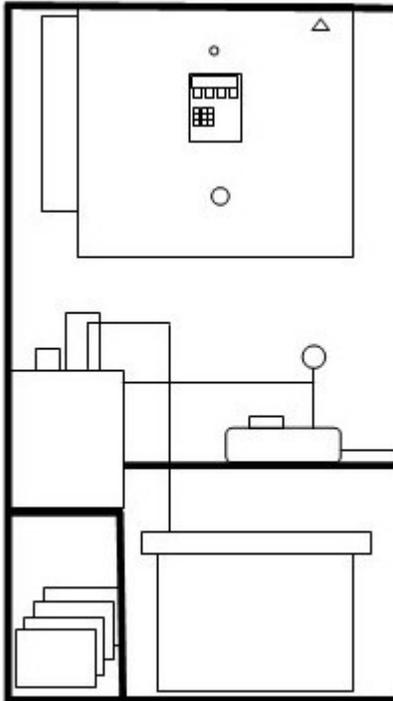


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Commercial Chlorine Generating Device

ZilvoldHF



ZILVOLDHF REGISTRATION NO. 29376 PEST CONTROL PRODUCTS ACT

COMMERCIAL Operation / Installation Manual

Maximum Output of hypochlorous (or hypobromous) acid equivalent to 14.82 kg of free Available chlorine per day

One Zilvold HF Unit Can Treat a Maximum of 3,000,000 Litres of Swimming Pool Water Controls Bacteria and Algae In Swimming Pool Waters

For swimming pools, a range of 1 to 3 ppm of free available chlorine must be maintained.
(For Indoor or Outdoor Use)

IMPORTANT

READ THE LABEL AND THIS MANUAL BEFORE INSTALLING & OPERATING

PLEASE RETAIN THIS MANUAL FOR FUTURE REFERENCE

PINNACLE AQUATIC GROUP INC.
5423 61ST AVE SE UNIT 140
CALGARY AB T2C 5N7

1-800-453-1944

Section 1a – GENERAL PRODUCT INFORMATION

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ZILVOLDHF

By PINNACLE AQUATIC GROUP INC.

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Section 1b – GENERAL PRODUCT INFORMATION

ZILVOLDHF

by **PINNACLE AQUATIC GROUP INC.**

Record The Following Information

Installer: _____

Date of installation: _____ Project Name: _____

Power Supply:

Serial Number:

Customer Assistance...

HOTLINE: 1.800.453.1944

Visit Us On The Internet @

www.pinnacleaquaticgroup.com

Manufactured for

Pinnacle Aquatic Group Inc.

5423 61st Ave SE Unit 140

Calgary AB T2C 5N7

ZILVOLDHF

By **PINNACLE AQUATIC GROUP INC.**

NOTICE TO USER:

This pest control product is to be used only in accordance with the directions on the label. It is an offence under the *Pest Control Products Act* to use this product in a way that is inconsistent with the directions on the label. The user assumes the risk to persons or property that arises from any such use of this product.

Section 1c – GENERAL PRODUCT INFORMATION

IMPORTANT SAFETY INSTRUCTIONS

READ AND FOLLOW ALL INSTRUCTIONS

INSTALLATION AND EQUIPMENT RELATED

Installation of ZilvoldHF:

**The ZilvoldHF Power Supply MUST be installed by a certified electrician
In accordance with all Federal and Provincial electrical codes.
Follow all aspects of the local and National Electrical Code(s) when installing ZilvoldHF**

1. WARNING – Risk of electrical shock. Install Power Supply at least 3m (10' – or in accordance with local electrical code) from the inside wall of the pool using non-metallic piping.
2. All field-installed metal components such as rails, ladders, drains or similar hardware within 3m (10') of the pool shall be bonded to the equipment grounding bus with copper conductors not smaller than No. 8 AWG in the U.S.A. and No.6 AWG in Canada.
3. CAUTION – Maintain water chemistry in accordance with manufacturer's instructions.
4. WARNING – **To reduce the risk of injury, do not permit children to operate this device.** Children should not use pools without constant adult supervision.

Equipment Related

1. A terminal connector is provided on your Power Supply to connect a minimum No. 8 AWG solid copper grounding bonding conductor between this unit and any metal equipment, metal enclosures of electrical equipment, metal water pipe or conduit within 1.5m (5') of the unit.
2. The ground bonding terminal is located on the bottom right hand side of the cabinet. To reduce the risk of electrical shock, this terminal must be connected to the grounding means provided in the electrical supply panel with a continuous copper wire equivalent size to the circuit conductors supplying your Power Supply.
3. A disconnection device from the power source, with a contact separation of at least 3mm (0.12") on all poles, must be incorporated in the fixed wiring for permanently wired units, refer to local electrical code requirements.

SAVE THESE INSTRUCTIONS

- DO NOT add pool chemicals directly to the skimmer. This may damage the unit.
- WARNING – Heavy pool usage and higher temperatures may require higher chlorine output to maintain proper free available chlorine/bromine residuals.
- People with a medical condition should consult a physician before entering pool water.
- When replacing the cell, only use replacement cells having a label that clearly states that it is a replacement cell for the chlorine/bromine generating device ZilvoldHF, REGISTRATION NUMBER 29376, PEST CONTROL PRODUCTS ACT.

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Section 1d – GENERAL PRODUCT INFORMATION

Technical Specifications

POWER SUPPLY

Power In: 220VAC/16A, 60 Hz
Power Out: 2 x 15V (DC)

CHLORINE CELL

Housing: Molded High-Impact PVC
Dimensions: 40.6 cm x 30.5 cm x 45.7 cm
(16" L x 12" W x 18" D)
Production: 600 grams of chlorine/hour

Housing: Frame mounted with weather protected cabinet

Weight (with cell, brine vessels and related piping and pumps):
Dry: ± 250 kg (± 550 lbs)
Wet: ± 500 kg (± 1100 lbs)

Frame Dimensions:
184 cm x 170 cm x 69.8 cm
(72.5" L x 67" W x 27.5" D)

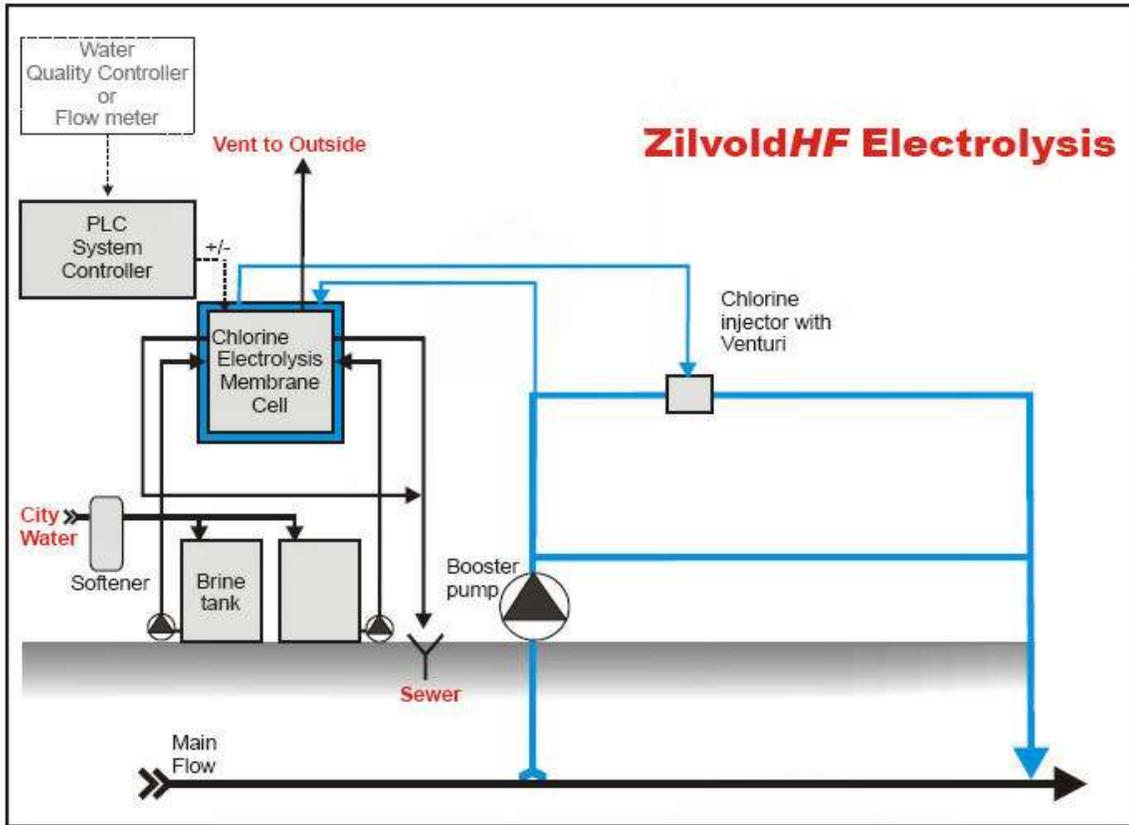
APPROVALS:

C.S.A.
P.C.P. REG. Pending
N.S.F. APPROVAL Pending

Life Expectancy: Cell life ± 5 years

TYPICAL ZILVOLDHF SINGLE CELL SYSTEM

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Section 2a – INSTALLATION

Main Components

PLC SYSTEM CONTROLLER converts incoming AC power to a DC current, which energizes the Cell.

ELECTROLYTIC MEMBRANE CELL The pre-assembled membrane cell receives the DC current from the PLC SYSTEM CONTROLLER that initiates the electrolytic process and allows chlorine to be produced. This process creates chlorine gas from a sodium chloride brine solution. The gas is drawn through a venturi and added to pool water to sanitize the pool.

BOOSTER PUMP is used to provide additional flow by the membrane cell in the event the swimming pool circulation pump does not provide the required flow.

FEED PUMPS are used to deliver the salt water brine to the cell and pump away depleted brine and sodium hydroxide.

Locating the ZilvoldHF PLC Cabinet and Cell

The ZilvoldHF comes factory assembled, frame mounted, pre-wired and pre-plumbed for its application.

CAUTION: Due to the weight of the unit, it is recommended to have several persons assist in locating the system.

The assembly should be set on a horizontal surface away from excessive exposure to heat and moisture.

Ensure a clear area around the unit to allow for any cleaning and/or maintenance to components and plumbing connections.

Power Supply Connections

Electrical Connections

Wiring. Electrical access is through the bottom right corner of the PLC cabinet. Power should be supplied through a dedicated GFCI breaker.

Ensure that the main panel circuit breaker is set to OFF. Connect your 220 VAC input wiring to the circuit panel. A 20 amp GFCI breaker should be interfaced with the main circulation pump. This ensures when the filter pump is turned off, the ZilvoldHF will be protected and also turned off. Installation should be done by a licensed electrician according to local electrical codes.

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ORP/PPM Connections and Fuse Locations

ORP/PPM CONNECTIONS

When an **ORP/PPM (or PPM only) chemical controller** is interfaced to your Zilvold HF , the controller will regulate the output. The controller wires will attach to the terminal block. As the controller measurement falls below the set point, the Zilvold HF is activated to produce chlorine until the set point is satisfied. Check with your local commercial guidelines for minimum and maximum ORP/PPM levels.

NOTE: THE REMOTE CONNECTIONS ARE DRY CONTACT ONLY! (CONTACT RELAY CLOSURE OR SOLID STATE RELAY). DO NOT ENERGIZE THESE INPUTS! DAMAGE TO THE CONTROL PANEL WILL OCCUR AND THE WARRANTY WILL BE VOIDED. EACH REMOTE MUST HAVE ITS OWN SET OF CONTACTS. DO NOT PUT MORE THAN ONE (1) REMOTE ON A SET OF CONTACTS.

FUSE LOCATIONS

There are very few user serviceable parts internally. The only parts that may be serviced are the fuses numbered 1 through 20 located inside the Control Panel. Refer to the fuse function list affixed to the inside of the Control Panel.

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Section 3a – OPERATION

ZilvoldHF Start Up Operations

1. ENSURE ALL POWER AND PLUMBING CONNECTIONS ARE COMPLETE:

2. TURN ON POWER TO THE PLC On the Operator Panel, perform the following:

- 2.1 Put the electrolysis in OFF mode
- 2.2 In the menu AUX SYSTEMS, switch the booster pump to OFF mode
- 2.3 In the menu AUX SYSTEMS, put the NaOH recycling pump into AUTOMATIC mode
- 2.4 In the menu SETUP, set SETP.CELLCONDITION to 0%

NOTE: after start up the SETP.CELLCONDITION must be reset to 100%

3. START WATER SOFTENER (according to its operation manual)

- 3.1 Fill reservoir with salt and set time

4. SALT CONTAINER

- 4.1 fill the salt container to the salt indicator marking
 - 4.2 the salt container will automatically fill with water from the softener
 - 4.3 with the supplied test kit, test the solution for correct concentration (result must be green with one drop of reagent)
- NOTE: it is important to use the correct salt otherwise damage will occur in the membrane cell.

5. FILL THE MEMBRANE CELL AND SIPHONS

- 5.1 In the menu SETUP, select FILL CELL.
- 5.2 The brine dosing pump will start. If it does not, it may be necessary to remove air in the lines according to the operation manual.
- 5.3 The water dosing pump will start. If it does not, it may be necessary to remove air in the lines according to the operation manual.
- 5.4 The brine solution can be seen filling the cell through the small view port on the side wall.
- 5.5 Once the cell is full, loosen the fitting and check that the brine solution flows from the cell waste pipe to sewer.
- 5.6 The sodium hydroxide (NaOH) vessel will begin to fill. You can manually fill the vessel to purge water to sewer.
- 5.7 The NaOH recycling pump will start. If it does not, it may be necessary to remove air in the lines according to the operation manual. After a period of time the siphon will be filled with NaOH. This can be checked visually.
- 5.8 The Anolyte pump will start. If it does not, it may be necessary to remove air in the lines according to the operation manual. The Anolyte pump doses small amounts of NaOH into an overflow vessel from the anode chamber. This prevents any chlorine odor from escaping the anode chamber.
- 5.9 Filling the cell will take a minimum of 20 minutes to allow for the proper brine solution.

NOTE: If electrolysis is started with a less than full cell, irreversible damage can occur!

START THE BOOSTER PUMP AND ADJUST PRESSURES

- 6.1 Open valves 3 and 4
- 6.2 Slowly open the valves to and from the swimming pool system.
- 6.3 When there is a positive pressure in the pool system, the booster pump will fill up.
- 6.4 Start the booster pump by switching it to AUTOMATIC mode in menu AUX.SYSTEMS. If the booster pump fails to start, refer to the troubleshooting guide.
- 6.5 Adjust the differential pressure to obtain sufficient vacuum
- 6.6 When the pressure is above 1.5 bar (ie: pump too large), the water can be by-passed by opening valve 3 and adjusting valve 4 to maintain appropriate pressure.
- 6.7 If all the above steps are correct, the floating metal bobbin will rise and the red LED located in the yellow body of the inductive sensor will light up. When the red LED is not on during normal operation, a FLOW OFF message will be displayed. The water surrounding the bobbin should be almost free of bubbles. If there is a mass of bubbles, air is being drawn in and the bobbin will sink down.
- 6.8 In the menu SETUP, adjust MANUAL production to 100%
- 6.9 Put the electrolysis in MANUAL operation. The electrolysis will begin to start after a short period of time as it does a self check on settings
- 6.10 In the menu VIEW, select CELL AMPERAGE. The amperage will begin at 0 amperes but should start to rise in a few seconds. **!YOU MUST SEE AN INCREASE IN AMPERAGE!**

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Amperage should rise to 50 ampere (=100% production) after approximately 30 minutes of run time. If the amperage is decreasing, **STOP** the unit and contact your service representative.

Voltage should start to rise within 30 seconds of operation. Normal operating voltage is ± 12 volt at 100% production and 50° C.

Starting temperature is dependant on fill water. It takes approximately 60 minutes to reach normal operating temperature of 50° C.

- 6.11 In the menu VIEW, select CELL CONDITION. The cell condition reflects the cell status and is dependant on cell conductivity and the screen will display '####'. The internal software will calculate the actual value within a few minutes (ie: 25%) and the value should begin to rise. **!YOU MUST SEE AN INCREASE IN THE PERCENTAGE VALUE!** If you do not see an increase, **STOP** the unit and contact your service representative.
Normal operating values of a new cell are between 110% and 135%. It will take approximately 20-30 minutes to reach the upper value.
- 6.12 In the menu VIEW, you should see the values rise in CELL AMPERAGE and CELL CONDITION.
- 6.13 Once the cell condition is above 105%, return to the menu SETUP and change the SETP.CELL CONDITION from 0% to 100%
- 6.14 Once the cell production is above 25 amperes (=50% production), go to the menu SETUP and turn off FILL CELL

Section 3b – OPERATION

Monitoring and Maintenance

Water Chemistry - VERY IMPORTANT NOTE! We recommend the following water chemistry ranges and periodic checks to monitor your systems efficiency. (Check expiry date of test kit reagents as test results may be inaccurate if used after that date.)

Daily Checks: <i>(Ideal)</i>		Bi-Weekly Checks:	
Free Chlorine:	1.0 – 3.0 ppm (pool) 3.0 – 5.0 ppm (spa)	Calcium Hardness:	200 - 240 ppm (pool) 140 - 160 ppm (spa)
Or Bromine:	2.0 – 4.0 ppm (pool) 3.0 – 5.0 ppm (spa)	Total Alkalinity:	100 - 120 ppm (pool) 80 - 100 ppm (spa)
pH:	7.2 – 7.8	Cyanuric Acid:	40 – 60 PPM
		Langelier’s Index: ± 0.3 pH of saturation (max.)	
		Monthly or as required, perform a visual cell inspection for wear, scale or debris	

CHLORINE REQUIREMENTS: For swimming pools, swimmers and bathers must not enter unless free available chlorine is between 1 and 3 ppm. During peak chlorine demand times it may be necessary to increase your chlorine output by increasing your production setting. Conversely, during low chlorine demand, you can set your production to a lower setting. **Caution: Chlorine levels maintained consistently above 3.0 ppm may cause or contribute to corrosion of pool equipment. Should the free available chlorine level be too low, use sodium hypochlorite to maintain an appropriate chlorine residual in the water.**

pH: When your pH falls below the accepted range, your chlorine is used up very quickly. For pH levels higher than the accepted range, your chlorine becomes much less effective. Improper pH also contributes to the strong smell, red eyes, dry itchy skin and brittle hair conditions usually associated with “too much chlorine”. Manual adjustments are not necessary. To decrease or increase the pool pH, adjustments can be made through the operator panel on the ZilvoldHF.

CALCIUM HARDNESS AND TOTAL ALKALINITY: The ZilvoldHF provides 100% pure chlorine for purification and sodium hydroxide for pH control. Neither of these products will adversely affect the calcium hardness or total alkalinity levels. When you start up and maintain your pool with proper water chemistry, it stays balanced much easier, until influenced by adding other ancillary chemicals or “out of balance” make-up water. If **calcium hardness** is low, use one of the many chemicals available to increase the level. If **calcium hardness** is high, greater attention must be given to keeping alkalinity and pH at the lower end of the recommended ranges or scaling may occur. For specifics on how much to add, please read and follow package instructions. Dilution may be required. To decrease **total alkalinity**, use muriatic acid. To increase **total alkalinity**, use bicarbonate of soda. Mix, and add it directly to the pool/spa water. DO NOT add bicarbonate of soda to the skimmer. This may cause immediate scaling of the cell. For specifics on how much to add, please read and follow package instructions

CYANURIC ACID (STABILIZER/CONDITIONER): Cyanuric acid (chlorine stabilizer) prevents the rapid breakdown of chlorine by sunlight. Regulations may exist regarding the use of cyanuric acid; please consult your pool professional.

GRAMS/KILOGRAMS AND POUNDS (LBS) OF CYANURIC ACID NEEDED FOR 50 PPM RESIDUAL									
Cyanuric Acid Level Before Addition	Pool/Spa Volume in Liters and U.S. Gallons (USG)								
	378 (100)	945 (250)	1890 (500)	3780 (1000)	18,900 (5,000)	37,800 (10,000)	94,500 (25,000)	189,000 (50,000)	378,000 (100,000)
0 ppm	19gr (.04)	47gr (.10)	94gr (.21)	189gr (.42)	945gr (2.1)	1.9kg (4.2)	4.7kg (10.4)	9.4kg (20.8)	18.9kg (41.6)
10 ppm	15gr (.03)	38gr (.08)	75gr (.17)	151gr (.34)	756gr (1.7)	1.5kg (3.4)	3.8kg (8.3)	7.6kg (16.6)	15.1kg (33.3)
20 ppm	12gr (.02)	30gr (.06)	60gr (.14)	120gr (.27)	605gr (1.4)	1.2kg (2.7)	3.1kg (6.6)	6.1kg (13.3)	12.1kg (26.6)
30 ppm	8gr (.016)	19gr (.04)	38gr (.08)	76gr (.17)	378gr (.8)	760gr (1.7)	1.9kg (4.2)	3.8kg (8.3)	7.6kg (16.6)
40 ppm	4gr (.01)	9gr (.02)	19gr (.04)	38gr (.08)	189gr (.4)	380gr (.8)	900gr (2.1)	1.9kg (4.2)	3.8kg (8.3)

LANGELIER’S INDEX: (or Saturation Index) A mathematical formula used by Pool Professionals to ensure that your total water chemistry does not fall into a corrosive or aggressive condition. Either condition can cause premature damage to pool equipment as well as your pool/spa surfaces.

FILTER BACKWASHING:

As a precautionary measure, we recommend turning the output to “0” on the ZILVOLDHF.

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Section 4a – TROUBLE SHOOTING AND SERVICING**TROUBLE SHOOTING**

<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>
1) Insufficient chlorine production.	<ul style="list-style-type: none"> A) The test kit reagents are old or expired. B) The unit is set too low in relation to demand. C) The chlorine demand/bather load has increased. D) Chlorine loss due to intense sunlight E) The body of water being sanitized leaks. F) Low Salt in brine tank. 	<ul style="list-style-type: none"> A) Retest with new Reagents. B) Turn up the output setting. C) Same solution as (B) or add a Non-Chlorine Shock which contains DUPONT OXONE™ such as Tabex Shock 'N Swim™, or equivalent. D) Check your stabilizer level and adjust if needed. E) Repair the leak and rebalance as needed. F) Check the salt level and adjust as needed.
2) No Green Lights with Power to the Control Panel.	<ul style="list-style-type: none"> A) On/Off Circuit Breaker tripped.. B) Control Panel Circuit Board Fuse Blown. 	<ul style="list-style-type: none"> A) Reset the On/Off Circuit Breaker Switch. B) Replace Fuse. See page 6 for fuse location.
3) "NO FLOW" Message.	<ul style="list-style-type: none"> A) Insufficient Flow (below 4.5 m³/hr/20 US gpm) B) The Flow Detector wire is loose. 	<ul style="list-style-type: none"> A) Ensure your Filter, Manifold Screen and Cell are clean of debris. Ensure there are no valves diverting flow away from the cell. B) Check each end for tightness onto the terminals.
4) "SALT TANK" Message.	<ul style="list-style-type: none"> A) Low salt in brine tank. 	<ul style="list-style-type: none"> A) Check residual salt level and adjust if needed.
5) "CELL CONDITION" Message.	<ul style="list-style-type: none"> A) Very cold pool water. B) Possible Cell failure. 	<ul style="list-style-type: none"> A) Lower output until the water temp. is above 16°C/60°F. C) Have the Cell tested by your service representative.
6) REMOTE ORP/PPM OR REVERSE POLARITY NOT ACTIVATING.	<ul style="list-style-type: none"> A) Loose connections B) Controller or components are defective. 	<ul style="list-style-type: none"> A) Check and tighten connections. B) Check with product manufacturer.

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Section 4b – TROUBLE SHOOTING AND SERVICING

SERVICING

NOTE: A Qualified Service Technician should perform All trouble shooting and repairs.

Accessing the Power Circuit Boards to replace the Board or Fuses:

CAUTION: BEFORE SERVICING, TURN OFF ALL POWER TO THE ZILVOLDHF CABINET AND POWER SUPPLY, AT THE MAIN PANEL CIRCUIT BREAKER!

POWER CIRCUIT BOARDS

Section 4c – TROUBLE SHOOTING AND SERVICING

To obtain service for your ZILVOLDHF, contact the Authorized Dealer/Service Centre listed below, or:

PINNACLE AQUATIC GROUP INC.

5423 61ST AVE SE UNIT 140.

CALGARY • ALBERTA • CANADA • T2C 5N7

Phone: 403.453.1944 • (Toll Free) 1.800.453.1944

If warranty service is being requested, you must provide a copy of your registered warranty card as proof of purchase. Warranty service cannot be performed without this document.

AUTHORIZED DEALER

WHEN CALLING FOR SERVICE – Please have the following information ready:

1. **Control Panel(s) Model No.:** _____
2. **Chlorine Cell(s) Serial Numbers:** _____
3. **Installation Date (MM/DD/YY):** _____
4. **Warranty Registration Number:** _____