

# SALT CHLORINATOR FOR ABOVE GROUND POOLS



**Crystal Pure 3.0 ABG**

# Table of Contents

<b>IMPORTANT SAFETY INSTRUCTIONS:</b> .....	<b>1</b>
<b>WATER CHEMISTRY:</b> .....	<b>2</b>
<b>INTRODUCTION:</b> .....	<b>2</b>
<b>ADDING SALT:</b> .....	<b>3</b>
<b>INSTALLATION:</b> .....	<b>5</b>
<b>INSTALL THE CONTROL:</b> .....	<b>5</b>
<b>SYSTEM OVERVIEW:</b> .....	<b>5</b>
<b>INSTALL THE CELL:</b> .....	<b>5</b>
<b>OPERATION:</b> .....	<b>7</b>
<b>MAINTENANCE:</b> .....	<b>8</b>
<b>TROUBLESHOOTING:</b> .....	<b>10</b>
<b>WARRANTY:</b> .....	<b>11</b>

# INSTRUCTIONS READ BEFORE USE

There are basic safety precautions that you need to follow to be safe. Including:

## **WARNING**

**Risk of Electric Shock.** All electrical wiring **MUST** be in conformance with all applicable local codes, regulations, and the National Electric Code ® (NEC®).

## **WARNING**

To reduce the risk of injury, do not permit children to use this product.

## **WARNING**

Higher temperatures may require higher chlorine output to maintain proper free available chlorine residuals. The actual amount of chlorination required by your pool can change, and varies according factors not limited to bather load, rain, temperature, dirt, debris, and chemical balance.

## **WARNING**

Always turn unit off when operating any plumbing control valves such as for backwashing, water exhaust, or during operation of spa or water features if operation restricts water flow to the cell. A build-up of flammable gases will result in hazardous conditions.

- When install the unit, ensure that materials and parts used in the pool are compatible with the use of chlorinated water and salt. Avoid high salt levels (above the recommended range).
- Ensure that the chlorine generator operates only when the circulation pump is operating.

When installed with a pool equipment timer, the Control Module must be to the load side of the timer clock.

- If additional chlorine is required (due to hot weather), use Sodium Hypochlorite to maintain an appropriate chlorine residual in the water.
- Proper pool chemistry must be maintained at all times.
- Please find the green terminal inside the control box and connect it to the grounding device in order to minimize the risk of electric shock. Use the correct copper wire size and make sure the wire is connected to an electrical service ground.
- The control box also equips with one bonding at the bottom. Use a solid copper bonding conductor not smaller than 8 AWG and Connect local bonding structure in the pool area.

**The Crystal Pure 3.0 ABG Salt water chlorination** is a process that uses dissolved salt for the chlorination of swimming pools. The chlorine generator uses electrolysis in the presence of dissolved salt to produce chlorine gas or its dissolved forms, hypochlorous acid and sodium hypochlorite, which are already commonly used as sanitizing in pools.

The The Crystal Pure 3.0 ABG is designed for residential swimming pool up to 20,000 gallons. The actual amount of chlorination required to properly disinfect the pool depends on the bather's load, rainfall, air temperature, water temperature, exposure of the pool to the sun, pool surface and cleanliness.

## WATER CHEMISTRY

### IDEAL CHEMICAL LEVELS

Salt Level	Free Chlorine	pH	Calcium Hardness	Stabilizer	Metals	Total Alkalinity	Saturation Index
3000 - 4000 ppm	1.5 - 3.0 ppm	7.2 - 7.7	200 - 400 ppm	50 - 80 ppm	0 ppm (none)	80 - 120 ppm	-.2 - +.2

## INTRODUCTION

### SATURATION INDEX

The "saturation index" (Si) or the "stability index" relates to the calcium and alkalinity in the water and is an indicator of the pool water "balance".

$$Si = pH + Ti + Ci + Ai - 12.1$$

### IDEAL SALT LEVELS

Use the tables on pages 12 (gallons/pounds) and 13 (liters/kilograms) to determine the amount of salt required for your pool. The ideal salt level is between 3,200-4,000 ppm (parts per million). Use the equations below to determine the size of your pool.

#### Gallons (pool size feet)

Rectangle

Length x Width x Average Depth x 7.5

Round

Diameter x Diameter x Average Depth x 5.9

Oval

Length x Width x Average Depth x 5.9

## HOW TO ADD SALT

When adding salt to the pool, it is best to pour the required salt into the shallow end of the pool and run the filter and pump at the same time to circulate the water and dissolve the salt.

Do not pour the salt bag into the water because the chemicals and ink on the bag will disturb water balance.

During the summer, salt may take 24-48 hours for salt to dissolve, while in winter it takes longer. Fine grain salt will dissolve faster than compressed tablets.

Do not add salt directly to the skimmer or directly onto the main drain. Due to high concentration of salt and reduced flow to the pump, this will shut down or shorten the life of the cell.

If salt is added incorrectly, turn off CMARSHA immediately for 24 hours while the pump and filter are still running. This will help distribute the salt evenly. The salt display may take 24 hours to respond to the change in salt concentration.

**WARNING:** Do not use salt with Phosphates

**Pounds (lbs) of Salt Needed to Reach Ideal Salinity Level (3,400 PPM)**

Current Salt Level (ppm)	Gallons of Pool/Spa Water													
	14,000	16,000	18,000	20,000	22,000	24,000	26,000	28,000	30,000	32,000	34,000	36,000	38,000	40,000
0	419	481	540	599	661	720	779	841	900	962	1,021	1,080	1,139	1,201
200	396	454	510	566	624	680	736	794	850	908	964	1,020	1,076	1,134
400	373	427	480	533	587	640	693	747	800	854	907	960	1,013	1,067
600	350	400	450	500	550	600	650	700	750	800	850	900	950	1,000
800	327	373	420	467	513	560	607	653	700	747	793	840	887	933
1,000	303	347	390	433	477	520	563	607	650	693	737	780	823	867
1,200	280	320	360	400	440	480	520	560	600	640	680	720	760	800
1,400	257	293	330	367	403	440	477	513	550	587	623	660	697	733
1,600	233	267	300	333	367	400	433	467	500	533	567	600	633	667
1,800	210	240	270	300	330	360	390	420	450	480	510	540	570	600
2,000	187	213	240	267	293	320	347	373	400	427	453	480	507	533
2,200	163	187	210	233	257	280	303	327	350	373	397	420	443	467
2,400	140	160	180	200	220	240	260	280	300	320	340	360	380	400
2,600	117	133	150	167	183	200	217	233	250	267	283	300	317	333
2,800	93	107	120	133	147	160	173	187	200	213	227	240	253	267
3,000	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
3,200	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
3,400	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal
3,600	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
3,800	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
4,000	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
4,200	High	High	High	High	High	High	High	High	High	High	High	High	High	High
4,400	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute

**Pounds (lbs) of Cyanuric Acid Needed to Reach Ideal Stabilizer Level (80 PPM)**

Current Stabilizer Level (ppm)	Gallons of Pool/Spa Water													
	14,000	16,000	18,000	20,000	22,000	24,000	26,000	28,000	30,000	32,000	34,000	36,000	38,000	40,000
0	9.4	10.7	12.0	8.0	9.4	10.7	12.0	18.7	20.0	21.3	22.7	24.0	25.3	26.7
10	8.2	9.4	10.5	7.0	8.2	9.4	10.5	16.4	17.2	18.7	19.8	21.0	22.2	23.3
20	7.0	8.0	9.0	6.0	7.0	8.0	9.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0
30	5.9	6.7	7.5	5.0	5.9	6.7	7.5	11.7	12.5	13.3	14.2	15.0	15.8	16.7
40	4.7	5.4	6.0	4.0	4.7	5.4	6.0	9.3	10.0	10.7	11.3	12.0	12.7	13.3
50	3.5	4.0	4.5	3.0	3.5	4.0	4.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
60	2.4	2.7	3.0	2.0	2.4	2.7	3.0	4.7	5.0	5.3	5.7	6.0	6.3	6.7
70	1.2	1.4	1.5	1.0	1.2	1.4	1.5	2.3	2.5	2.7	2.8	3.0	3.2	3.3
80	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



# INSTALLATION

The The Crystal Pure 3.0 ABG electrolytic cell and flow detection switch will be damaged by freezing water, similar to other pool components that require proper winterization. In areas of the country that experience severe or extended periods of freezing temperatures, be sure to drain all water from the pump, filter, supply line, and return line prior to freezing conditions.

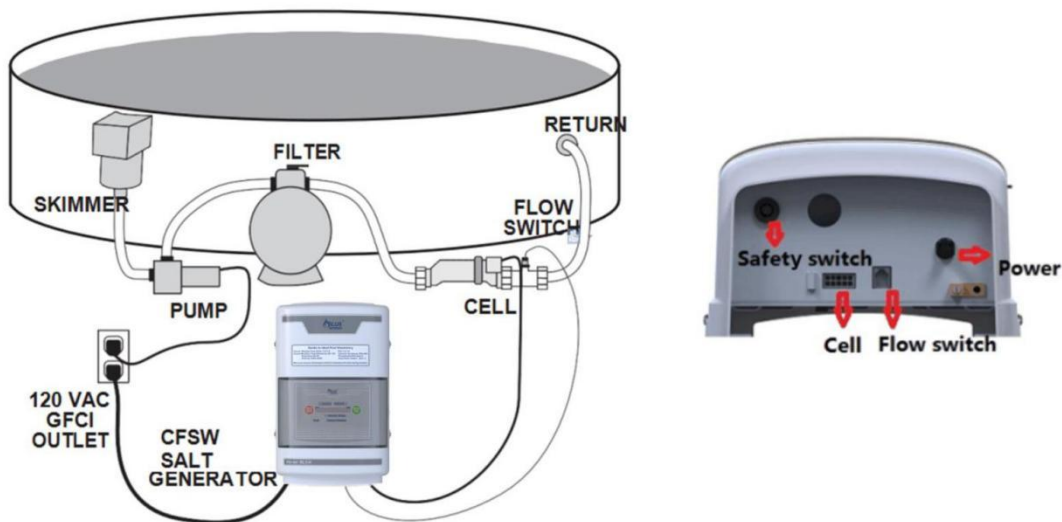
## INSTALL THE CONTROL

The The Crystal Pure 3.0 ABG control unit must be mounted a minimum of 6 ft. (2 meters) horizontal distance (or more if local codes require) away from the pool.

The control is designed to mount vertically on a flat surface with the knockouts facing downward and not to block the four sides of the control.

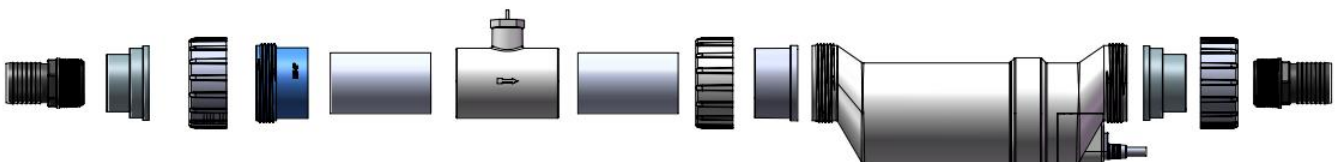
Do not mount the The Crystal Pure 3.0 ABG in a panel or tightly enclosed space.

## SYSTEM OVERVIEW



## INSTALL THE CELL

To install the cell and flow switch, refer to the picture below. Flow switch is installed after the cell. When using the hose adaptors, remove the O-ring from the pipe union tailpiece and install them in the hose tailpieces. Tighten all union nuts **BY HAND** for a watertight seal.



# WIRING

The Power must be turned off before performing any wiring. Be sure to follow local and NEC electrical codes. To provide safe operation, the The Crystal Pure 3.0 ABG must be properly grounded and bonded.

## INPUT POWER

**CFW only for 120 V AC input power.** Wire the The Crystal Pure 3.0 ABG to the LOAD SIDE of the filter pump timer.

**It is very important that the The Crystal Pure 3.0 ABG is powered only when the pump is running.**

# ELECTROLYTIC CELL AND FLOW SWITCH

The electrolytic cell and flow switch cables have connections on the ends that plug into the The Crystal Pure 3.0 ABG for easy attachment and removal. See pic attached above. The The Crystal Pure 3.0 ABG above ground Salt Chlorinator has an Auto control system with very simple operation.

**OUTPUT LEVEL CONTROL:** There are 10 LEDS, each LED equals 10%. Chose the “desired level %” by pressing Min to decrease or Max to increase. the The Crystal Pure 3.0 ABG will produce chlorine according to the “Desired Level %” adjustment setting for the entire filter cycle.

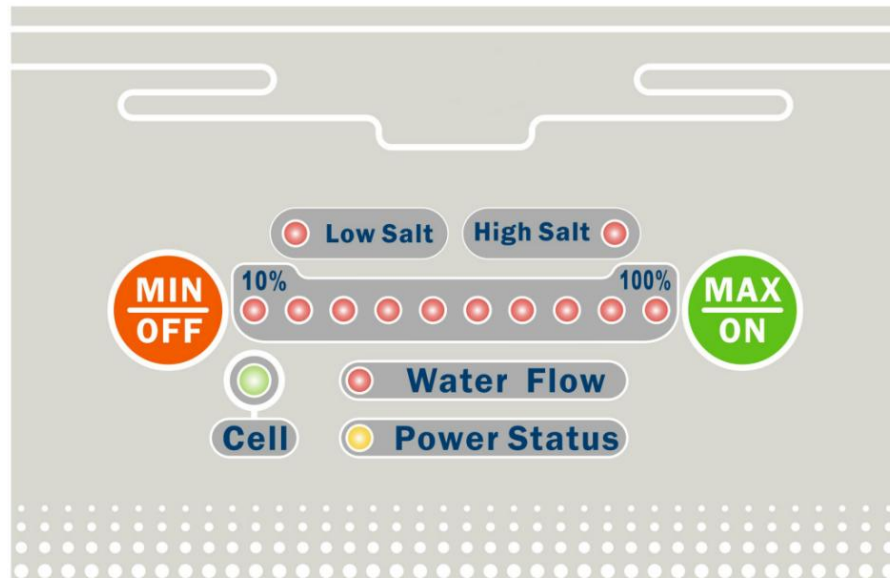
**MAX:** Press Max to increase the level up to 100%, when you have an abnormally high bather load, heavy rainfall, cloudy water conditions, or any other condition which requires that a large amount of purification be introduced. Push Max until all 10 LEDS ARE ON. This electronically “Max chlorinates” (shocks) the water for 24 hours (filter pump must be on during this time) or until the power has been turned off, whichever comes first. **At the end of the Max chlorination period, be sure to push Min to decrease level back to the desired level position.**

**MIN:** Press Min to decrease the desired level. When all the 10 LEDs are OFF, it will prevent the The Crystal Pure 3.0 ABG from energizing the electrolytic cell. In this position there is no chlorine generation.

**LOW SALT:** When flashing, the salt level is low and the The Crystal Pure 3.0 ABG generating at low efficiency. When illuminated steady, the salt level is too low and the The Crystal Pure 3.0 ABG has shut down.



**CELL CHECK:** When the cell is working, the green light is on.



## INDICATOR LED

**POWER STATUS:** Power illuminate, model is in power.

**WATER FLOW:** When it is on, flow switch will be detected that there is no flow through the cell. If it is flashing, the flow is restored.

**LOW SALT:** When it is on or flashing, The Crystal Pure 3.0 ABG salinity is too low to work.

**Note:** Before adding large quantities of salt, it is recommended to have your salt level professionally checked.

**Note:** If the Salt level is at the correct level but the LOW SALT LEVEL is still on, the cell must be replaced.

**HIGH SALT:** When illuminated the salt level is around 4500 ppm. When illuminated steady, salt level is higher than 5400 ppm and the The Crystal Pure 3.0 ABG has shut down. The pool water must be diluted with fresh water before operation is restored.

## OPERATION

By familiarizing yourself with the operation of the The Crystal Pure 3.0 ABG generator, you can achieve maximum performance for your pool. When chemical levels are in the recommended range, there are FOUR factors that you can control. Filter time each day, amount of salt in the pool, the output of chlorine you set, and stabilizer level in the water will directly impact the amount of chlorine the The Crystal Pure 3.0 ABG will generate. When you just begin to set the

model, it will take you days to find ideal chlorine output, you can start at a high setting and then turn down.

## **MAINTENANCE**

When checking other water chemistry levels, always monitor the salinity level of the swimming pool. After the system runs for a period of time, it will eventually need to clean the cells due to the scaling of natural minerals.

You will be notified by opening "CHECK CELL" Light. When lit, cleaning the cell with a cleaning stand is better.

Important information: The frequency of cleaning depends on your water chemistry and water saturation index.

For most people, only need to clean a few times per season. Faster mineral accumulation must be long-term high saturation index, chemical imbalance may lead to rapid fouling. Consult Swimming pool professionals.

## **HOW TO CLEAN THE CELL?**

**Important information:** If there is severe mineral accumulation, more than one cleaning may be required to dissolve the remaining solids.

After cleaning, carefully inspect the cell plate with bright light. If you see any remaining scale, debris or physical blocked in the salt cell, please repeat the cleaning process as needed. If it is "check cell" come back soon after cleaning,

- 1) Confirm that the salinity is within the range
- 2) Ensure that the cell is fully filled with water
- 3) Verify the cell type setting of the system

### **Before removing the cell for cleaning or replacement:**

- 1) Turn off all power sources of all swimming pool equipment and close the water supply line valve (if applicable).
- 2) Unplug the cell cable connecting to the control box.
- 3) Loosen the threaded ring around the joint at the junction of the pool and the pipes.

### **To clean the cell with mineral deposits:**

- 1) Cleaning stand and adjust the direction of the cell vertically. Place on the ground and stabilize to keep it upright.

- 2) In a separate bucket, mix one part of muriatic acid with four parts of water. Pour this acid solution directly to cell. Make sure that the cleaning water completely covers the components inside the cell.
- 3) Wait for the foaming to stop. Let the solution soak for no more than fifteen minutes.
- 4) Properly dispose of the acid solution, and use a hose to wash away the remaining debris from the pool.
- 5) Look inside the unit and check if there is no debris or scale residue. If necessary, repeat steps 2-4.
- 6) Re install the cell into the PVC return pipe.

Note: If you do not currently have a cleaning cap or cleaning rack, you can fully immerse the cell in a five-gallon bucket.

**ALWAYS POUR ACID INTO WATER-NEVER POUR WATER INTO ACID.  
BE SURE TO WEAR PROTECTIVE GLASSES, CLOTHING, AND CHEMICAL RESISTANT  
GLOVES.**

# TROUBLESHOOTING

## **Low or no residual chlorine in pool**

1. Increase Output Level. This is often required seasonally with increasing temperatures
2. Increase run time to at least 1 hour per 10° ambient temp.
3. Activate Super Chlorination mode or chemically shock pool.
4. Remove Cell from plumbing, then inspect and clean.
5. Cold water (below 50F) can cause the The Crystal Pure 3.0 ABG to stop generating.
6. Low pH oxidizes chlorine quickly, making it difficult to maintain desired chlorine levels. Adjust pH levels to re-balance water.
7. Warm pool water increases chlorine demand—increase Desired Output Level% or filter run time.
8. The Crystal Pure 3.0 ABG switch in OFF position.
9. Desired Output Level% adjustment setting is too low.

## **“No Flow” LED illuminated or flashing**

If there is adequate flow and the LED is still on, verify that that the arrows on the flow switch are pointing in the direction of flow.

## **Low Salt / High Salt LED is on:**

Verify salinity and Cell Version in the status Menu, if this doesn't work, ensure correct connection, clean cell if necessary.

## **Replace the new cell**

Remove and inspect the cell for scale. If the cell is scaled, follow the directions on page 12 for cell cleaning. If the pool has the proper amount of salt and the LOW SALT LED is still illuminated, the cell may be depleted and needs to be replaced.

## **Water leak**

Ensure O-Rings are clean and in good condition.  
Inspect threads for damage, ensure that each will screw back on without resistance.

## **No Power**

Check fuses on the Control Module.  
Have a professional test the input power, ensure correct wiring configuration & connections. Make sure 120V AC input power is connected to the control

# Model: The Crystal Pure 3.0 ABG

## FOR POOL 10,000 GALLON/ 20,000 GALLON

### 2 YEARS LIMITED WARRANTY

#### **TWO YEARS LIMITED WARRANTY (For RESIDENTIAL USE)**

Guarantee that The Crystal Pure 3.0 ABG will be free from defects in materials and workmanship, defects in normal use and non-commercial applications within one (1) year or two (2) years specified below. Proof of purchase is required. This limited warranty is limited to the original purchaser of the The Crystal Pure 3.0 ABG system and is not transferable. The Crystal Pure 3.0 ABG is intended to be used in residential swimming pools and the warranty schedule is as follows.

Two (2) years limited warranty on cell for residential use, but for commercial use 1 year only.  
ONE (1) year limited warranty on controller for residential use, but for commercial use 6 months only.

**TERMS OF SALE:** If, after receiving this item you discover that it was not the one you wanted, simply return it for a full refund within 30 days. You will have to pay for the return shipping charges. Refund is void if you have installed, used or damaged the item in any way. Item must be returned with its original box, packing materials and instructions (if applicable) in the same perfect new condition. Cleared Payment via PayPal must be received within 3 days of transaction and prior to shipping.

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

1. To obtain the benefits of this warranty, contact the warranty department for troubleshooting.
2. Should a defect in any item or part covered by the warranty become evident during the warranty's term, Products Will at its sole discretion repair or replace such item or part. Products 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 Products, or the removal, reinstallation, or any such costs incurred in obtaining warranty replacements or repairment.
3. This warranty extends to the original retail purchaser and original installation site only, beginning at the original date of purchase, and is non-transferrable.
4. The warranty contains the following exclusions. O-Rings, rubber gaskets, electrical fuses, and circuit-breaker components are normal replacement items subject to wear and are excluded from the warranty.

**• Product discoloration, or any other cosmetic or superficial damage or deterioration, regardless of its cause, is not covered by this warranty. The warranty is not applicable to problems arising from circumstances outside the control of Products, including, but not limited to the following:**

A. 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.

B. Damage due to improper installation or connection to improper voltages, including materials and workmanship supplied by others.

C. Damage due to negligence or failure to properly maintain equipment, including the maintenance of clean and tight electrical connections.

D. Damage due to improper service, as well as unauthorized equipment modifications and use of non-genuine replacement parts.

E. Damage due to misapplication, misuse, abuse, overuse the cell lifetime (over 10 hours per day) or failure to operate equipment as specified in the owner's manual.

F. Problems resulting from tampering, accident, fire, flood, freezing, lightning, insects, or other natural elements, or other circumstances beyond the control of Products.

G. Damage due to over-tightening of threaded components or excessive pressure or stress.

H. Material supplied or workmanship performed by others in the process of installation.

The liability of Products shall not exceed the repair or replacement of defective items or parts under the referenced limited warranty terms. There are no implied warranties of merchantability or fitness for a particular purpose that apply to this equipment. Under no circumstances shall Products, its agents, employees, and affiliates be liable for any loss, damage, injury, inconvenience or loss of time, incidental expenses such as labor and material charges, or any other incidental, or consequential damages, which may result from the use, installation, removal, or reinstallation of its equipment and parts. This warranty is valid only in the United States of America. This warranty gives you specific legal rights and you may also have other rights, which vary from state to state. This warranty supersedes all previous publications. Any dispute between the original purchaser and Products will be settled by binding arbitration, conducted in Mecklenburg County, NC, under the rules of the American Arbitration Association.

**Disclaimer:** This limited warranty is the entire warranty. No other warranties apply, expressed or implied. This limited warranty gives you specific legal rights, which varies accordingly from state to state. Under no circumstances shall the manufacturer or authorized agents/installers 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. The Manufacturer or agents/installers are not liable for any other expenses that may be encountered during installation or servicing. Authorized agents/installers may charge a trip fee for warrant-able service work. Some states do not allow the exclusion of limitations of incidental or consequential damages.

Listed exclusions and limitations may not apply to you.

During the full coverage warranty process, we cover all replacements, repairs and labor cost. The customer is responsible for shipping to and from our warranty center.