMARCIC cannot ensure that any other equipment in or around the pool will not corrode.
- Avoid chlorine gas buildup. When the pump is turned off, a buildup of flammable gas will result in a hazardous situation.
- Add the acid to the water, not the other way around.

Introduction

The CMARCIC series salt cells generate chlorine gas by electrolysis and disinfects the swimming pool from salt molecules (NaCl) in water. A small amount of charge is applied to a group of titanium plates in the electrolytic cell. Sodium hypochlorite (NaOCl) is generated. In water, sodium hypochlorite is decomposed into sodium ion (Na⁺) and hypochlorite ion (OCl⁻). It is a hypochlorite ion that forms hypochlorous acid (HOCl) with hydrogen (H⁺) ions (from water). Hydrochloric acid is an active agent that destroys bacteria and algae and oxidizes organic matter. This form of chlorine acts quickly in the pipeline, leaving only a small amount of residue in the pool. In addition, the electrolytic bath constantly "impacts" the incoming water and burns any oil, organic matter or other particles that need to be oxidized.

Most importantly, this process continuously recovers salt after cleaning the pool, the original molecules are reformed and the whole process starts again.

The cell unit has LED screen readings and buttons, as well as temperature sensors and salt level sensors, which can produce chlorine gas at a specified output.

If the salinity in the pool water is too low or too high, the red LED will light up and the cell will be turned off until salt or water is added to the pool.

The CMARCIC cells has self-cleaning cycle, which can reverse polarity and reduce calcium accumulation. This function turns the cell on and off regularly to minimize the accumulation of calcium and scale and further extend the cell life.

The CMARCIC cells includes: Flow sensor, temperature sensor, salt sensor.

Mark: The salt reading is around +/-300 ppm accuracy.



Dual Voltage 115V-230V Power Center: The Power Center is a dual-voltage power supply, which means that there is no need for 115V/230V wiring. This power supply converts the AC current into the low-voltage DC current needed to generate chlorine gas.

The power center contains transformers, fuses, cell connectors, AC current wiring configuration, and DC current output cables which are connected to the CMARCIC series cell. Fuses are installed in the housing to provide additional protection.

For information about installing and using Power Center correctly, please refer to Installation.



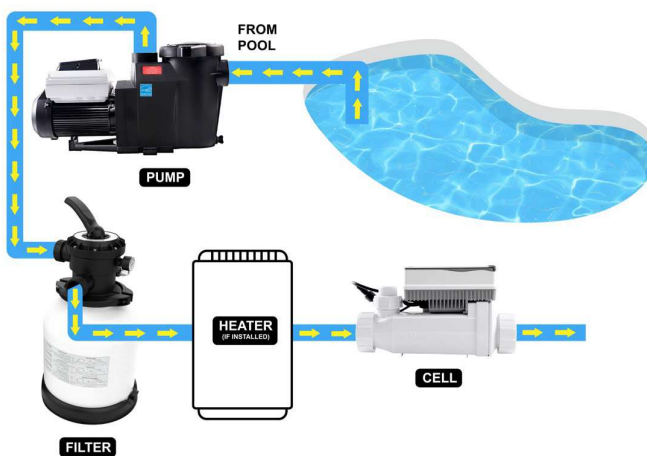
Warning: Incorrect wiring may lead to chlorine leakage.

To reduce the risk of personal injury, the Power Center must be installed on the load side of the clock. The load side of the electronic control switch or relay are connected to the load side, to receive power only when the pool pump is turned on. Otherwise, dangerous chlorine gas accumulation may occur.

When the pool pump is turned off and water is not flowing through the equipment, salt chlorination cell should never be energized.

Turn off the AC power supply before inserting and unplugging the model.

The CMARCIC series cells can be used in 115v/230v and automatically converted.



Water Chemistry



Note: Dry acid can cause a build-up of by-products that can damage the chlorinator cells.

New Pool Water: Newly filled or refurbished pools may contain undesirable substances. Such undesirable substances may interfere with the CMARCIC series cell's ability to properly chlorinate. Before turning on the CMARCIC cell, make sure the water has been tested and properly balanced by a professional pool.

Super Chlorination: Burns off swimmer waste that is bound to chlorine, this releases chlorine for disinfection. This can be accomplished by quickly and dramatically increasing the chlorine level. The water in the pool is considered super chlorinated when the chlorine level is raised to ten (10) times the total amount of chlorine. At the time the unit is turned on, the water inside the CMARCIC cell is highly chlorinated because the pool water is constantly flowing through the CMARCIC cell.

Note: When the pool is first started up, it is best to use an outside source for hyper chlorination, i.e., an electric shock treatment from your local pool supplier.

Chloramine: Ammonia (found in urine and sweat) combines with free chlorine to form chloramines, this should not be present in the pool water. This will bind the free chlorine in the pool and will not allow the pool to be disinfected with chlorine. Chloramine can also burn eyes and give off a foul smell. At the initial start-up of the tank, chloramine is removed from the super chlorate as required to maintain an appropriate level of free chlorine.

Cyanuric acid: Within two hours, UV rays from the sun can destroy 90% of the unstable chlorine. Cyanuric acid is needed in outdoor pools to help stabilize and maintain proper levels of chlorine. Cyanuric acid stabilizes the chlorine in the water and prevents UV degradation. Cyanuric acid levels should be maintained between 30-50 ppm when using CMARCIC (See page 8).

Note: DO NOT USE CYANURIC ACID IN INDOOR POOLS.

Total Dissolved Solids (TDS): Adding salt to swimming pool water will raise the TDS level, while this does not adversely affect the pool water chemistry. For clarity, the pool water TDS professional testing personnel must be aware that salt has been added to the CMARCIC cell. The person performing the TDS test (see page 17) can then subtract the salinity level to achieve a TDS level that is compatible with the TDS reading of a salt-free pool.

Metals: Certain metals, such as copper and iron, can cause chlorine loss. In addition, metals can stain your pool. Metals can also damage the CMARCIC cell. Have your local pool professional check for metals and recommend removal methods.

Nitrates and phosphates can cause extremely high chlorine demand and can deplete the pool of chlorine. In some cases, nitrates may even reduce your chlorine levels to zero. Your local pool professional can test for nitrates and phosphates. While the ideal nitrate level is 0 ppm, pool owners should ensure that nitrate levels do not exceed 10 ppm.

Ideal Water Chemistry Level

Voltage input	230VAC/115VAC
PH	7.2-7.8
Calcium Hardness	50-300 for vinyl 220-320 for fiberglass 350-450 for plaster
Total Alkalinity	60-180 ppm
Ideal Salt Level	2600-4450 ppm
Cyanuric Acid	30-50 ppm
Chlorine	1-4 ppm

How to test chlorine?

It is recommended that chlorine test samples be collected and compared from two (2) locations in the pool. A higher level should be found at the pool return line. The high liquid level in the tank return line indicates that CMARCIC is producing chlorine gas. Collect chlorine samples for testing at the following locations:

- The pool return line.
- 18 inches (457 mm) below the water surface, away from the pool return line.

What kind of salt?

It is important to use only 99% pure sodium chloride (NaCl). This is a common food-grade salt or soft water salt, which is available in your local store, with a bag of 40-80 pounds. Water can be used to adjust salt particles; However, they take longer to dissolve. It is prohibited to use rock salt, salt containing more than 1% yellow sodium cyanide, salt containing more than 1% anti-caking additive or iodized salt.

For all newly laid gypsum pools: Do not use newly surfaced gypsum to operate IRCF-C20, 40, 60. Salt is a corrosive element, and your swimming pool may be seriously damaged by salt. Wait at least one (1) month after construction to allow the gypsum to cure, then add salt and operate CMARCIC. Follow the pool surface manufacturer's guidelines for your specific pool.

For new vinyl-lined pools: contact the manufacturer for recommended guidelines prior to adding.

How Much Salt to Use?

The amount of salt needed is determined by using the table on page 7. It is specifically dependent on the water source and the chemicals used to disinfect it; most water contains some salt. Therefore, pool owners must always test the salt level before adding salt. A handheld meter calibrated for NaCl (salt) can be used to determine the salt content of the water. The LEDs will provide information about the salt level.

- A salt level of 3400 ppm is recommended for optimal water quality.
- Low salt concentrations below 2300 ppm or above 6000 ppm will cause the unit to shut down.

Note: Salt measurement values will vary depending on the measuring device (salt test strips, electronic testers and titrators). Salt sensor readings are accurate within +/- 300 pp. For more troubleshooting information on high salinity, see "Troubleshooting" on page 21.

Saturation Index

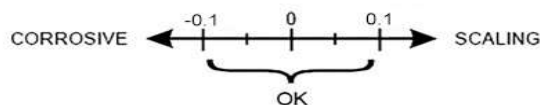
The saturation index is a formula that measures the ability to dissolve or deposit calcium carbonate and is used as an indicator of the corrosiveness and temperature. The formula for well-balanced water results in a range between -0.3 and +0.3, outside of which the pool water is considered out of balance and may damage the pool equipment or cause scaling of the CMARCIC cell.

The formula for Si: $SI = pH + CHF + AF + TF + TDSF$.

Cyanuric acid in the form of cyanurate ions contributes to the alkalinity. Therefore, the total alkalinity must be corrected. We subtract 1/3 of the cyanuric acid level from the reading obtained in the total alkalinity test.

Total Alkalinity - 1/3 Cyanuric Acid = Corrected Alkalinity

This correction can be considerable in established pools with high Cyanuric Acid levels; for example, at 100 ppm Cyanuric Acid, the correction amounts to 33 ppm ($100/3 = 33.3$)



°C	°F	Ti	Calcium Hardness	Ci	Total Alkalinity	Ai
12	53	0.3	75	1.5	75	1.9
16	60	0.4	100	1.6	100	2.0
19	66	0.5	125	1.7	125	2.1
24	76	0.6	150	1.8	150	2.2
29	84	0.7	200	1.9	200	2.3
34	94	0.8	250	2.0	250	2.4
39	103	0.9	300	2.1	300	2.5
			400	2.2	400	2.6
			600	2.4	600	2.8
			800	2.5	800	2.9

Note: Use the closest reading on the chart.

Total alkalinity in this document is the sum of carbonate and bicarbonate alkalinity. If cyanuric acid is used, a

How to Add or Remove Salt

Check the salt level before adding or removing salt.

In ground pools:

Turn on the filter pump and add salt directly to the shallow end pool.

Above ground pool with main drainage:

Add directly to the pool in front of the return nozzle. Run the filter pump for 24 hours with suction coming from the main drain (use pool vacuum if there is no main drain) to disperse the salt evenly throughout the pool.

Above ground pool with no main drainage:

Add directly to the pool. Brush salt to speed up the dissolution process. Salt is not allowed to pile up at the bottom of the pool. Eliminate the following: Run the filter pump for 24 hours with suction coming from the main drain (use pool vacuum if there is no main drain) to disperse the salt evenly throughout the pool.

In any pool, do not add salt directly to skiers or to the main drain port. This will close or shorten the life of the cell due to high salt concentration and reduced pump flow.

Pounds and (Kg) Of Salt Needed For 3400 PPM

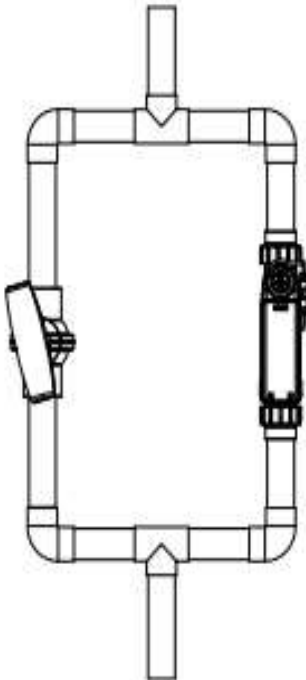
Adding Salt																							
Approximate Pounds (kg) of Salt Needed to Obtain Ideal Salinity (3,400 PPM)																							
Current salt level (ppm)	0	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000	4200	4400
14,000G	419 lbs	396 lbs	373 lbs	350 lbs	327 lbs	303 lbs	280 lbs	257 lbs	233 lbs	210 lbs	187 lbs	163 lbs	140 lbs	117 lbs	93 lbs	OK	OK	Ideal	OK	OK	OK	High	Dilute
52,500L	190 kg	180 kg	170 kg	159 kg	148 kg	138 kg	127 kg	117 kg	106 kg	96 kg	85 kg	74 kg	64 kg	53 kg	42 kg								
16,000G	481 lbs	454 lbs	427 lbs	400 lbs	373 lbs	347 lbs	320 lbs	293 lbs	267 lbs	240 lbs	213 lbs	187 lbs	160 lbs	133 lbs	107 lbs	OK	OK	Ideal	OK	OK	OK	High	Dilute
60,000L	218 kg	206 kg	194 kg	182 kg	170 kg	158 kg	145 kg	133 kg	121 kg	109 kg	97 kg	85 kg	73 kg	61 kg	48 kg								
18,000G	540 lbs	510 lbs	480 lbs	450 lbs	420 lbs	390 lbs	360 lbs	330 lbs	300 lbs	270 lbs	240 lbs	210 lbs	180 lbs	150 lbs	120 lbs	OK	OK	Ideal	OK	OK	OK	High	Dilute
67,500L	245 kg	232 kg	218 kg	205 kg	191 kg	177 kg	164 kg	150 kg	136 kg	123 kg	109 kg	95 kg	82 kg	68 kg	55 kg								
20,000G	599 lbs	568 lbs	533 lbs	500 lbs	467 lbs	433 lbs	400 lbs	367 lbs	333 lbs	300 lbs	267 lbs	233 lbs	200 lbs	167 lbs	133 lbs	OK	OK	Ideal	OK	OK	OK	High	Dilute
75,000L	272 kg	257 kg	242 kg	227 kg	212 kg	197 kg	182 kg	167 kg	152 kg	138 kg	121 kg	106 kg	91 kg	76 kg	61 kg								
22,000G	661 lbs	624 lbs	587 lbs	550 lbs	513 lbs	477 lbs	440 lbs	403 lbs	367 lbs	330 lbs	293 lbs	257 lbs	220 lbs	183 lbs	147 lbs	OK	OK	Ideal	OK	OK	OK	High	Dilute
82,500L	300 kg	284 kg	267 kg	250 kg	233 kg	217 kg	200 kg	183 kg	167 kg	150 kg	133 kg	117 kg	100 kg	83 kg	67 kg								
24,000G	720 lbs	680 lbs	640 lbs	600 lbs	560 lbs	520 lbs	480 lbs	440 lbs	400 lbs	360 lbs	320 lbs	280 lbs	240 lbs	200 lbs	160 lbs	OK	OK	Ideal	OK	OK	OK	High	Dilute
90,000L	327 kg	309 kg	291 kg	273 kg	255 kg	236 kg	218 kg	200 kg	182 kg	164 kg	145 kg	127 kg	109 kg	91 kg	73 kg								
26,000G	779 lbs	738 lbs	693 lbs	650 lbs	607 lbs	563 lbs	520 lbs	477 lbs	433 lbs	390 lbs	347 lbs	303 lbs	260 lbs	217 lbs	173 lbs	OK	OK	Ideal	OK	OK	OK	High	Dilute
97,500L	354 kg	335 kg	315 kg	295 kg	276 kg	256 kg	236 kg	217 kg	197 kg	177 kg	158 kg	138 kg	118 kg	98 kg	79 kg								
28,000G	841 lbs	794 lbs	747 lbs	700 lbs	653 lbs	607 lbs	560 lbs	513 lbs	467 lbs	420 lbs	373 lbs	327 lbs	280 lbs	233 lbs	187 lbs	OK	OK	Ideal	OK	OK	OK	High	Dilute
105,000L	381 kg	360 kg	339 kg	318 kg	297 kg	276 kg	255 kg	233 kg	212 kg	191 kg	170 kg	148 kg	127 kg	106 kg	85 kg								
30,000G	900 lbs	850 lbs	800 lbs	750 lbs	700 lbs	650 lbs	600 lbs	550 lbs	500 lbs	450 lbs	400 lbs	350 lbs	300 lbs	250 lbs	200 lbs	OK	OK	Ideal	OK	OK	OK	High	Dilute
112,500L	409 kg	387 kg	364 kg	341 kg	318 kg	297 kg	273 kg	250 kg	227 kg	205 kg	182 kg	159 kg	136 kg	114 kg	91 kg								
32,000G	962 lbs	908 lbs	854 lbs	800 lbs	747 lbs	693 lbs	640 lbs	587 lbs	533 lbs	480 lbs	427 lbs	373 lbs	320 lbs	267 lbs	213 lbs	OK	OK	Ideal	OK	OK	OK	High	Dilute
120,000L	436 kg	413 kg	388 kg	363 kg	339 kg	317 kg	291 kg	267 kg	243 kg	218 kg	195 kg	169 kg	145 kg	121 kg	96 kg								
34,000G	1021 lbs	964 lbs	907 lbs	850 lbs	793 lbs	737 lbs	680 lbs	623 lbs	567 lbs	510 lbs	453 lbs	397 lbs	340 lbs	283 lbs	227 lbs	OK	OK	Ideal	OK	OK	OK	High	Dilute
127,500L	463 kg	439 kg	412 kg	385 kg	360 kg	337 kg	310 kg	283 kg	258 kg	232 kg	207 kg	180 kg	154 kg	129 kg	104 kg								
36,000G	1080 lbs	1020 lbs	960 lbs	900 lbs	840 lbs	780 lbs	720 lbs	660 lbs	600 lbs	540 lbs	480 lbs	420 lbs	360 lbs	300 lbs	240 lbs	OK	OK	Ideal	OK	OK	OK	High	Dilute
135,000L	490 kg	464 kg	436 kg	408 kg	382 kg	358 kg	328 kg	300 kg	274 kg	248 kg	219 kg	190 kg	163 kg	137 kg	110 kg								
38,000G	1139 lbs	1076 lbs	1013 lbs	950 lbs	887 lbs	823 lbs	760 lbs	697 lbs	633 lbs	570 lbs	507 lbs	443 lbs	380 lbs	317 lbs	253 lbs	OK	OK	Ideal	OK	OK	OK	High	Dilute
142,500L	517 kg	490 kg	460 kg	430 kg	403 kg	378 kg	346 kg	317 kg	289 kg	259 kg	231 kg	201 kg	172 kg	144 kg	117 kg								
40,000G	1201 lbs	1134 lbs	1067 lbs	1000 lbs	933 lbs	867 lbs	800 lbs	733 lbs	667 lbs	600 lbs	533 lbs	467 lbs	400 lbs	333 lbs	267 lbs	OK	OK	Ideal	OK	OK	OK	High	Dilute
150,000L	545 kg	515 kg	484 kg	453 kg	424 kg	398 kg	364 kg	333 kg	304 kg	263 kg	243 kg	211 kg	181 kg	152 kg	123 kg								

**Amount Of Stabilizer (Cyanuric Acid) Needed to Obtain 40 PPM in Pool
(The Cyanuric Acid should be at 30-50 ppm)**

POUNDS and (kg) of STABILIZER CYANURIC ACIDL NEEDED FOR 80 PPM									
Current Stabilizer Level (ppm)	0 ppm	10 ppm	20 ppm	30 ppm	40 ppm	50 ppm	60 ppm	70 ppm	80 ppm
14,000G 52,500L	9.4 lbs 4.3 kg	8.2 lbs 3.7 kg	7.0 lbs 3.2 kg	5.9 lbs 2.7 kg	4.7 lbs 2.1 kg	3.5 lbs 1.6 kg	2.4 lbs 1.1 kg	1.2 lbs 0.54 kg	0.0
16,000G 60,000L	10.7 lbs 4.9 kg	9.4 lbs 4.3 kg	8.0 lbs 3.6 kg	6.7 lbs 3.0 kg	5.4 lbs 2.4 kg	4.0 lbs 1.8 kg	2.7 lbs 1.2 kg	1.4 lbs 0.64 kg	0.0
18,000G 67,500L	12.0 lbs 5.4 kg	10.5 lbs 4.8 kg	9.0 lbs 4.1 kg	7.5 lbs 3.4 kg	6.0 lbs 2.7 kg	4.5 lbs 2.0 kg	3.0 lbs 1.4 kg	1.5 lbs 0.68 kg	0.0
20,000G 75,000L	13.4 lbs 6.1 kg	11.7 lbs 5.3 kg	10.0 lbs 4.5 kg	8.4 lbs 3.8 kg	6.7 lbs 3.0 kg	5.0 lbs 2.3 kg	3.3 lbs 1.5 kg	1.7 lbs 0.77 kg	0.0
22,000G 82,500L	14.7 lbs 6.7 kg	12.9 lbs 5.9 kg	11.0 lbs 5.0 kg	9.2 lbs 4.2 kg	7.4 lbs 3.3 kg	5.5 lbs 2.5 kg	3.7 lbs 1.7 kg	1.8 lbs 0.82 kg	0.0
24,000G 90,000L	16.0 lbs 7.3 kg	14.0 lbs 6.4 kg	12.0 lbs 5.4 kg	10.0 lbs 4.5 kg	8.0 lbs 3.6 kg	6.0 lbs 2.7 kg	4.0 lbs 1.8 kg	2.0 lbs 0.91 kg	0.0
26,000G 97,500L	17.3 lbs 7.9 kg	15.2 lbs 6.9 kg	13.0 lbs 5.9 kg	10.8 lbs 4.9 kg	8.7 lbs 3.9 kg	6.5 lbs 2.9 kg	4.3 lbs 2.0 kg	2.2 lbs 1.0 kg	0.0
28,000G 105,000L	18.7 lbs 8.5 kg	16.4 lbs 7.4 kg	14.0 lbs 6.4 kg	11.7 lbs 5.2 kg	9.3 lbs 4.2 kg	7.0 lbs 3.2 kg	4.7 lbs 2.1 kg	2.3 lbs 1.1 kg	0.0
30,000G 112,500L	20.0 lbs 9.1 kg	17.2 lbs 8.0 kg	15.0 lbs 6.8 kg	12.5 lbs 5.6 kg	10.0 lbs 4.5 kg	7.5 lbs 3.4 kg	5.0 lbs 2.3 kg	2.5 lbs 1.2 kg	0.0
32,000G 120,000L	21.3 lbs 9.7 kg	18.7 lbs 8.5 kg	16.0 lbs 7.2 kg	13.3 lbs 6.0 kg	10.7 lbs 4.8 kg	8.0 lbs 3.6 kg	5.3 lbs 2.4 kg	2.7 lbs 1.2 kg	0.0
34,000G 127,500L	22.7 lbs 10.3 kg	19.8 lbs 9.0 kg	17.0 lbs 7.7 kg	14.2 lbs 6.3 kg	11.3 lbs 5.1 kg	8.5 lbs 3.9 kg	5.7 lbs 2.6 kg	2.8 lbs 1.3 kg	0.0
36,000G 135,000L	24.0 lbs 10.9 kg	21.0 lbs 9.5 kg	18.0 lbs 8.1 kg	15.0 lbs 6.7 kg	12.0 lbs 5.4 kg	9.0 lbs 4.1 kg	6.0 lbs 2.7 kg	3.0 lbs 1.3 kg	0.0
38,000G 142,500L	25.3 lbs 11.5 kg	22.2 lbs 10.0 kg	19.0 lbs 8.6 kg	15.8 lbs 7.1 kg	12.7 lbs 5.7 kg	9.5 lbs 4.3 kg	6.3 lbs 2.8 kg	3.2 lbs 1.4 kg	0.0
40,000G 150,000L	26.7 lbs 12.0 kg	23.3 lbs 10.5 kg	20.0 lbs 9.0 kg	16.7 lbs 7.5 kg	13.3 lbs 6.0 kg	10.0 lbs 4.5 kg	6.7 lbs 3.0 kg	3.3 lbs 1.5 kg	0.0

Installation

Ensure that chlorine/bromine feeder is installed after cell.

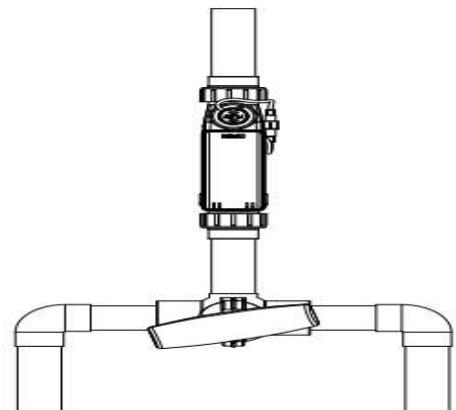


When CMARCIC is used with the in-floor cleaning system, it is suggested to use a separate return pipe for the cleaner to reduce the increased hydraulic stress on the CMARCIC series cell.

Loop Plumbing Diagram

CMARCIC is designed to operate at a water flow rate of 25 +/- 5 gallons per minute (gpm) to 105 gpm. When the speed exceeds 80 gallons per minute, you must use the bypass circuit to obtain the best chlorine production. Installation with flow rate exceeding 80 gallons per minute include installations with floor cleaning systems or booster pumps. These systems must use a bypass loop with flow control valve to ensure that the flow through the CMARCIC cell is kept within its designed working water flow.

Plumbing Diagram



- Be sure to install CMARCIC after the filter and heater. The CMARCIC cell shall be at least three (3) feet from the outlet of the heater.
- If CMARCIC is installed on a combined swimming pool/spa system, please install it before the backflow valve of the swimming pool/spa (see the figure below). This way both the swimming pool and spa can be properly chlorinated, and gas accumulation in the swimming pool water pipes can be avoided.
- Install CMARCIC cell horizontally.

Determine the size of the pool (gallons of water in the pool)

Rectangular Pools	Length x width x average depth x 7.5
Round Pools	Diameter x diameter x average depth x 5.9
Oval Pools	Length x width x average depth x 6.7
Bevel	Multiply total gallons by 0.85 = gallon capacity

Determine the size of the pool (liter of water in the pool)

Rectangular Pools	Length x width (meters) x average depth x 1000
Round Pools	Diameter x diameter x average depth x 785
Oval Pools	Length x width (meters) x average depth x 893
Bevel	Multiply total liters by 0.85 = liter capacity



Caution: To protect the service life of CMARCIC, do not use dry acid (sodium bisulfate) to adjust the pH value in arid geographical areas. This will cause excessive evaporation and minimize the dilution of pool water with fresh water.

ATTENTION: Make sure you have disconnected the power supply before installing!

Grounding (earthing) is required. This unit should be installed and grounded by qualified service personnel. Installed to allow access to unit buttons and power centers.

Please read the safety precautions and important instructions on page 1. Be sure to read and observe the safety instructions before making any electrical wiring. Wiring can only be done by qualified professionals.

- The CMARCIC cell shall be installed at least three (3) feet from the outlet of the heater.
- Pipe coupling: Schedule 80, with a maximum pressure of 75 psi at 70°F (21°C).

How to install cell:

1. Install the PVC coupling to the plumbing pipe with PVC glue. Let the glue dry.
2. Install the cell vertically. Allow access to the unit operator control panel. Install the cell on the coupling. Make sure that the O-ring is properly seated.
3. Turn on the pump and visually check whether there is leakage around the coupling.

Connecting the Cell Cable to the Power Center



Warning-Please turn off the power of the main system before making any connection.

1. Before connecting the power cord to the power center, please make sure that the AC power supply is turned off.
2. Align the two (2) pins of the cell power cord connector with the socket on the top of the power supply.
3. Center and insert the connector. Turn the round socket nut until the connector is locked in place. The power center is a dual voltage of 115V-230V, which will automatically switch without additional wiring.

LED Light Instructions



SuperChlor / Salinity:

Short Press:

Show the salinity.

Long Press (Until the long press light become green) :

Enter SuperChlor mode, long time press again to exit setup. SuperChlor mode will auto-exit after 24 hours.

Generate:

The light stably on means it is operating. The light off means it is something wrong.

Cold-Water:

Warning: the water temperature lower than 10°C or higher than 50°C, the system is shut down.

Salt:

Good LED On:

Good salt. It shows salt salinity is within the working range of 2600PPM-4450PPM.

Inspect Salt Red On:

Salt Level below 2300 PPM or above 6000 PPM

Inspect Salt Red Flashing:

Salt Level 2300 PPM to 2800 PPM/4500 PPM to 6000 PPM

Cell Good LED On:

The cell is good and produces chlorine gas.

Inspect Cell Red:

The cell needs to be inspected. This could mean the blades may contain calcium or the cell is not producing chlorine gas.

Flow:

Good Flow LED On:

Enough water flows to produce chlorine gas.

No Flow LED Flashing:

There is water flow. Continuous detection of water for one minute is necessary when the system starts. Or the flow of water is unstable.

No Flow LED On:

No water in the cell.

Sanitize Output Setting:

Press the button MIN and MAX, 10% for each setting.

Operation

IMPORTANT: An external pool pump timer required.

CMARCIC aims to provide enough chlorine to disinfect the pool water every day. If the pool pump runs continuously for 24 hours and CMARCIC runs at 100%, it will produce more chlorine than most swimming pools need (1-4 ppm). CMARCIC has its own internal timer, which cycles the electrolytic cell on and off according to a set percentage of disinfectant output. For example, when the pool pump is running, the cell always keeps 100% working state. When set to 80%, the cell is allowed to rest for 20% when the pool pump is running, and the cell life is prolonged. To adjust CMARCIC to the size of your pool, just reduce the output time of disinfectant from 10% to 100%.



The CMARCIC cell can only produce chlorine. The CMARCIC cell cannot monitor or control the chlorine level in the pool or spa water. It is the pool owner's responsibility to monitor and maintain free chlorine levels between 1.0 and 4.0 parts per million (ppm) as recommended by the APSP. It is the pool owner's responsibility to check the free chlorine level during regular pool pump operation and adjust the sanitizer output on the CMARCIC cell accordingly.

Start-up Procedure (Super Chlorination)**Super chlorination is recommended prior to pool startup.**

Super chlorination should begin with clean chlorinated pool water.

The CMARCIC cell will accumulate sufficient levels of chlorine for sanitation within a few hours. The CMARCIC cell will not be able to produce enough chlorine to reach breakpoint chlorination. Super chlorination works better when performed at pool startup until the chlorine level returns to 1.0 to 4.0 ppm prior to turning on the CMARCIC cell.

Output Settings and Adjustments

The output of chlorine is displayed by the LED display, and the salt concentration will be checked for 1/2 minute before working. If the salt content is normal, it will start to work, otherwise, please adjust according to the warning displayed on the LED display. For example, if the salt concentration is 2600 ppm, both the LED display screen and the LED salt inspection salt will indicate that there is not enough salt in the pool to produce chlorine.

To set the output, just press the MIN or MAX button.

For the first installation (after 24 hours of operation), please use a reliable test method to test the free chlorine in the pool water. The ideal range of maintenance is 1.0-4.0 ppm.

If the level of free chlorine in the swimming pool water is too low, please press the "Max" button to increase chlorine production. If the free chlorine level in the pool water is too high, press the "Min" button to reduce chlorine production.

Due to the different demand for free chlorine in swimming pool water, it may take several days to determine the daily working hours of the swimming pool and the percentage setting of "disinfectant output" of the swimming pool.

According to the suggestion of APSP, the adjustment should be continued as needed, and the interval between each adjustment should be 24 hours until the free chlorine level in the pool water is stable at 1.0-4.0 ppm.

Precautions:



- Don't fertilize your swimming pool. Fertilizer contains nitrate, which will lead to a high demand for chlorine.
- Never use dry acid to adjust pH value in arid areas, where evaporation is excessive and fresh water rarely dilutes pool water. The accumulation of by-products will damage CMARCIC.
- Do not add any pool water balancing chemicals (including salt) unless CMARCIC is turned off.
- Do not let the cyanuric acid content in the outdoor swimming pool drop below 30 ppm.

Note: DO NOT USE CYANURIC ACID IN INDOOR POOLS.

Maintenance

Every salt system requires maintenance after use, which is the focus of this section.

Weekly Service

PH level test: 7.4 to 7.6, although 7.2 to 7.8 is an acceptable range under the APSP guidelines.

Note: Never use dry acid (Sodium bisulfate) to adjust pH value in arid areas, where evaporation is excessive and fresh water rarely dilutes pool water. The accumulation of by-products will damage CMARCIC.

Total Alkalinity Test: Use a reliable test method to test the total alkalinity of the pool water. Adjust according to the advice of swimming pool professionals. The ideal range of total alkalinity is 80-100 ppm.

Chlorine Test: Use a reliable test method to test the free chlorine of the pool water. Maintain the ideal range by adjusting the CMARCIC cell sanitize output setting. Free chlorine needed: 1.0-4.0.

Note: Chlorine exceeding 4.0 ppm may cause excessive corrosion of metal parts and may damage related swimming pool equipment.

Monthly Service

To ensure that your swimming pool maintains the correct chemical balance, it is very important to perform the following recommended salt and pool water tests every month with reliable test methods.

- Adjust salinity according to LED warning and LED display.
- **Test salinity:** Press the salinity key to check the reading or take the pool water samples to the local pool shop for testing.
- **Cyanuric Acid:** The pool water is sampled, and the content of cyanuric acid is detected by reliable detection method. When CMARCIC is used, the recommended ideal cyanuric acid level is 30-50 ppm.
- **Calcium Hardness:** Use a reliable test method to test the calcium hardness of the pool water. Adjust according to the advice of swimming pool professionals if necessary. The ideal range of pool water calcium is 200-400 ppm recommended by APSP.
- **Metals Detection:** It is recommended to regularly sample the pool water to detect whether there are metals such as copper, iron, and manganese. These metals can damage batteries and other related swimming pool equipment, so they should not appear in swimming pool water. If these metals are present, please contact your pool professional.
- **TDS (Total Dissolved Solids):** Use a test kit or let a pool professional test the water sample to test the TDS level of the pool water. Adjust according to the advice of swimming pool professionals if necessary. It is

suggested that the APSP standard of salt pond should be at least 3000 to at most 5700-6000 ppm (including salt).

Cleaning Blades

Remove calcium buildup from the cell before acid cleaning: Use a garden hose on the spray setup and spray directly into the ends of the cell. Most of this calcium buildup has a muddy consistency and will be blown out of the cell. Once most of the calcium has been removed, continue with the acid wash as most of the calcium has been removed and the acid wash will now be more effective.

Auto Clean: The CMARCIC series cell has an automatic cell blade cleaning feature (cell reversal) that helps remove scale deposits from the CMARCIC cell.

Note: Automatic cleaning does not interrupt chlorine production. "Scale" is a white crusty deposit that forms when the water is too hard or when the pool water is out of balance and scales. If excessive scale is present on the blade, acid cleaning is required.

Acid Cleaning: If the CMARCIC cell blades show a tendency to scale, it is recommended that the CMARCIC cell be removed and inspected for scale and/or debris formation on the blades every two (2) months. Areas of high hardness may require more frequent cleaning. Some filters allow debris to pass through the CMARCIC cell and may become trapped between the blades. A small amount of scale formation is normal. If a look through the CMARCIC cell reveals excessive scale formation between the blades or the presence of debris, the CMARCIC cell must be cleaned as follows:

- Use a high-pressure water jet from a garden hose. If the blades cannot be reasonably cleaned, disconnect the AC power from the power center.
- Mix one (1) quart of hydrochloric acid with one (1) gallon of tap water in a plastic bucket.
 - **Note:** Always wear rubber gloves and goggles when cleaning the CMARCIC cell. Always add acid to water; do not add water to acid.
- Screw the cap with gasket and O-ring onto the threaded end of the CMARCIC cell (cap, o-ring, and gasket are included with the cleaning kit).
- Place the CMARCIC cell horizontally in a five (5) gallon bucket. Pour the acid solution (as described in step) into the CMARCIC cell until it just covers the cell blades and salinity probe. Allow the acid solution to froth, then clean the blade.
 - **Note:** The acid should only be contained in the CMARCIC cell covering the blade. Try not to sprinkle acid on the outside of CMARCIC. If acid does spill on the outside of CMARCIC, clean it with water.
- The foaming action begins, which is caused by the dissolution of scale (calcium carbonate) from the blade. If intense foaming is not started, there is no need to clean the blade to stop the cleaning process and continue to the next step.
 - Otherwise, keep the blade immersed in the solution until the foam stops. However, do not leave the acid in the CMARCIC cell for more than thirty (30) minutes, leaving it in for a longer period will damage the blade.
- Take the CMARCIC cell out of the barrel and put it into an empty five (5) gallon barrel. Rinse and inspect the inside and outside of the CFPT by using clean tap water thoroughly. Repeat the acid cleaning process if deposits are still visible.
- After cleaning, replace the cell and return to normal operation.
- If an acid cleaning procedure is required, it is recommended that the pool water sample be analyzed by a pool professional for excessive calcium hardness (i.e., ideal range of 200 to 400 ppm) and/or improper water balance.
- Check the interior of the CMARCIC cell every two (2) months (or more frequently in hard water areas). If no scale or debris deposits are observed inside the CMARCIC cell after four (4) months, it is not necessary to check.

- Continue to check every two (2) months. However, due to possible changes in pool water chemistry and filtration, it is recommended that the cell be removed for inspection at least twice a year.
- Reconnect the CMARCIC cell communication cable plugs at the power center, then reconnect AC power to the CMARCIC cell power center.

Troubleshooting

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
Low or no chlorine residual in pool	Sanitizer Output percentage set too low or off at 0%	Increase Output Level.
	Insufficient run time	Increase run time to at least 1 hour per 10° ambient temp.
	Heavy pool use, inclement weather, organic matter	Activate Super CL mode or chemically shock pool.
	Water chemistry Issues: Low Chlorine Stabilizer Low salt in the pool (less than 2300 ppm) Phosphates in pool Nitrates in pool	Contact pool professional, ensure all chemicals
	The cell is dirty, clogged, or Has excessive scaling or mineral build-up	Remove cell from plumbing, inspect and clean (see p.13).
Low or no chlorine residual in pool after recent installation	Water chemistry was not balanced prior to system installation and a high chlorine demand persists.	Contact pool professional, ensure all chemicals on p.6 are within range, chemically shock pool if necessary.
Red Inspect Cell LED is on.	It is time to clean the electrolytic cell.	The Cell must be cleaned.
	Cell efficiency has been greatly reduced.	Inadequate water flow exists, or cell must be replaced.
Red Inspect Salt Led is on.	Pool water salt is too low or too high, system is off. Less than 2300 or Over 6000 ppm	Correct the salinity level.
Red Inspect Salt Led is flashing	Pool water salt is low or high, 2300 PPM to 2800 PPM/4500 PPM to 6000 PPM. 2300-2600, the system is still working.	Correct the salinity level.
No Power	Fuse/Reset has tripped.	Check fuses on power center
	No AC Power to the power center	Check the connection
No Flow LED is on.	Incorrect installation	Verify Sensor probe correct orientation
	Sensor probe is dirty or clogged.	Ensure correct connection, clean the sensor probe if necessary.

	Insufficient circulation	Ensure operation of the pump, at least 25-30 GPM. Check water level, filter pressure, or for air or blockages in PVC plumbing.
Water leak	O-Ring improperly seated	Ensure O-Rings are clean and in good condition.
	Threaded collars are cross-threaded.	Inspect threads for damage, ensure that each screw goes back on without resistance.
Cell frequently has mineral buildup	This is due to imbalanced water chemistry and a high Saturation Index.	Ensure that your Saturation Index is at or near zero, to avoid damage or premature cell failure.
Cell never or rarely has mineral buildup.	Water may be corrosive due to imbalanced water chemistry and a low Saturation Index.	Ensure that your Saturation Index is at or near zero, to avoid damage or premature cell failure.
COLD WATER Led is on.	Water temperature is too hot or cold for operation.	Check operation of the heater, or turn off until the water temp is between 50° F TO 122 °F.
	Bad contact line contact of Sensor problem	Ensure Sensor probe is well-connected.
	Damaged Sensor problem	Contact manufacturer.

How to calibrate salinity?

If you need to calibrate the salinity, please press "MIN" and "MAX" at the same time and press several times quickly. When the display shows "SALT Tsys:", press "MAX" to lower the salinity, and press "MIN" to increase the salinity.

For example, the current salinity is 3720ppm, if you want to reduce 107ppm, press "MAX", then the current salinity is 3720-107=3613ppm. The number 107,108 etc. means 107ppm and 108ppm. If you want to increase the salinity, please press "MIN".

Limited Warranty

The CaliMar® **CMARCIC series** salt cells are warranted to be free from defects in materials and workmanship, under normal use and non-commercial application, for a period of one (1) year.

This limited warranty is subject to the following terms, conditions, and exclusions.

To obtain the benefits of this warranty, contact the warranty department for troubleshooting. Proof of purchase may be required. This warranty extends to the original retail purchaser and original installation site only, beginning at the original date of purchase, and is non-transferrable. This cell is intended for residential pool use and any commercial application voids all warranties.

Should a defect in any item or part covered by the warranty become evident during the warranty's term, CaliMar® will at its sole discretion repair or replace such item or part. CaliMar® reserves the right to replace defective parts with new or refurbished parts. This warranty does not include the cost of labor or transportation charges for equipment or component parts to or from CaliMar®, or the removal, reinstallation, or any such costs incurred in obtaining warranty. The warranty is not applicable to problems arising from circumstances outside the control of CaliMar®, including, but not limited to the following:

- Product discoloration, or any other cosmetic or superficial damage or deterioration, regardless of its cause.
- Problems arising from failure to maintain proper water chemistry levels, per manufacturer's recommendations, as outlined in the Owner's Manual.
- Problems resulting from tampering, accident, electrical surges, abuse, neglect, unauthorized or unqualified repairs, product alteration, fire, flood, freeze damage, lightning, insects, Acts of Nature, or other circumstances beyond the control of CaliMar®.
- Damage due to over-tightening of threaded components or excessive pressure or stress.
- Damage or premature wear due to improper pool chemistry, and failure to maintain pool water chemistry in accordance with the recommendations contained in the owner's manual.
- Damage due to improper installation or improper voltages, including materials and workmanship supplied by others.
- Damage or degrading of concrete, stone, wood, or synthetic surfaces adjacent to the swimming pool or spa.
- Damage due to negligence or failure to properly maintain equipment, including the maintenance of clean and tight electrical connections.
- Damage due to improper service, as well as unauthorized equipment modifications and use of non-genuine replacement parts.
- Damage due to misapplication, misuse, abuse, overuse of the cell lifetime (over 10 hours per day) or failure to operate equipment as specified in the owner's manual.
- Material supplied or workmanship performed by others in the process of installation.
- O-Rings, rubber gaskets, electrical fuses, and circuit-breaker components are normal replacement items subject to wear and are excluded from the warranty.

Disclaimers: This limited warranty constitutes the entire warranty. No other warranties apply, expressed or implied. The liability of CaliMar® shall not exceed the repair or replacement of defective items or parts under the referenced limited warranty terms. Under no circumstances shall CaliMar® or authorized agent/installer be responsible for consequential, special, or incidental damage(s) of any kind, including but not limited to personal injury, property damage, or damage to or loss of equipment. CaliMar® or agent/installer is not liable for any other expenses that may be incurred during installation or servicing. This warranty is valid only in the United States of America.



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