OWNER'S MANUAL

Polaris Watermatic

C300 ORP Controller 120v
C305 ORP Controller 240v
C310 ORP/pH Controller 120v
C315 ORP/pH Controller 240v

Polaris

IMPORTANT SAFETY INSTRUCTIONS

When installing and using this electrical equipment, basic safety precautions should always be followed, including the following:

READ AND FOLLOW ALL INSTRUCTIONS.

Installation of this equipment should be performed by a licensed electrician and conform to all NationalElectric Code (NEC), state and local codes. Installations in Canada must comply to CEC requirements.

WARNING: To reduce the risk of electrical shock:

- Install all electrical equipment at least 10 feet (3 m) from inside wall of pool or spa.
- Always disconnect power before servicing this equipment.

To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.

SAVE THESE INSTRUCTIONS.

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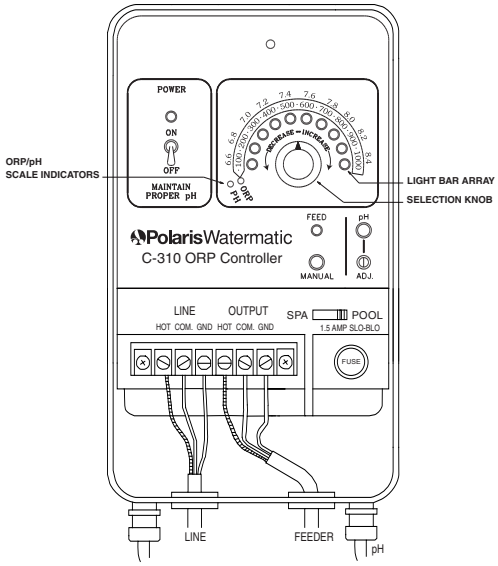
Introduction

The Polaris Watermatic® C300, C305, C310 and C315 Controllers are designed to automatically monitor and maintain the sanitizer level in swimming pools, spas and any circulating water system that requires water chemistry management. The C310 and C315 will also monitor the pH balance. They are designed for easy installation and simple operation.

The controllers are designed to be used in conjunction with the Polaris Watermatic G1000 Feeder.

During the filtration cycle of the pool or spa, the sanitizer level is maintained by a constant measurement of the ORP (Oxidation-Reduction-Potential). Measurements are displayed on the controller's ORP light bar array (see drawing below). If the sanitizer level (ORP) falls below the preset point, the controller will activate the chemical feeder until the desired level is reached.

The C310 and C315 also display the pH level on the pH light bar array, although no control or maintenance is provided.



C310 Shown

Specifications

ORP Range:	100 mV to 900 mV
pH Range:	7.0 - 8.2 (Monitor only)
Input Power:	**C300/C310**: 120 VAC 50/60 Hz, terminal strip, GFCI source required **C305/C315**: 240 VAC 50/60 Hz, terminal strip.
Controller Power:	Less than .5 Amp internally fused
Output Power:	**C300/C310**: 120 VAC 50/60 Hz, ORP: terminal strip,1-1/2 amp Slo-Blo fuse **C305/C315**: 240 VAC 50/60 Hz, terminal strip.
Display:	Light Bar Array
Operating Temperature:	40°-120° F
Sensors:	pH: glass combinations with 10' cable ORP: platinum combination with 10' cable

Selectable Features:

- Desired ORP settings
- pH calibration
- Safety lockouts for low or high (out of range) ORP levels

Note: When automating a body of water, it is essential to set the feed rate so desired levels can be attained in short operating cycles. If the feeders are unable to keep up with demand within a short time frame, automation becomes ineffective.

Components:

The C300/C305/C310/C315 Controller box contains:

- ORP/pH Controller
- ORP Sensor (part #3-250)
- pH Sensor (part #3-260, C310, C315 models only)

Pre-installation

Before beginning the installation, it is important to do a site assessment and consider where and how you will mount the controller.

The controller should be mounted on a wall or other surface within eight feet (2.5 meters) of the feeder, in close proximity to the time clock and within six feet of the GFCI power source. Once the best site is determined, obtain all necessary mounting screws or anchors (no mounting screws are provided). You will also need seal-tight or strain relief connectors for the electrical access holes in the control box and electric wire as required by local code (outdoor UL approved #16-3 flexible cord is recommended — solid copper wiring is not recommended).

Installation

Before installing the controller, you should install your Polaris G1000 Feeder. Make sure that the voltage of the feeder and the controller match.

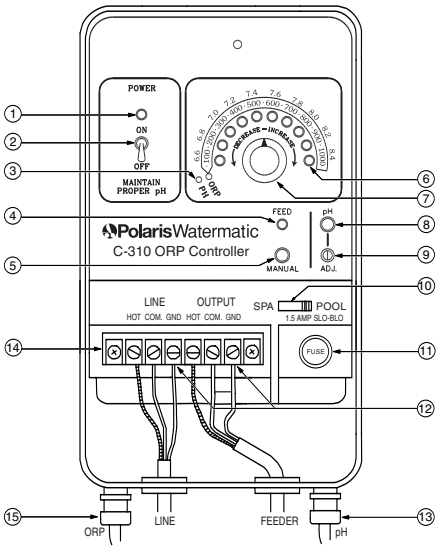
Installing the Controller

Important: The C300 and C310 controllers are rated at 5 amp 120 volt and the C305 and C315 controllers are rated at 5 amp 240 volt, however, both are fused with 1-1/2 amp Slo-Blo fuses.

1. Turn off power to the filter pump at the breaker box.
2. Remove the Caution Plate at the bottom of the controller by removing the two screws.
3. To avoid damage, remove the controller module from the controller box by removing the BNC connector(s) and the faceplate screws.
4. Drill or cut out the electrical access holes that are best suited for your installation (using a hammer can damage the controller). Install seal-tight or strain relief connectors in the access holes, and replace the module.
5. Mount the controller on the wall or surface within eight feet (2.5 meters) of the feeder.

6. Wire the load side of the filter time clock to the line side of the controller (outdoor UL approved #16-3 flexible cord is recommended — solid copper wiring is not recommended). If the filter pump is not controlled by a time clock, then wire directly to the load side of the filter pump switch (refer to the wiring diagram on the inside panel of the controller).

7. Remove the four screws on the feeder solenoid cover. Wire the load side of the controller to the solenoid on the feeder. Connect the hot and the common wires to the solenoid and connect the ground wire.



#	DESCRIPTION
1	Power On Light
2	Power On/Off Switch
3	Scale Indicators
4	Feed Light
5	ORP Manual Feed Button
6	ORP Light Bar Array
7	ORP Selection Knob
8	pH Selector
9	pH Adjustment Knob
10	Pool/Spa Switch
11	Fuse (1-1/2 amp Slo-Blo)
12	Ground Lug
13	pH Sensor
14	Terminal Strip
15	ORP Sensor

C310 Shown

Note: The voltage on the feeder solenoid must match the output voltage of the controller. The C300 and C310 Controllers must be matched with a G1000 120v feeder. The C305 and C315 Controllers must be matched with a G1000I 240V feeder.

Allow 2 feet of extra cord to provide a drip loop, which prevents moisture from entering the solenoid compartment, and to allow for servicing of the hopper. After making sure the gasket is in place and the wires do not interfere with the solenoid plunger, replace the solenoid cover, tightening all screws to seal the feeder. Do not overtighten.

8. If the controller is to be installed on a spa, use a small screwdriver to switch the pool/spa switch (#10) left to actuate the spa mode.

9. Replace the Caution Plate.

10. Carefully unpack the ORP and pH sensors (pH sensors are only available with the C310 and C315 Controllers). and remove protective caps from the sensor tips. Slowly place the sensors into the feeder tank. Do not install the sensors if there is no water in the feeder tank. Save the sensor caps for use during servicing or winterizing. Attach the ORP and pH sensor (C310 and C315 only) connectors to the proper fittings on control box (see drawing on page 5).

Initializing the Sensors

1. Determine the free sanitizer level of your swimming pool or spa using a DPD test kit. It should be between 1.0 and 3.0 ppm -- adjust if required.

   Note: The controller will not operate if the sanitizer level is below 0.2 ppm (below 100 mV).

2. Check the pH level of your pool or spa with your test kit. The pH should be maintained between 7.2 and 7.6 to get the maximum sanitizer efficiency and assure the accuracy of the controller. A pH level above or below this range will cause inaccurate sensor readings. High or low pH levels can also cause irritation to swimmers as well as other problems associated with the pool and equipment. This system dispenses the only pH neutral sanitizer (dichlor) which will help to maintain the ideal pH level.

3. Make sure the power switch (#2) is off and the selection knob (#7) is rotated counterclockwise to the lowest setting.

4. Turn on the filter pump and then turn on the controller power switch. The red power light (#1) and indicator lights on the controller light bar array (#6) will come on.

5. Leave the system running for approximately five minutes so the sensors can get an accurate reading from the pool.

6. Check for leaks and correct as necessary.

Choosing your Sanitizer Level Setting

1. The average pool should have a sanitizer level between 1.0 and 3.0 ppm. This equates to approximately 650 mV on the controller's ORP light bar array. **If the pool has been balanced correctly**, the lights illuminated on the ORP light bar array should be near 650 mV. Adjust the ORP selection knob to point at the illuminated light on the ORP light bar array. If more than one light is illuminated, set the knob to point in between the two lights.

   To maintain a higher sanitizer level, set the selection knob above the light shown on the light bar array. To maintain a lower sanitizer level, set the selection knob below the light shown on the light bar array. Be careful when adjusting the selection knob. The dial is extremely sensitive in the 600 to 800 mV range, and an adjustment of 50 mV could change the sanitizer level by several parts per million.

2. Allow the system to operate for 24 hours.

3. With the filtration system running, retest the sanitizer level of the water using a test kit and adjust the sanitizer selection knob if necessary. It may require two to three days to accurately set the controller to maintain the ideal sanitizer level.

4. If the chemistry of the pool or spa water changes (e.g. refilling, significant changes in pH, build-up of total dissolved solids, additions of other chemicals, etc.), the sanitizer level may have to be adjusted.

pH Calibration (C310 and C315 only)

Due to the nature of the pH sensors, it is necessary to periodically recalibrate them to the standard settings. Calibration consists of putting the pH sensor into a solution with a known pH and adjusting the light bar array to the known reading.

1. With a test kit, measure the pH of the water in the pool or spa.
2. Take a clean sample of the measured pool water and place the pH sensor (if the sensors aren't labeled, this is the blue sensor) into the water sample.
3. Push the pH selector button. The yellow ORP scale indicator light (#3 on page 5) will go out and the green pH scale indicator light will come on. The lights on the light bar array now correspond to the readings on the pH scale.

   When the button is pushed, the controller will monitor the pH for approximately 5 seconds, or for as long as the pH button is held down, before returning to the ORP scale.
4. The pH can be calibrated to match the reading taken by the test kit by simultaneously holding down the pH button and turning the pH adjustment knob (#9) until the lights on the light bar array indicate the pH reading of the test kit.

   You can now add sanitizer to your Polaris feeder. See the feeder owner's manual for instructions.

Note: It is advisable to recalibrate the pH sensor every six to eight weeks due to potential drifting with age.

Operation

The controller will only operate during the filtration cycle.

Feed Light Activation

1. The yellow feed light (#4) will flash to indicate when sanitizer is being dispensed.
2. Delays are built into the system to prevent the feeder from oversanitizing the pool. Once the feeder has dispensed a dose of sanitizer, the feeder is unable to dispense again for 20 minutes (5 minutes for spa mode). This delay allows the sanitizer to be circulated through the pool or spa and returned through the filtration system where the sensors can test the sanitizer level. After the delay period, another dose of sanitizer will be dispensed if needed. Although no sanitizer is being dispensed during the delay, the feed light will illuminate steadily during the delay period.
3. Do not adjust the selection knob when the feed light is on. When the feed light is on, the lights on the light bar array may register an inaccurate sanitizer level because the system is still circulating a dose of sanitizer.

Out-of-range Alert

The lowest red light on the light bar array will flash when the ORP is less than 100 mV and the controller will not activate the feeder. Depending on the level of ORP, the manual feed button (see below) may be used to raise the ORP level.

Manual Feed

The main purpose of the manual feed button is to restart the feed cycle if the system has shut down because the ORP level dropped below 100 mV due to an empty feeder or dirty sensor. It can also be used to test the solenoid. It cannot be used while the feed light is on. If the manual feed option is desired when the feed light is on, simply turn the controller off and on to reset the feed light. Then the manual feed option can be used.

Winterizing

If the system is subject to extended shutdowns or is located in colder climates, it is important to winterize the system.

1. Turn off the main power to the controller.
2. Gently remove the sensors from the feeder. **Note: The sensor tips must be stored in a protective cap or bottle filled with a liquid solution of one teaspoon salt and three teaspoons water.** Mix the solution thoroughly and make sure the solution completely covers the sensor tips. **STORE THE SENSOR IN A WARM PLACE - DO NOT SUBJECT SENSORS TO FREEZING TEMPERATURES.**
3. Empty the system of all water. Disconnect the feeder tubes from the tank and loop them together (attach the bottom tube to the front of the on/off strainer assembly).
4. If the pool or spa has a sensor bypass assembly installed, drain the water from the bypass assembly.
5. Remove all granular material from the feeder and clean all feeder parts.

Setting Feed and Delay Times

The controller is pre-set at the factory with the following feed and delay times:

Pool Setting: Feed = 9.6 seconds, Delay = 20 minutes

Spa Setting: Feed = .6 seconds, Delay = 5 minutes

For heavily used pools, shorten the delay time to 10 minutes. For large spas (1000+ gallons), increase the feed time to 1.2 or 2.4 seconds. To modify the factory settings, see the Appendix.

Maintenance

Testing

1. Test the sanitizer and pH levels weekly with a test kit or more frequently as required by local health codes.
2. Adjust the pH in the pool or spa as needed to maintain a level between 7.4 and 7.6.

Cleaning the Sensor Tips

1. It is important to keep the sensor tips clean to ensure accurate sanitizer level readings. When the sensor tips become dirty, the indicator lights will read lower than the actual sanitizer level and can cause the controller to oversanitize.

   Note: A sensor tip coated with scale will not look visibly dirty.

2. As a general rule, the sensor tips should be cleaned every two to four weeks for commercial pools and spas, and once each month for residential pools and spas. However, cleaning frequency can vary from one body of water to another. To determine the appropriate frequency for your pool or spa, note the light bar reading prior to cleaning. After cleaning the sensor, allow a stabilizing period of approximately ten minutes. If the light bar reading is identical to the reading prior to cleaning, the sensor was not dirty and the time between sensor cleanings can be increased.
3. To clean the sensor tip, turn off the controller and gently remove the sensor from the feeder. Swirl the tip for five seconds in muriatic acid (diluted 5 to1) or white vinegar, and rinse it in water. **DO NOT TOUCH, WIPE OR BRUSH THE END OF THE SENSOR.**
4. For commercial pools and spas, every third cleaning, swirl the sensor tip in a solution of liquid soap and warm water. Rinse with water.
5. Gently replace the sensors in the feeder and turn on the controller.
6. Allow the controller to operate for a few minutes to get an accurate reading. Adjust the selection knob if necessary.

Checking the ORP Sensor

1. The ORP sensor should be checked every six months or anytime the feeder oversanitizes the water.
2. Clean the sensor tip as noted above.
3. Place the sensor in a clean glass of tap water. This should give a reading between 200 and 400 mV. Adding a pinch of Dichlor should cause the ORP level to jump to between 700 and 800 mV.

   Note: If the sensor has been sitting in a high concentration of chlorine for more than 20 hours, it may pick up a 'memory' which will prevent it from reading below 500 to 600 mV. If this is the case, adjust your controller setting accordingly. The sensor should return to normal after a week or two of normal operation. To return the sensor to normal functioning more quickly, place it in a glass of tap water for 72 hours.
4. If the sensor does not respond as indicated, the sensor should be replaced.

Checking the pH Sensor (C310 and C315 only)

1. The pH sensor should be checked every six months or anytime the pH cannot be calibrated to the test kit.
2. Place the sensor in a clean glass of tap water. Add a small amount of acid to the glass. The pH reading should drop to the lowest red light. Then place the sensor in any solution with a pH above 7.5. The pH reading should move up.
3. If the sensor does not respond as indicated, the sensor should be replaced.

Troubleshooting

PROBLEM	POSSIBLE CAUSE	SOLUTION
SANITIZER LEVEL TOO LOW	Selection knob set too low	Adjust knob clockwise until the proper sanitizer level is reached
	pH level too low (less than 7.2)	Check pH level with a test kit and adjust as required
	Chemical feeder empty	Refill chemical feeder
	Chemical feeder is clogged	Clean and dry feeder measuring cup assembly
	Defective sensor	Replace sensor
SANITIZER LEVEL TOO HIGH	Selection knob set too high	Adjust knob counterclockwise until the proper sanitizer level is reached
	pH level too high (above 7.8)	Check pH level with a test kit and adjust as necessary
	Sensor tip is dirty	Clean sensor tip
	Defective sensor	Replace sensor
DISPLAY LIGHTS OFF	No power supply	Check circuit breaker
SOLENOID DOES NOT OPERATE	Solenoid piston obstructed, causing the fuse to blow	Eliminate cause of solenoid obstruction and replace fuse
	Broken wire connector on solenoid	Rewire solenoid

Guidelines for Using ORP for Water Maintenance

Q. Why should I maintain a pH level between 7.4 and 7.6?

A. pH levels below 7.4 can cause eye irritation, metal corrosion, etching of plaster, stains, damage to vinyl liners, and loss of sanitizer. In addition to eye irritation, pH levels above 7.6 can cause cloudy water, scale formation and loss of sanitizer efficiency (low ORP).

Q. How do I increase the pH level?

A. Small amounts of basic (alkaline) chemicals such as pH Plus or pH Up can be added.

Q. How do I lower the pH level?

A. Small amounts of liquid (muriatic) or dry acid (sodium bisulfate) such as pH Minus or pH Down can be added.

Q. How does 650 mV relate to the ppm of chlorine?

A. Pure water, without conditioner, at a pH level of 7.5 corresponds to approximately 1.5 ppm of chlorine. Actual pool or spa water usually takes at least 1-2 ppm of chlorine to generate 650 mV ORP (although the Total Dissolved Solids and pH can affect the activity of the chlorine and thus change the level of ORP).

Q. Does an ORP of 650 mV stop algae?

A. No. Because algae is a living organism that adapts genetically to a constant level of sanitizer, the periodic addition of an algicide or shocking may be necessary. Please note that the addition of some chemicals can change the ORP readings for up to several days.

Q. What causes a low ORP?

A. A low sanitizer level, a pH level above 7.6, a conditioner level above 200 ppm or a TDS (Total Dissolved Solids) above 3,000 ppm can all cause a low ORP.

Q. How do I make sure the ORP sensor is working properly?

A. Watch the sensor reading when adding sanitizer. If it does not respond properly, follow the recommended cleaning procedures. If cleaning does not solve the problem, check the sensor as outlined on page 12.

Q. How should the ORP sensor respond to adding acid?

A. Adding acid decreases the pH level thus increasing the ORP.

Q. How should the ORP sensor respond to adding base?

A. Adding base increases the pH level thus decreasing the ORP.

Q. How should the ORP sensor respond to adding sanitizer?

A. Depending upon the type of sanitizer used, the ORP should increase. A sanitizer high in base, such as liquid chlorine (sodium hypochlorite) or a dry chlorine powder (calcium hypochlorite), however, can cause the pH level to rise and the ORP to decrease. The pH level must be in the ideal range to maintain the proper ORP level.

Q. Can ORP be used with ozone?

A. Even though ozone is an excellent oxidizer, it has a very short lifetime. Therefore, a chlorine or bromine residual will still be needed in order to maintain the proper ORP level. When using ozone, the ozone must be introduced into the system downstream from the sensors.

Q. Can ORP be used with UV or metal ions?

A. Only if the proper chlorine or bromine residual is maintained.

Warranty

Polaris Watermatic Controller

This limited warranty is extended to the original consumer purchaser of this Polaris Watermatic C300, C305, C310 or C315 Controller manufactured by Zodiac Pool Care, Inc. (“Zodiac”), 2620 Commerce Way, Vista, CA 92081-8438, USA.

Zodiac warrants the Watermatic Controller it manufactures, including all parts and components thereof, to be free of defects in material and workmanship. For questions regarding your Polaris Watermatic Controller, please feel free to call or write us. Be sure to provide the serial number of your unit.

The warranty commences on the date of installation of the controller and shall remain in effect for a period of one (1) year, but in no event shall it be in effect for more than two (2) years from the date of manufacture of the controller as established by the serial number.

This limited warranty does not apply if the failure is caused or contributed by any of the following: improper handling, improper storage, abuse, unsuitable application of the unit, lack of reasonable and necessary maintenance, winter freezing or repairs made or attempted by other than Zodiac or one of its authorized service centers. Zodiac will repair or replace, at its option, a unit or part proved to be defective within the warranty period and under the conditions of the warranty.

Unless local repair is authorized, the consumer must deliver or ship the unit or the warranty parts, freight prepaid to the nearest Polaris Authorized Service Center or return it freight prepaid (after proper authorization) to the plant of manufacture. Authorization to return a unit to the plant of manufacture must be obtained from the Zodiac Customer Service Department. For your convenience, please check with your dealer for the local procedure before exercising this warranty. If further directions or instructions should be required, contact the Customer Service Department at 1-800-822-7933 (USA and Canada only) or 760-599-9600. Be sure to insure your shipments against loss or damage during transit.

Zodiac is not responsible for the cost of removal of the unit, damages due to removal, any other expenses incurred in shipping the unit or parts to or from the factory or its authorized service centers, the installation of the repaired or replacement unit. The consumer must bear these expenses.

This warranty does not cover repair or replacement of a unit except at our factory or a Polaris Authorized Service Center.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ALL SUCH OTHER WARRANTIES ARE DISCLAIMED EXCEPT TO THE EXTENT ANY IMPLIED WARRANTY MAY BE IMPOSED BY STATE CONSUMER LAW. ANY SUCH IMPLIED WARRANTY IMPOSED BY STATE CONSUMER LAW IS LIMITED IN DURATION TO ONE (1) YEAR FROM DATE OF PURCHASE.

IN NO EVENT SHALL ZODIAC BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE OR KIND OR FOR DAMAGES TO PERSONS OR PROPERTY, INCLUDING ANY DAMAGE RESULTING FROM THE USE OF THE POLARIS WATERMATIC CONTROLLER.

Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you.

This limited warranty is valid only in the United States of America and Canada, and it does not apply to Polaris Watermatic Controllers sold or installed in any other country.

Appendix

Pool Mode

As indicated in the Operation section, the factory default setting in the pool mode is a feed time of 9.6 seconds with a delay of 20 minutes. Additional feed and delay times are available by changing the dip switches located on the back of the controller.

FEED TIME OPEN PISTON

Feed Cycle	Switch #1	Switch #2
9.6 seconds	OFF	OFF
14 seconds	ON	OFF
4.8 seconds	OFF	ON
7.2 seconds	ON	ON

FEED DELAY TIME

Delay Cycle	Switch #3
20 minutes	OFF
10 minutes	ON

Spa Mode

The factory default setting in the spa mode is a feed time of .6 seconds and a delay of 5 minutes. Additional feed and delay times are available by changing the dip switches located on the back of the controller.

FEED TIME OPEN PISTON

Feed Cycle	Switch #1	Switch #2
.6 seconds	OFF	OFF
1.2 seconds	ON	OFF
2.4 seconds	OFF	ON
3.6 seconds	ON	ON

FEED DELAY TIME

Delay Cycle	Switch #3
5 minutes	OFF
10 minutes	ON

Note: The dip switches #4 and #6 must be left in the OFF position. Dip switch #5 is preset ON to prevent the controller from feeding if the ORP level should fall below 100 mv. Turning off dip switch #5 will turn off the low ORP feature.

Your pool. Our reputation.

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