

POOLWARDEN

Automated Pool & Spa Chemical Controller
And Data Recorder



Installation
&
Operation



Version: 110/220 VAC Web Server

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Contents

IMPORTANT WARNING AND SAFETY INSTRUCTIONS	3
POOLWARDEN OVERVIEW	5
SYSTEM COMPONENTS	5
Maximum Electrical Specifications	6
Certifications	6
Models and Options	6
POOLWARDEN INSTALLATION	7
Mounting PoolWarden	7
Flow Cell To Circulation Plumbing	7
Sensor Wire Connection	10
Supply 110/220 Vac Input Selection	10
Load / Equipment Connection & Installation	11
PoolWarden OPERATION	13
Default Readings Screen	14
MAIN MENU - SETUP	15
Information Menus	16
PROGRAMMING - GETTING STARTED	18
Step 1 - Time Menu	18
Step 2 - Security Setup Menu	18
Step 3 - Relay Control Type Menu	19
Step 4 - Relay Setup Menu (ORP, pH and Alarms)	19
Step 5 - Service Menu	25
COMMUNICATION - GETTING STARTED: LAN / ETHERNET	26
Step 1 - The Communication Module	26
Step 2 - Network Setup Menu	26
Step 3 - Client IP Security	26
Step 4 - DATA SERVER SETUP	27
Step 5 - INFORMATION	27
Step 6 - EMAIL	27
COMMUNICATION: REMOTE CONNECTION	27
ADVANCED FEATURES	28
Data Recording Menu	29
Serial Printer	29
System Menu	30
TrueDPD Menu	30
Flow Menu	31
Heater	31
CYA Menu	32
Reset Menu	32
Time Menu	32
CHANGING RELAY TYPE	33
Heater Control Type	33
Feed Daily Control Type	34
Alarm Out Control Type	35
Superchlorination	35
Water Level Control Type	35
ORP Control Types	36
Replacement Parts	37
Maintenance	38
Technical Support	38
Troubleshooting	39
LIMITED WARRANTY	40

IMPORTANT WARNING AND SAFETY INSTRUCTIONS

- 1 READ AND FOLLOW ALL INSTRUCTIONS
- 2 SAVE THESE INSTRUCTIONS
- 3 **WARNING** – To reduce the risk of injury, do not permit children to use this product
- 4 **DANGER** – Risk of injury
 - 4.1 Replace damaged cord immediately.
 - 4.2 Do not bury cord.
 - 4.3 Connect to a grounded, grounding type receptacle only.
 - 4.4 Do not use an extension cord.
- 5 **WARNING** – This product is provided with a ground-fault circuit-interrupter at the end of the power cord. The GFCI must be tested before each use. Turn the PoolWarden off by placing the ON/OFF switch to the OFF position. Next, push the test button on the GFCI and place the ON/OFF switch to the ON position. The PoolWarden should not operate. Now push the reset button on the GFCI and the PoolWarden should now operate normally. When the product fails to operate in this manner, there is a ground current flowing indicating the possibility of an electric shock. Disconnect the power until the fault has been identified and corrected.
- 6 It is very important to follow the safety guidelines in this manual to ensure safe installation and programming. Upon installation, it is important to properly train all personnel basic water quality management techniques, proper operation and programming to anyone who operates or services PoolWarden.
- 7 All applicable local installation codes and ordinances must also be adhered to. Improper installation will create an electrical hazard which could result in death or serious injury to pool users, installers or others due to electrical shock, and may also cause damage to property. The PoolWarden must be installed by a licensed or certified electrician or a qualified pool professional:
 - 7.1 United States: National Electrical Code (NEC), NFPA 70
 - 7.2 Canada: Canadian Electrical Code (CEC), CSA C22.1.
- 8 **WARNING** – *Disconnect all power to PoolWarden prior to any service including the main AC power and any other AC sources that may be connected to the AUX relays. Never apply power when PoolWarden*

service door is unlocked or in the open position. Only qualified and licensed technicians should perform any service or repair.

- 9 **WARNING** – *Always mount PoolWarden in safe and dry area. Never mount PoolWarden above any other electrical equipment.*
- 10 **WARNING** – *Install PoolWarden in a location that is not accessible to the public.*
- 11 **WARNING** – *Pool and Spa Chemical Safety*
 - 11.1 *Never mix sodium hypochlorite and muratic acid!*
 - 11.2 *When mixing acid and water, always add acid to the water, never add water to the acid.*
- 12 **CAUTION** – **TEST THE GROUND FAULT CIRCUIT INTERRUPTER BEFORE EACH USE OF THE POOL/SPA**
- 13 **CAUTION** – **CONNECT ONLY TO A CIRCUIT PROTECTED BY A CLASS A GROUND FAULT CIRCUIT INTERRUPTER**

- 1 **ATTENTION:** **TOUJOURS VÉRIFIER L'EFFICACITÉ DU DISJONCTEUR DIFFÉRENTIEL AVANT D'UTILISER LE BAIN**
- 2 **ATTENTION:** **LIRE LA NOTICE TECHNIQUE**
- 3 **AVERTISSEMENT:** **DÉCONNECTER DU CIRCUIT D'ALIMENTATION ÉLECTRIQUE AVANT L'ENTRETIEN**
- 4 **ATTENTION:** **CONNECTER UNIQUEMENT À UN CIRCUIT PROTÉGÉ PAR UN DISJONCTEUR DIFFÉRENTIEL DE CLASSE A**

POOLWARDEN OVERVIEW

ControlOMatic, with over 20 years of technological leadership in Pool & Spa Chemical Control Systems, congratulates you on your selection of the PoolWarden Chemical Controller. PoolWarden measures pH, sanitizer and temperature on up to two bodies of water and will control the appropriate feed equipment to keep the measurements within a preprogrammed range. Using ORP (oxidation reduction potential) technology the control of sanitizer takes into account the effects of pH, and a pH lockout feature is also included for high pH values. Supporting both 110 and 220 VAC, the PoolWarden will control chemical feed equipment using relays to keep the pool or spa water in balance. Water measurements are taken continuously while PoolWarden's internal relay programming determines if chemical adjustments are needed. PoolWarden then communicates the adjustment signals through relays which control the chemical feed equipment. PoolWarden also contains additional dry-contact auxiliary relays that can be used to control heaters, pumps, chlorine backup and external alarm notifications.

SYSTEM COMPONENTS

- ◆ **CONTROLLER:** PoolWarden is a microprocessor based, modular automation system that is capable of continuous monitoring locally onsite or remotely offsite.
- ◆ **INTERFACE:** PoolWarden uses a 16-button built in keypad, and an easy to read 80 character liquid crystal display. The display's internal back-light provides controller viewing in pool rooms with low light conditions. Back-light illumination time can be adjusted to suit the operator.
- ◆ **MEMORY:** PoolWarden is designed with nonvolatile memory which preserves all internal programming in case of power loss. Internal memory is preserved for up to 10 years without having power applied.
- ◆ **RELAYS:** PoolWarden S (single pool) includes 4 relays (2 of which are dry contact relays). PoolWarden D (two pools) includes 8 relays. Four of the 8 relays are dry contact relays (2 for each body of water).
- ◆ **SENSORS:** ORP Sensor, pH Sensor, Temperature Sensor and Flow Sensor.
- ◆ **VOLTAGE:** PoolWarden is designed with an ON/OFF switch and requires 120 VAC Input Voltage to operate.
- ◆ **SECURITY:** PoolWarden is designed with a lockable enclosure and provides up to four levels of password security protection (Admin, Tech, Service and Guest) for both local onsite and remote offsite interaction with the controller.
- ◆ **COMMUNICATION:** PoolWarden can connect to the Internet for direct monitoring, setup, and data interface via a WIFI or Ethernet option.
- ◆ **DATA:** PoolWarden will record up to 8192 lines of data with the built in internal memory.
- ◆ **HEATERS:** Auxiliary relays can control pool heaters with up to two set-points for each day to facilitate energy management.
- ◆ **PUMP CONTROL:** Auxiliary relays can be setup as a simple timer for controlling the on/off state of main pumps.
- ◆ **OVERFEED PROTECTION:** PoolWarden is designed with overfeed protection. Standard Overfeed limits the amount of time a relay can turn on feed equipment in a 24-Hour period.
- ◆ **PROPORTIONAL FEED:** Proportionally reduces the on-time as the measurement gets closer to the set-point to prevent overshoot.
- ◆ **E-MAIL ALERTS:** PoolWarden provides support for 4 email addresses. Alarm alerts can be sent directly from the controller for real-time management.
- ◆ **DIGITAL FLOW SENSORS:** PoolWarden can track flow rate and flow volume.
- ◆ **AUXILIARY RELAYS:** Auxiliary relays can control additional / backup sanitizer or acid feed pumps.

Maximum Electrical Specifications

ITEM	DESCRIPTION	LIMIT
Input Voltage	Maximum input AC voltage	220 VAC, 50-60 Hz
Input Current	Maximum input current	10 A
Relay Voltage	Maximum relay voltage	220 VAC
Relay Current	Maximum Relay Current	2.5 A
Temperature	Minimum/Maximum Operating Temperature	30/110 °F
Standby Current	Maximum operating current	0.1 A Max
pH	Measurement of pH	4.22 to 9.98
ORP	Oxidation Reduction Potential	0 to 999 mV
Temperature	Water temperature measurement.	32 to 122 °F

Models and Options

ITEM	DESCRIPTION
PW-XFC	PoolWarden controller with flow cell and sensors
PW-XFC-P	Add 2 pigtails per pool for easy connection of external feeders
PW-XFC-PE	Add 2 pigtails per pool and Ethernet communication
PW-XFC-E	Add Ethernet communication
PW-XMTD	PoolWarden controller with flow cell and sensors pre mounted on white back panel
PW-XMTD-P	Add 2 pigtails per pool for easy connection of external feeders
PW-XMTD-PE	Add 2 pigtails per pool and Ethernet communication
PW-XMTD-E	Add Ethernet communication
TrueDPD	Adds free chlorine measurement using the DPD colorimetric method. This is available as a single and dual sensor.
X	In the above model numbers, replace the x for S (Single pool) or D (Dual Pool)

Certifications



4010758
 Conforms to
 UL STD 1563
 Certified to CSA STD
 C22.2 No. 218.1



NSF/ANSI 50 - Equipment for
 Swimming Pools, Spas, Hot
 Tubs and Other Recreational
 Water Facilities
<http://info.nsf.org/Certified/Pool/Listing.aspx?Company=C0214550&Standard=050&>

POOLWARDEN INSTALLATION

Mounting PoolWarden

Turn off any heaters, pool or spa circulation systems, chemical feed pumps or any related shut-off valves or equipment and relieve pressure from the filtration system. Find a suitable mounting location near a 120/220 VAC power source that meets the following criteria:

- ◆ Facilitates a combined (influent & effluent) maximum tubing run of 30'.
- ◆ Do not mount controller above electrical sources or electrical equipment.
- ◆ At least 10' away from any pool, spa or body of water and not accessible to the public.
- ◆ Away from corrosive materials and physical hazards.
- ◆ Not in direct sunlight or directly above or near any heat source.
- ◆ For 220 VAC, ability to hard wire with GFCI (ground fault circuit interrupter) protection.

Securely mount controller, or the optional controller backboard, vertically on the wall using supplied screws or appropriate fasteners for the wall construction. Never mount MiniWarden horizontally.

Flow Cell To Circulation Plumbing

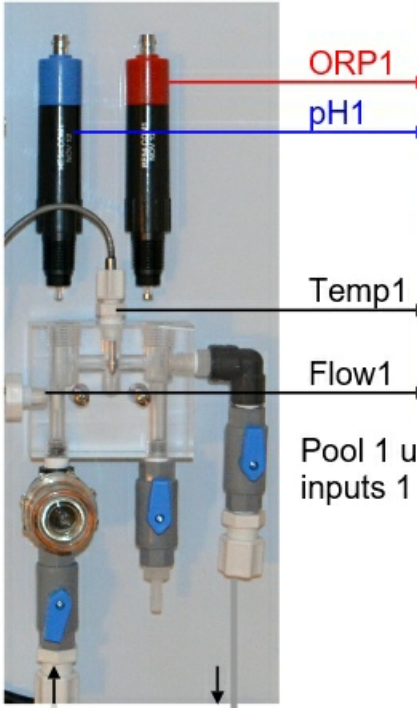
There are many ways to connect the flow cell tubing to the circulation plumbing. Always make sure the input source to the flow cell is well upstream from any chemical injection points. Successful flow cell installation requires a pressure differential, or there will be no water flowing through the cell. The Flow cell input should be filtered water and therefore after the filter. Never install the input to the flow cell between the main circulation pump and filter as that will be very high pressure which may damage the pump and provide the most debris to the flow cell. PoolWarden is equipped with a strainer to filter out any debris that does get past the filter. Periodically check and clean the strainer. Install the flow cell return after the heater, there will be a pressure drop across that should be sufficient to provide flow through the flow cell. If there is no heater, the next choice is the suction plug in the pumps strainer, make sure to adjust the return valve on the flow cell to keep the pressure in the flow cell positive.

- ◆ Flow Cell Input: Drill & tap a connection point in the circulation system at a location just after the filter. The best location is where there is a pipe fitting as that will provide the most threads. Install a tube connector and run tubing to the input side of the flow cell.
- ◆ Flow Cell Output: Drill & tap a connection point in the circulation system at a location with reduced pressure just after the heater. Install a tube connector and run tubing to the return side of the flow cell.

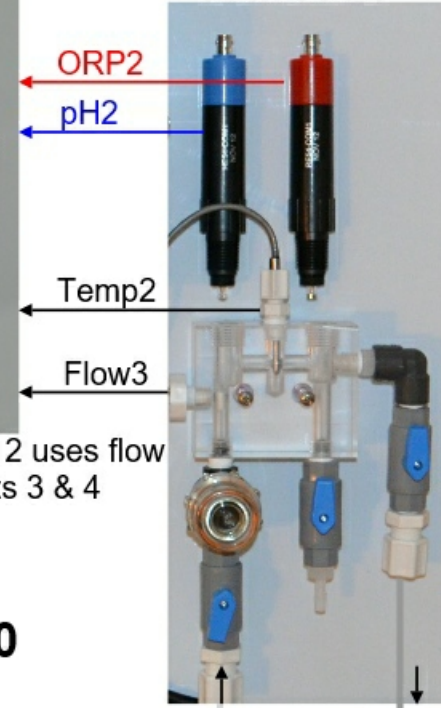
CAUTION: Maximum pressure across the sensors should be 10 PSI (pressure gauge may be required). Always expose the sensors to positive pressure. Prevent exposing the sensors to suction or a vacuum by connecting the flow cell output tubing to the suction side of the pump as the vacuum may suck the sensor gel from the sensors rendering the sensors inoperable in a very short period of time.

- ◆ If not pre-mounted, find a suitable location to mount the acrylic flow cell within 3 feet of the controller. Mount and assemble flow cell parts according to Picture 2.
- ◆ Remove pH (Blue) and ORP (Red) sensors from the boxes. Use Teflon tape on sensor threads and all other flow cell parts to ensure water tight connection and fasten accordingly.
- ◆ Install the appropriate 1/2" or 3/8" hard vinyl input and output tubing from the pools circulation system connection points to the "In" and "Out" connection points on the flow cell according to Picture 2.
- ◆ Once connected, turn circulating pump back on, test for leaks at all connection points, and make sure all air evacuates from the tubing.
- ◆ There is a small magnet in the flow cell that is held in place with a piece of tape. Remove the tape and make sure the magnet remains in the hole above the filter / strainer.

POOL1 = SPA Sensors



POOL2 = POOL Sensors

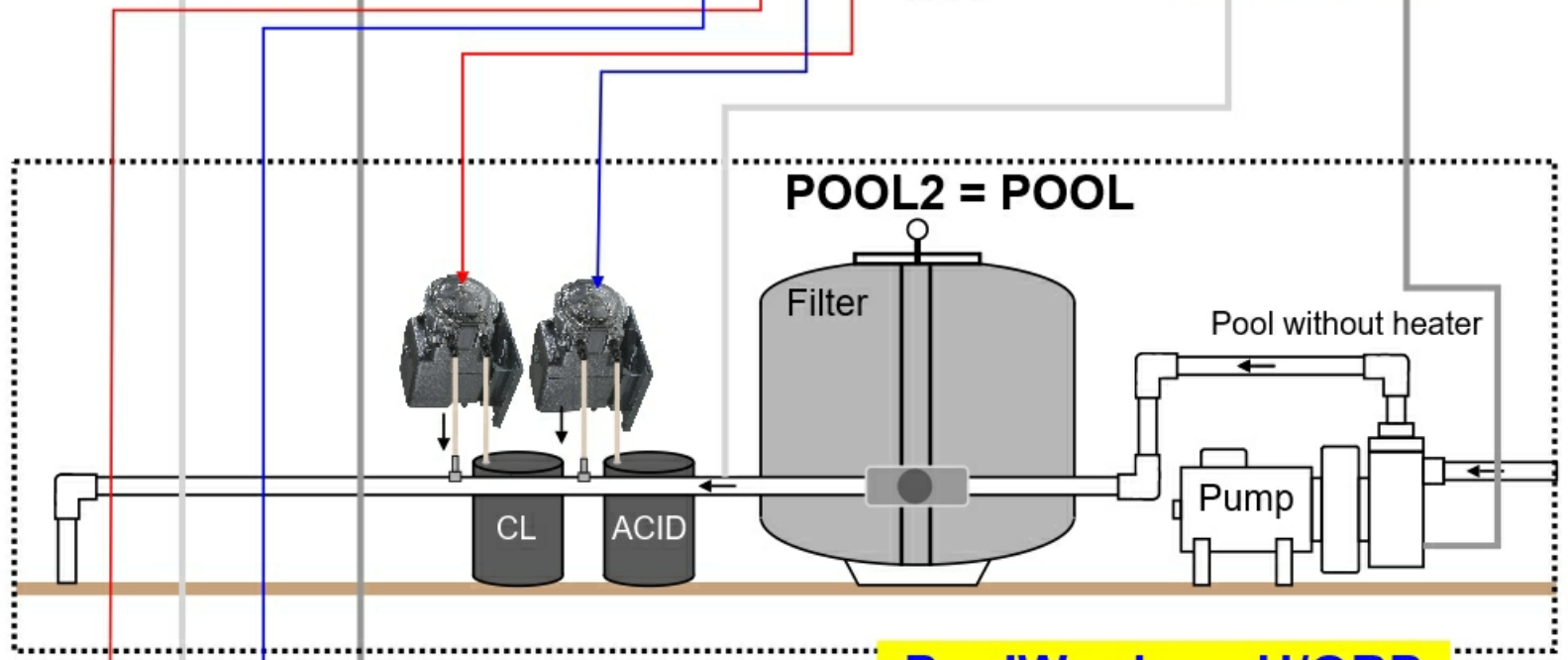


Pool 1 uses flow inputs 1 & 2

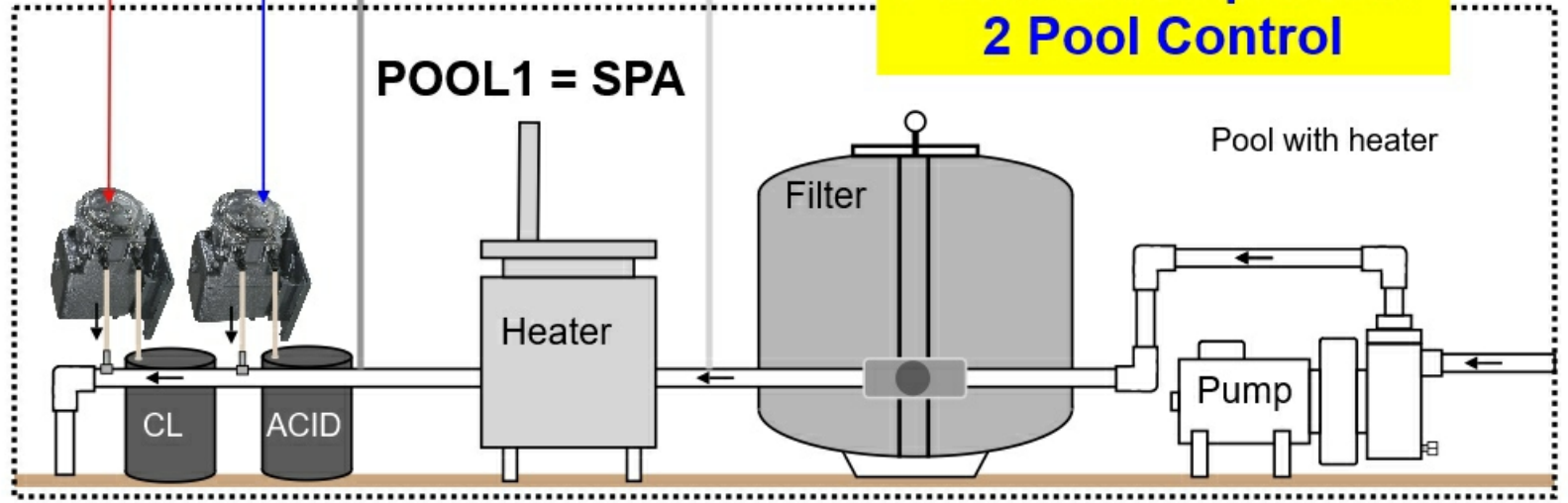
Pool 2 uses flow inputs 3 & 4

ORP1
pH1
ORP2
pH2

110/220
VAC



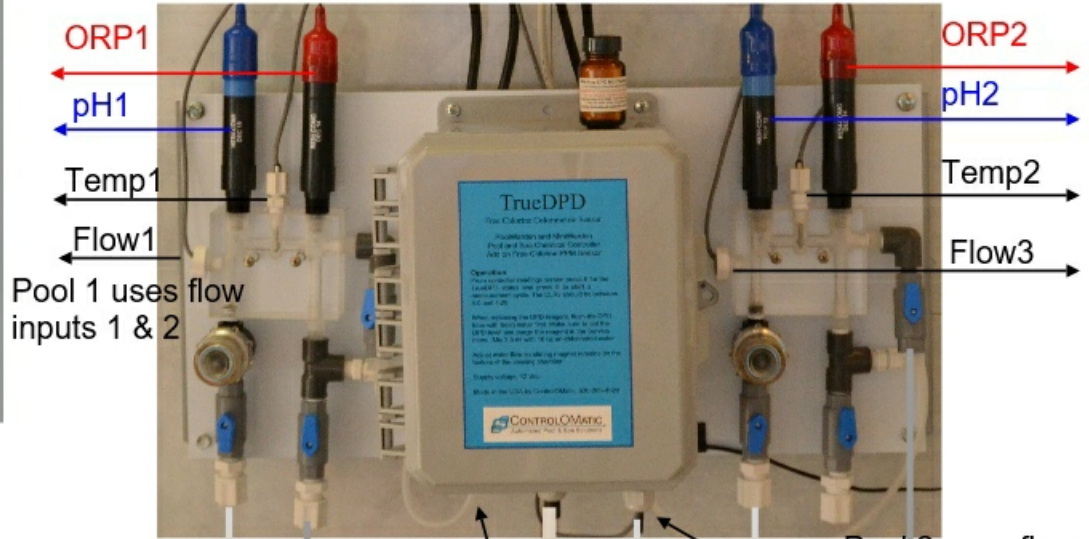
**PoolWarden pH/ORP
2 Pool Control**





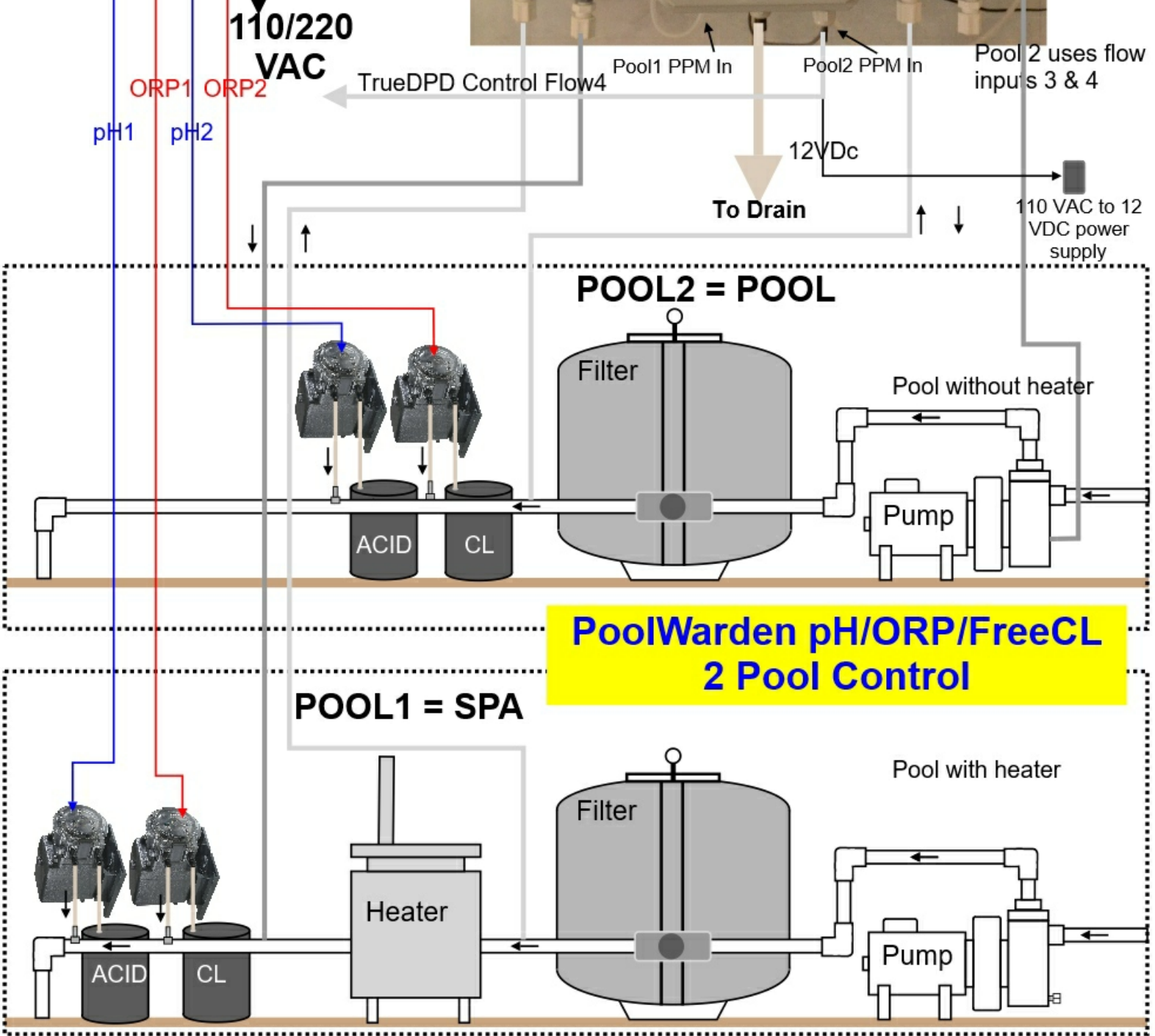
**POOL1 = SPA
Sensors**

**POOL2 = POOL
Sensors**



Pool 1 uses flow inputs 1 & 2

Pool 2 uses flow inputs 3 & 4



**PoolWarden pH/ORP/FreeCL
2 Pool Control**

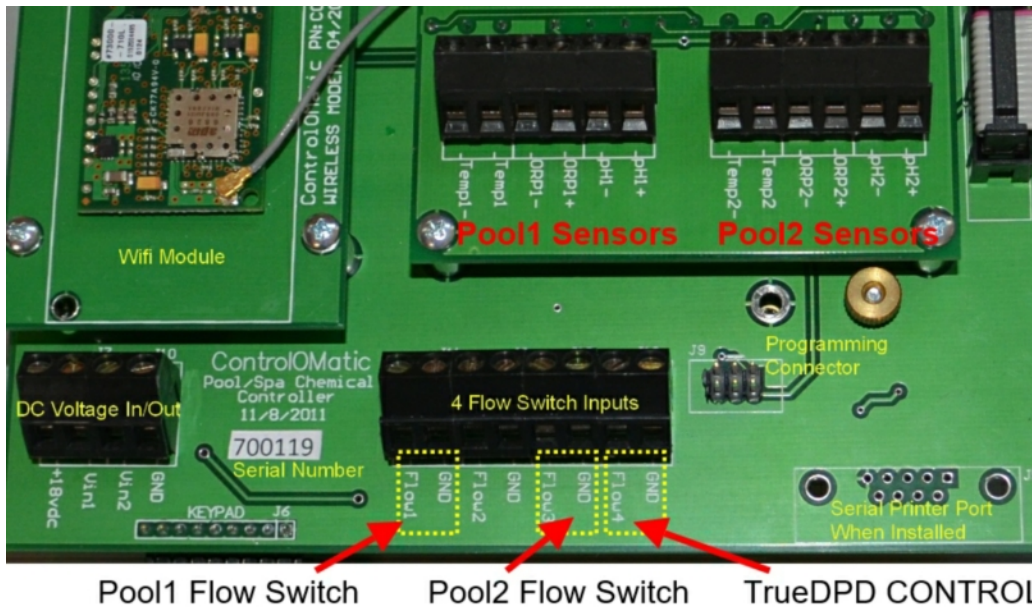
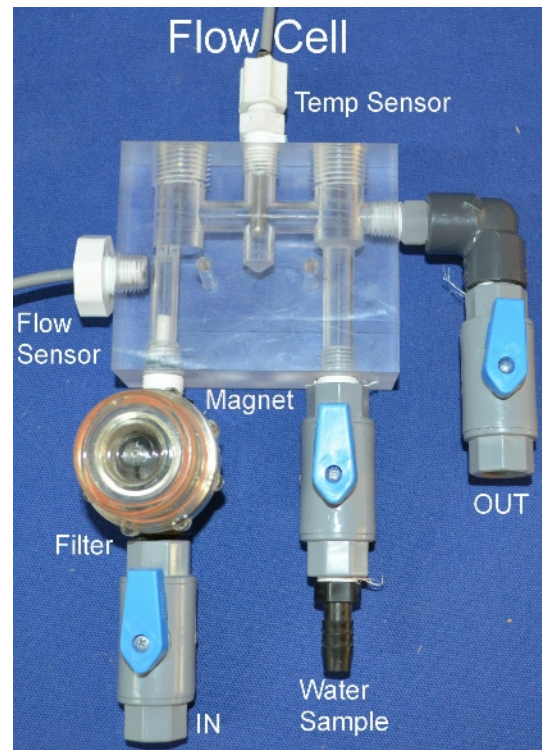
IMPORTANT NOTE: There needs to be just enough flow (0.5 gpm) through the flow cell to raise the flow magnet inside the flow cell to make contact with the flow sensor. To test this, turn the “input” shut-off valve to the off position and watch the flow magnet drop from the flow sensor. Next, turn the input shut-off valve back on and watch the flow magnet rise to the flow sensor. If the flow magnet rises abruptly and pings/knocks the flow cell acrylic then the flow is too high. To reduce flow, perform the same exercise, but now open the shut-off valve slowly and stop when you see the magnet “slowly” rise to make connection with the flow sensor. Leave the shut-off valve in that position.

Sensor Wire Connection

If not pre-mounted, route the pH (Blue Sensor Wires), ORP (Red Sensor Wires), flow sensor and temp sensor wires through the cable grips at the bottom of controller and connect as labeled inside or as indicated below in PICTURE 3. **Note: Black wires are always negative (-) and the Clear or Red wires are always positive (+).**

◆ **REQUIRED** Flow Sensor Connections: Connect flow sensor wires for pool #1 to flow switch 1 and connect flow sensor wires for pool #2 to flow switch 3.

◆ **Optional** Flow Sensor Connections: Flow switch 2 & 4 are auxiliary switches for Pool #1 and Pool #2 respectively. For powered 3 wire digital flow meters or water level indicators use the 18VDC connection on the left of the main board, note that it has a 1 amp fuse.

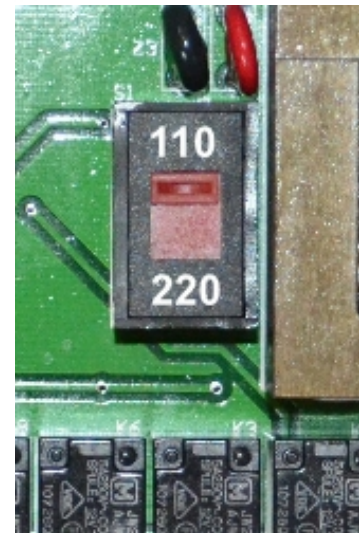


Supply 110/220 Vac Input Selection

The PoolWarden supports both 110 VAC and 220 VAC. For 110 VAC the power cord includes a GFCI on the end of the cord that plugs in. For 220 VAC the cord should be removed and the PoolWarden should be hardwired to a circuit breaker with a GFCI by a licensed electrician. The cord can be returned to ControlOMatic for a credit.

◆ **VAC Selector:** The red switch in the center of the bottom circuit board must have the switch notch up for 110 VAC, and down for 220 VAC. Incorrect selection will damage the PoolWarden.

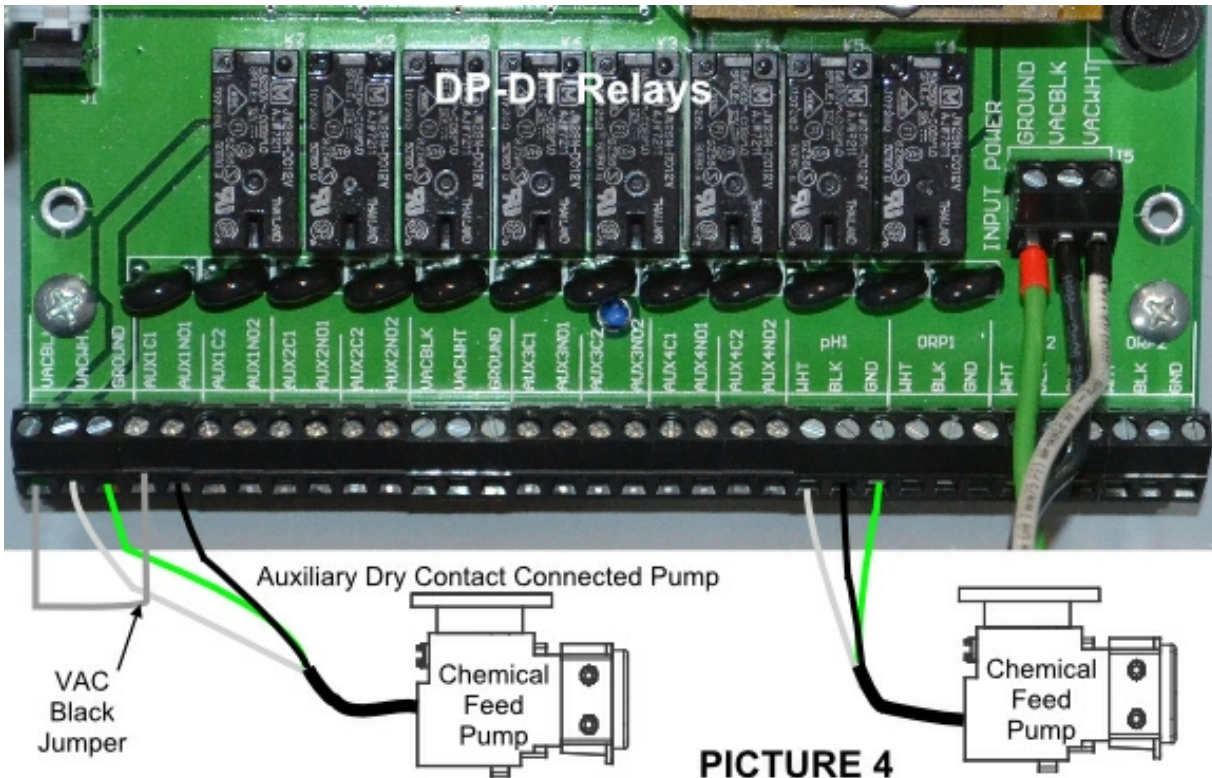
◆ A good solid earth ground is required for PoolWarden to work properly. Without a solid ground connection the sensors may drift.



- ◆ The ORP and pH relay are directly connected to the input VAC. If you have the PoolWarden set for 220 VAC then the loads must also be 220 VAC.
- ◆ For 220 VAC operation, the neutral line will be connected to the Red 220 VAC wire and the Line connection will be to the Black 220 VAC wire. The Neutral connection for pH and ORP relays switches the Neutral input VAC wire. The relays are double pole double throw and break both lines.

Load / Equipment Connection & Installation

ORP & pH RELAYS: The chemical feed relays for pH and ORP are internally connected to the input VAC main input which is located on the right side connector on the circuit board through 10 AMP fuses F1 and F2.



No voltage is being supplied to the load / equipment when the relay is off, hence, voltage is being supplied to the load / equipment when the relay is on. Any standard chemical feed pump or solenoid can be hard wired directly into the appropriate ORP and pH connection terminals as shown below in PICTURE 4 so long as their voltage matches the input VAC connected to the PoolWarden.

- ◆ VACBLK: Connection to the VAC black (Line) wire
- ◆ VACWHT: For 110 VAC connect to the input white neutral wire. For 220 VAC connect to the red VAC wire.
- ◆ PH / ORP WHT: For 110 connect to the white neutral wire on the load. For 220 connect to one of the Line connections.
- ◆ PH / ORP BLK: For 110 connect to the black line wire on the load. For 220 connect to the other Line connection.
- ◆ PH / ORP GND: Connect to the green ground wire on the load.

DRY CONTACT RELAYS: A dry contact relay is not connected to any voltage and acts as a switch. To supply power to a load / equipment (such as a chemical pump) through any of the auxiliary dry contact relays, the voltage must be supplied using a jumper to the main input voltage. To facilitate this jump, PoolWarden is equipped with terminals right next to the auxiliary dry contact relay terminals labeled VACBLK, VACWHT and GROUND. Please note that these VAC terminals are after the 10 AMP fuses F1 and F2.

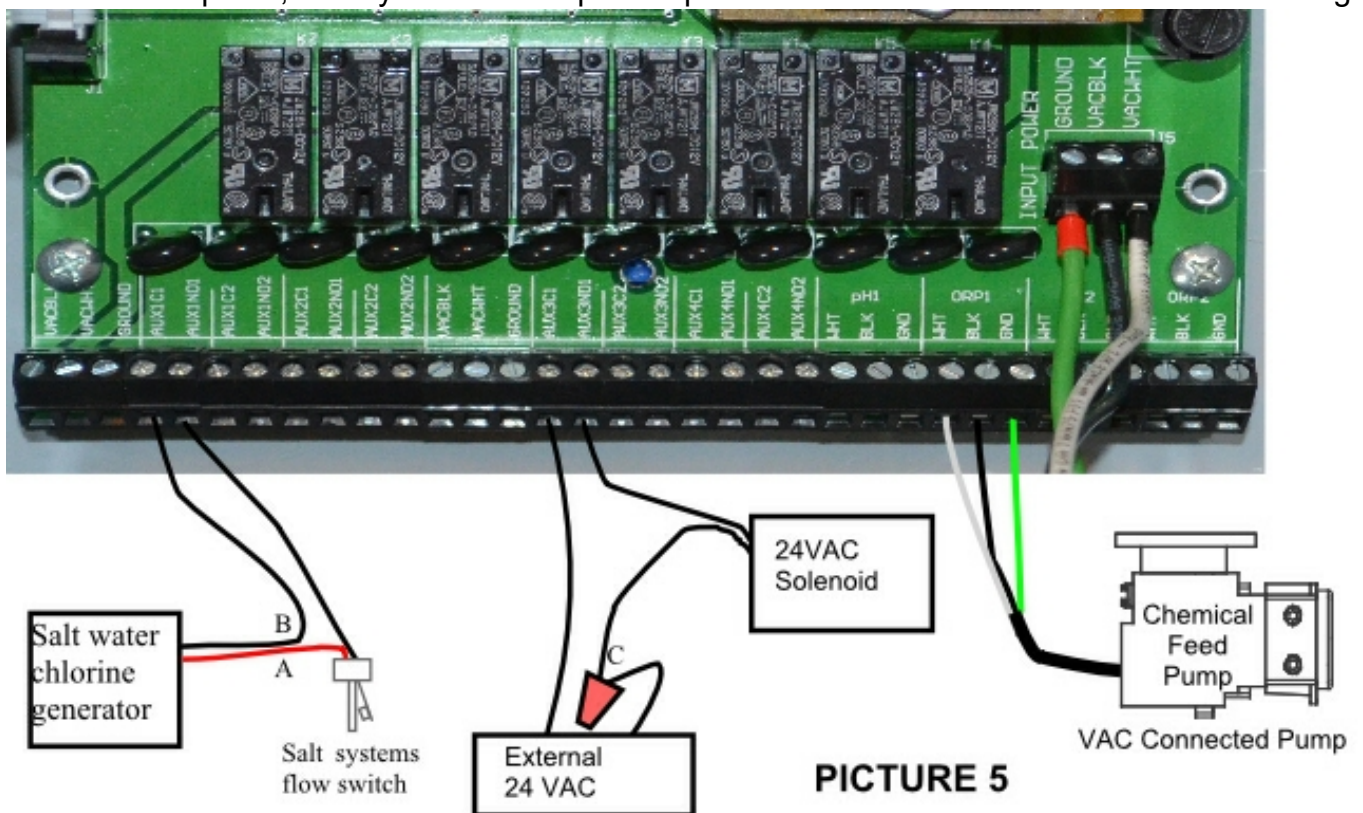
Relay Board Acronyms for the Auxiliary Dry Contact Relays:

- ◆ AUX#NO1: Normally Open aux relay, side 1 of the relay
- ◆ AUX#NO2: Normally Open aux relay, side 2 of the relay

- ◆ AUX#C1: Common connection to relay # side 1.
- ◆ AUX#C2: Common connection to relay # side 2.
- ◆ GROUND: Connected to the GROUND connection on the input VAC terminal.
- ◆ VACBLK: A convenient connection to the input VAC black line wire.
- ◆ VACWHT: A convenient connection to the input VAC white neutral wire.
- ◆ GROUND: A convenient connection to the green ground wire.

Supported Auxiliary Dry Contact Loads / Equipment:

- ◆ Standard Chemical Feed Pumps: Any Chemical Feed Pump can be connected to an Auxiliary Dry Contact Relay as shown in PICTURE 4 on the previous page. This may be needed to set up a back up sanitizer to the main sanitation control. A black wire 110 VAC jumper is needed to energize the dry contact for 110 VAC operation and two jumpers for 220 VAC operation..
- ◆ Chlorine Generators: A high power chlorine generator should not be powered using PoolWarden’s internal power as it may exceed the input 2.5 AMP relay rating. Simply connect an auxiliary dry contact to control the on/off status of the generator. When PoolWarden’s relay turns on, while the flow switch is on, then the chlorine generator will turn on. When the relay is turned off it makes the chlorine generator think there is no flow, and the chlorine generator will turn off.
- ◆ Loads / Equipment Using External 24 VAC (Erosion Feeders & Suction Side Cal Hypo): Solenoids are used to control water flow through a chlorine erosion feeders and suction side cal hypo systems and most use 24 VAC. Install a 24 VAC Transformer external to the PoolWarden and connect one of the output leads to an AUX#C1 relay and connect the AUX DRY#NO1 to the solenoid as shown in PICTURE 5. Connect the other 24 VAC Transformer wire to the remaining solenoid wire (C). If the 24 VAC Transformer has a an output ground wire then connect it to one of the Ground terminals on the relay board.
- ◆ Circulation Pumps: Never connect a circulation pump directly to any of the relays inside PoolWarden. Always use an external High-Power Relay that the Auxiliary Dry Contact Relay inside PoolWarden can control. Please refer to the circulation pump’s manual for proper set-up and control of a variable speed pump.
- ◆ External Alarms (Light or Sound): If a more noticeable alarm notification is needed beyond the red LED on PoolWarden’s front panel, a relay can be set up to output the alarm status to an external buzzer or light.

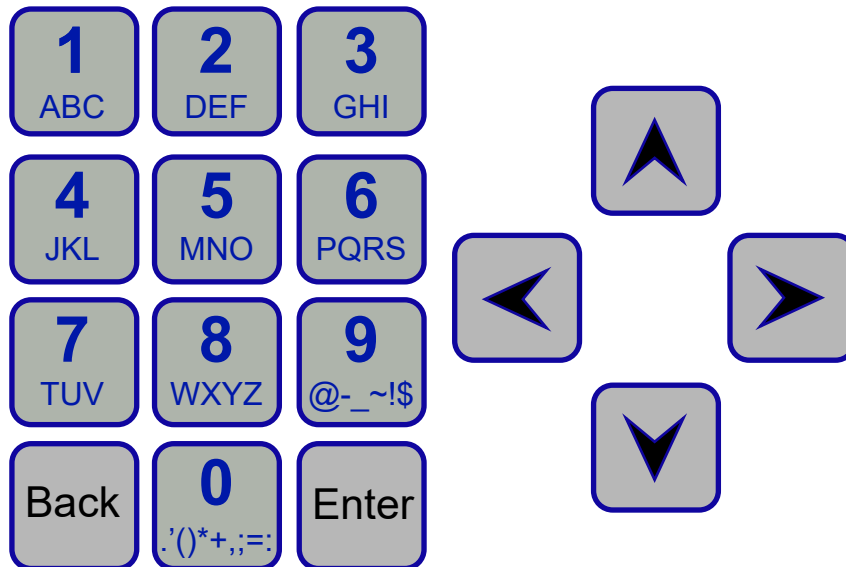


PICTURE 5

PoolWarden OPERATION

This section reviews all the navigation features associated with PoolWarden's keyboard.

- ◆ **Back:** From the main readings display the **Back** button provides access to the main menu where all of the configurations are. If PoolWarden is password protected then you will need to enter the password to access the main menu. The **Back** button will also go back one menu from almost any screen and pressing it enough times will get back to the readings display.
- ◆ **Enter:** The **Enter** button provides access to most menus and sub menus within PoolWarden and allows you to accept or save an entry.
- ◆ **Number & Text Keys:** The number and text keys allow you to change numerical values and text in many menus.
 - ☐ **Number Keys:** "0 through 9" change numerical values.
 - ☐ **Text Keys:** Some menus allow for entering or changing text. The first press of a number key will display the number. The next press will display the first Lower-Case letter below the number and so on. Continuing to press the key will display Upper-Case letters.
 - ☐ When the cursor is in the first position, pressing the left arrow key will toggle between upper and lower case.
- ◆ **Arrow Keys:** The arrow buttons (**Up, Down, Left & Right**), allow navigation within each menu. All menus are fully rotational which means if you use the **Up** arrow to scroll to the top of a menu and press it one more time - you will be at the bottom of that same menu and vice-versa.
 - ☐ **Up Arrow:** Moves the cursor up one selection in a menu.
 - ☐ **Down Arrow:** Moves the cursor Down one selection in a menu. Also used to cancel changing a value.
 - ☐ **Left Arrow:** Moves back to the previous menu just like the **Back** button.
 - ☐ **Right Arrow:** Selects the item the cursor is currently on just like the **Enter** button.



Default Readings Screen

The Default Readings Screen is displayed after power up and when a button isn't pressed for a period of time. It is the most critical screen as it will display the current pH & ORP sensor readings, flow status, relay status, alarm status and various symbols that are defined below. Menus within PoolWarden are accessed through the Default Readings Screen. Please review definitions of all Row & Column information and symbols below.

Default Readings Screen

ORP	pH	Tf	Flow	
681	7.7	75	ON	a
695	7.5	102	ON	
RlyP1	↑↓o	_	P2	↓o
				N

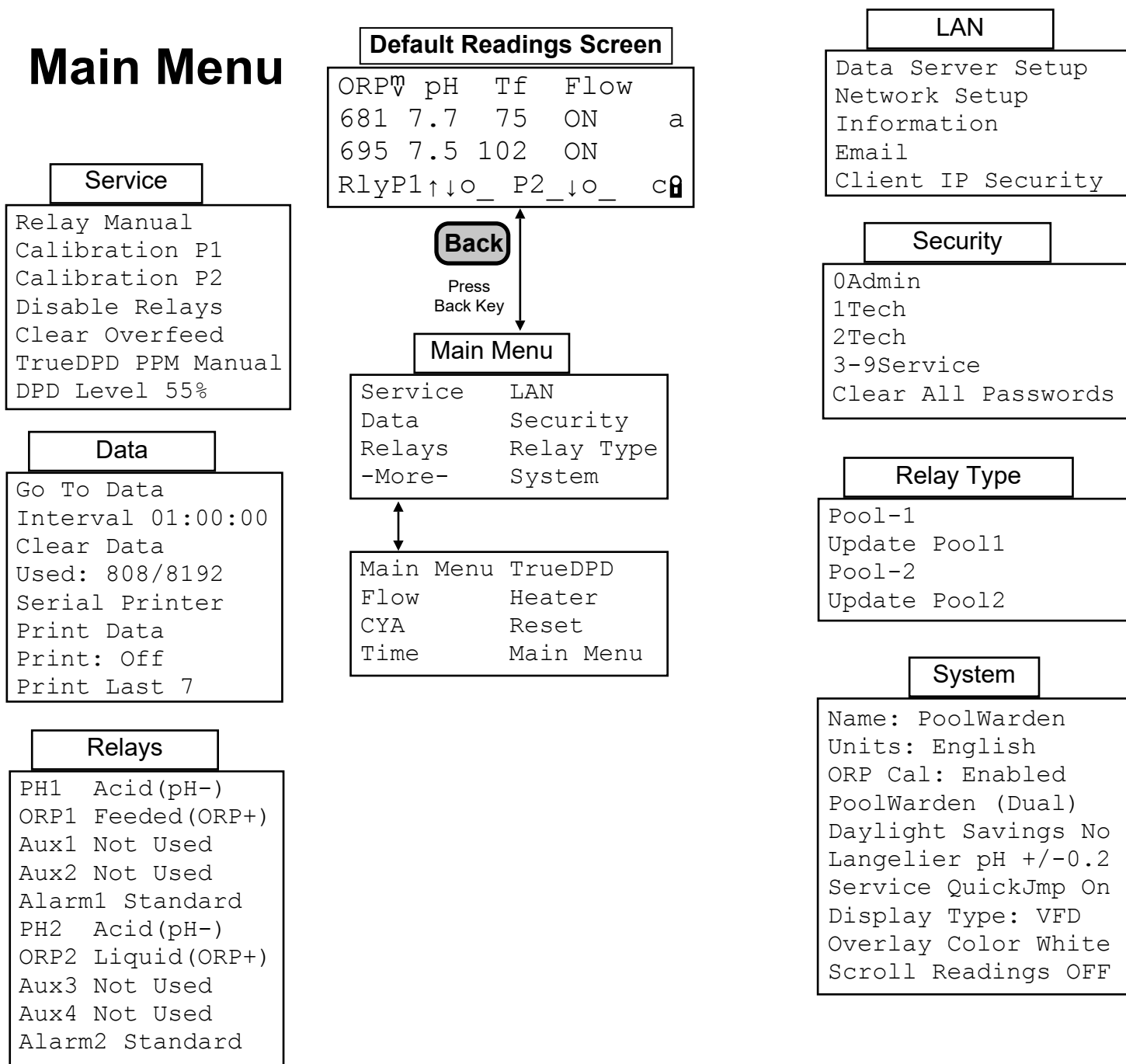
- ◆ **Row 1 (Column Header):** The first row is a column header and defines what you find below that particular column header. Example above: The “pH” Column Header on the first row means that the current pH readings for Pool 1 (7.7) and Pool 2 (7.5) are just below. When the PoolWarden is turned on a number will display on this line to the right which is a delay before the relays will operate, the turn on delay gives time for accurate reading prior to controlling the relays.
- ◆ **Row 2 (Current Measurements Pool1):** The current real time measurements and status for Pool 1. Example above for Pool 1: ORP=681, pH=7.7, Temperature (Tf) = 75 degrees Fahrenheit, Flow = ON. The “a” on the far right indicates that Pool1 is in alarm.
- ◆ **Row 3 (Current Measurements Pool2):** The current real time measurements and status for Pool 2. Example above for Pool 1: ORP=695, pH=7.5, Temperature (Tf) = 102 degrees Fahrenheit, Flow = ON and the alarm is not on for Pool2.
- ◆ **Row 4 (Relay Status):** Row 4 displays the current status of all the relays in the following order with symbols that are defined below (**RlyP1** = Pool1 and **P2** = Pool 2);
 - ☐ **RlyP1:** ORP1, pH1, Aux1, Aux2 **P2:** ORP2, pH2, Aux3, Aux4
 - ☐ **_** : An underline indicates the relay is OFF and not in an active feed cycle.
 - ☐ **↑** : An Up arrow indicates the relay is ON and in an active feed cycle.
 - ☐ **↓** : A Down arrow indicates the relay is OFF and in the OFF part of an active cycle.
 - ☐ **o** : An "o" indicates the relay has reached the on time limit (overfeed limit) for the day and will not turn on again until the overfeed limit clears automatically each night at midnight or when PoolWarden's power is cycled.
 - ☐ **s** : An "s" indicates the relay has reached the setpoint overfeed limit and will not turn on again until the setpoint is achieved by other means (manually adding the required chemicals). The only other way to clear this is to cycle power. **NOTE: The setpoint overfeed will not clear when the Clear Overfeed menu item is selected in the service menu or at midnight like the daily overfeed.**
 - ☐ The letter 'b' next to an ORP reading indicates ORP is in pH lockout and ORP backup is on.
 - ☐ The letter 'p' next to an ORP reading indicates ORP is in pH lockout and is off.
- ◆ **Other Symbols Defined:**
 - ☐ The letter “a” on the right will display when the Pool alarm is on.
 - ☐ “p” In the last 4 characters of the display screen, indicates a user PIN code has been entered, this will clear when it is sent to the server.
 - ☐ “N” or “c” is displayed in the lower right indicates communication status with remote networks.
 - ☐ The LOCK symbol in the lower right indicates security is enabled.
- ◆ **Flow Status:** The flow will either be ON or OFF with the standard flow sensor or if a digital flow sensor is used. Digital flow sensor indication will be ON if the sensor is active. Flow status for Pool 1 uses Flow 1 input for the sensor connection and Pool 2 uses Flow 3 input for the sensor connection on the sensor circuit board. This cannot be changed. For status with digital flow sensors press the **Up Arrow** to access the digital flow sensor screen.

MAIN MENU - SETUP

Simply press the **Back** button from the Default Readings Screen to gain access to the "Main Menu". From the "Main Menu" use the Up & Down arrow keys to navigate to each sub menu item and press **Enter** to go to that sub menu or selection. Accessing the Main Menu can be password protected and the available selections will be dependent on the security level of the password.

The menu selections will vary based on the following options: 1) Single/Dual pool version, 2) PW-Lan Ethernet option, 3) TrueDPD enabled and 4) Serial printer added.

The Main Menu is divided into two separate menus. The first menu includes items that need access more often. From the first menu select -More- to access the second half of the main menu which includes more advanced features.



Information Menus

PoolWarden has 4 Menus (Main, Handy, Flow & Alarm) which are all accessible directly from the Default Readings Screen. The Handy Menu, Flow Menu, and Alarm Menus are NOT password protected.

◆ **Handy Menu:** Press ▼ **Down Arrow** or **Enter** from the default readings screen.

- ❑ **Enter Password:** Allows for the entry of a password if PoolWarden has been security enabled.
- ❑ **Last 7 Days Data:** Allows scrolling through the last 7 noontime readings to enter into the pool log.
- ❑ **Startup Screen:** This will show the initial start up screen when PoolWarden is turned on. It will display the serial number and software version.
- ❑ **Enter Service Pin:** Service Technician can be assigned a Pin Code to enter into this section when a pool is being serviced. This feature only applies when PoolWarden is Communication Enabled and can send / store data at www.PoolWarden.com.
- ❑ **Enter Measurements:** The following manually taken pool measurements: PPM, pH, ALK, Hard and CYA can be entered here. If PoolWarden is communication enabled then the data will be sent / stored at www.PoolWarden.com. Entering these manual measurements will also enable the Langelier Index Adjustment in the System Menu. See Langelier pH in the System Menu for more information.
- ❑ **Last Month On Times:** Will display the full amount of time each relay was ON for last month and current month.
- ❑ **Relay Information:** Displays relay type, Length of time on for day and month, Number of times relay has been turned on for the day. Enter 0 to 4 for Pool1 relays, and 5 to 9 for Pool2 relays.
- ❑ **System Information:** List the total hours the unit has been on, total number of power up cycles, total number of times a PIN has been entered and the total number of times manual measurements.

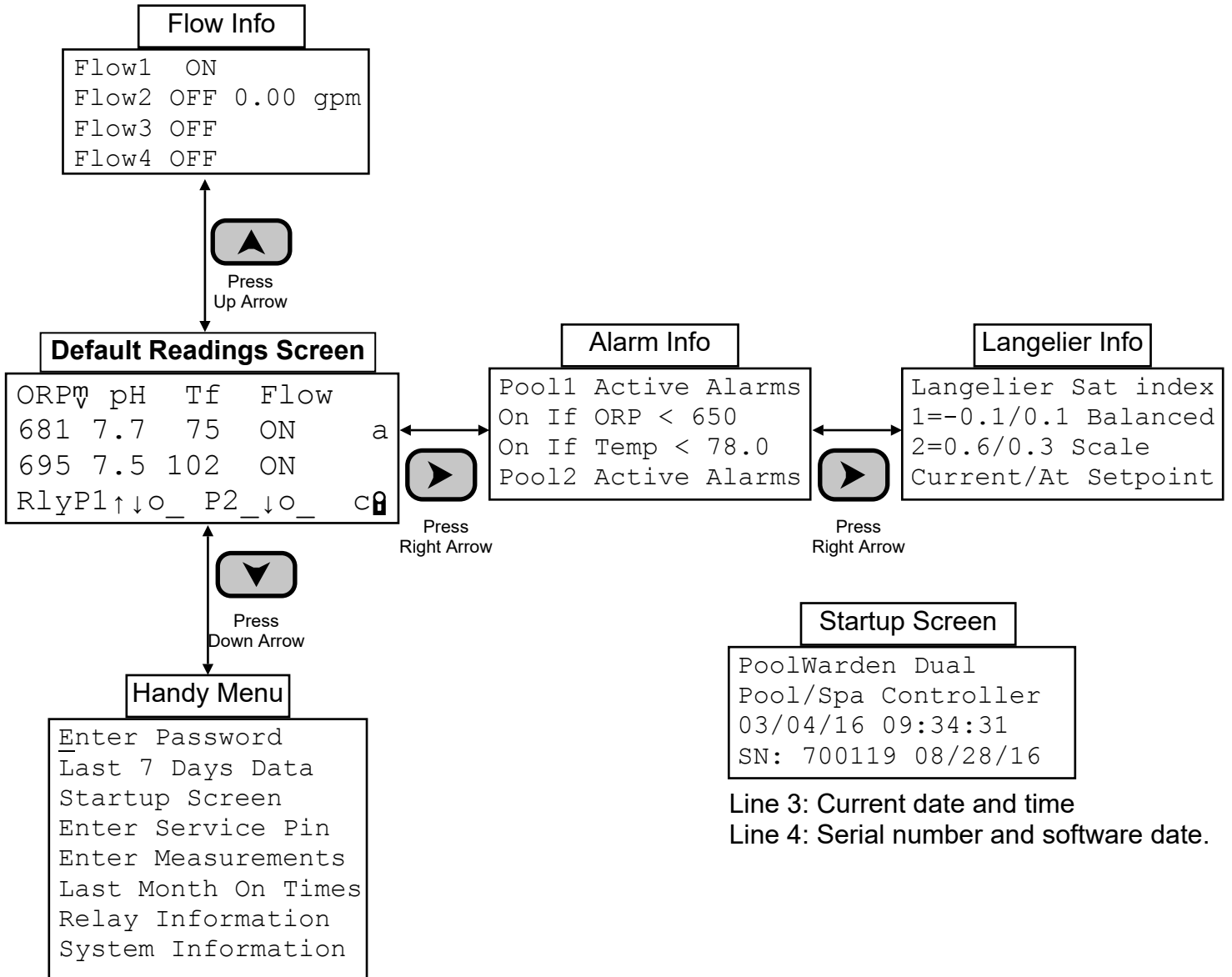
◆ **Digital Flow Screen:** Press the ▲ **Up Arrow** from the readings screen to access the flow screen which shows all 4 flow switch inputs and the flow rates if any are setup as a digital flow sensor. If the TrueDPD is connected, flow switch input number 4 is used for communication and control and isn't available as a flow input.

◆ **Alarm Screen:** Press ► **Right Arrow** from the readings screen to access the alarm menu. The alarm screen shows all alarms even if the current alarm is OFF. There are many conditions that can turn the alarm light on. Those conditions are set up for each pool in the Relay Setup Menu. The alarm screen lists the condition that have already turned the alarm on, or will turn the alarm on after the delay.

◆ **Langelier Index:** If manually taken measurements have been entered in the Handy Menu, press the ► **Right Arrow** from the Alarm Screen to access the Langelier index values. The measurement uses the manually entered ALK, Hard and CYA and the current measurement for pH and temperature. The screen displays the current Langelier index, and what it would be if the pH was at the setpoint (desired value).

◆ **Set Point Screen:** Pressing the 9 key from the readings screen will show current set-points.

Information Menus

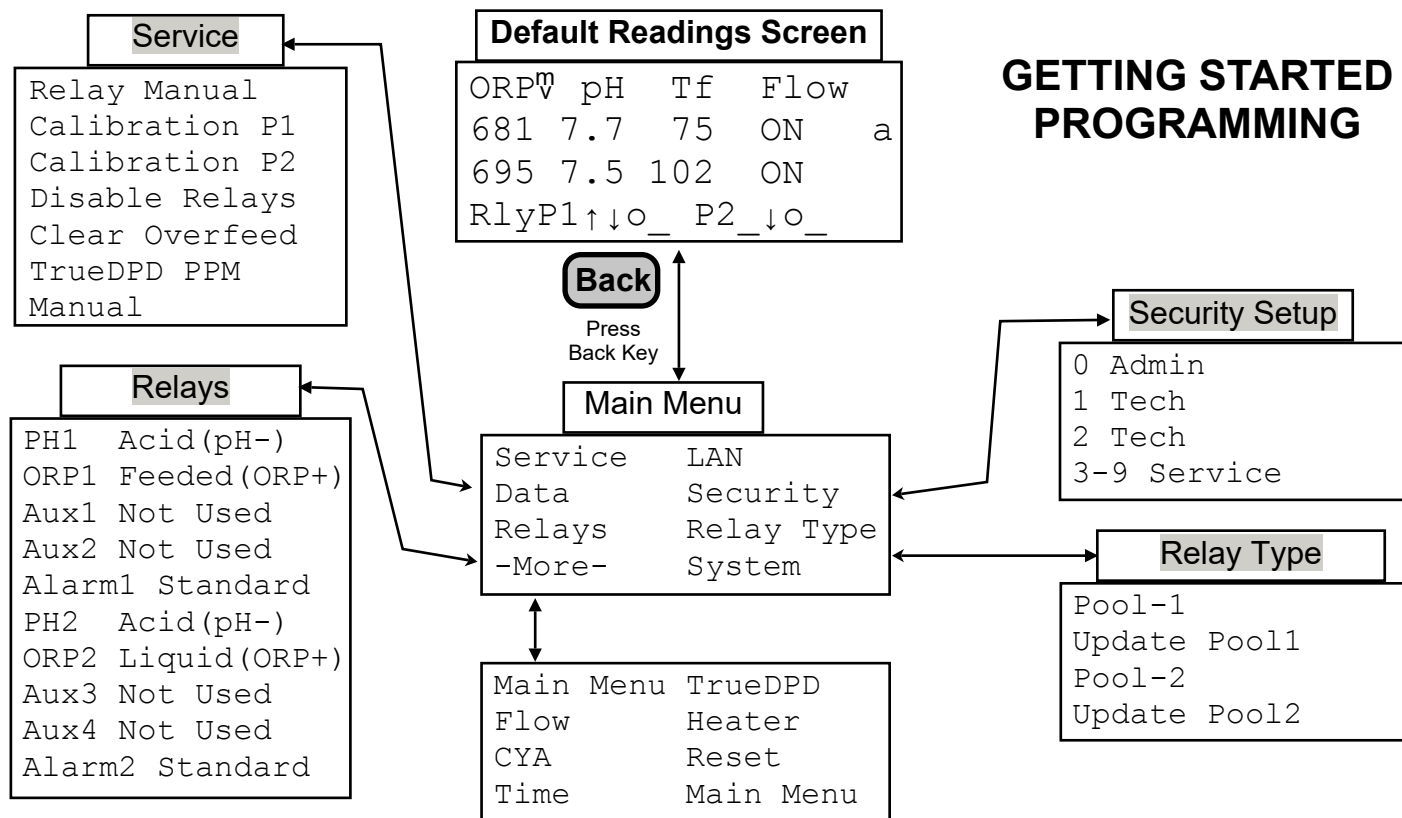


Quick Keys

- 2: If quick menus enabled, ORP setpoint and mixing times setup
- 3: If quick menus enabled, pH setpoint and mixing times setup
- 6: TrueDPD information screen, press 9 in this screen to start a measurement
- 9: Display the setpoints

PROGRAMMING - GETTING STARTED

The menu tree below represents the “Getting Started” menus that are necessary to get PoolWarden setup. The remaining menus represent more advanced features that will be covered in later sections. Become very familiar with the 4 menus below surrounding the Main Menu as they will be utilized most of the time. Any menu utilizing the **Back** button for access can be password protected.



Step 1 - Time Menu

The first step is to set the Date, Time and Day of the Week in the Time Menu. Press the **Back** button to access the “Main Menu” and scroll down to “-More-” and then Time to set the correct Date, Time and Day of the week and then proceed to Step 2 below. Much more will be covered on the “System Menu” in the Advanced section of this manual.

Step 2 - Security Setup Menu

The next step is to set up and assign passwords to the various personnel who will be working with or servicing PoolWarden. Menus that are accessed from the “Default Readings Screen” using the **Back** button can be password protected. The Handy Menu, Flow Menu and Alarm Menu are not Password Protected - anyone can access them. From the “Default Readings Screen”, simply press the **Back** button to access the “Main Menu” and use the **Down Arrow** to scroll to “Security Setup”. There are 3 levels of access that are defined below. Scroll to the level and assign up to a 10 digit password (numbers only) and press “Enter” to save the password. Entering zero “0” will disable a password and the maximum value for any password is 4294967295.

- **1 Admin Password:** Access to all menus within PoolWarden including ability to add, delete, or change passwords. If the Admin Password has been lost, please read the troubleshooting section at the end of this manual.
- **2 Technician Passwords:** Access only to the Service Menu, Data Recording Menu, Relay Setup and Advanced Menus.
- **7 Service Passwords:** Access only to the Service and Data Recording Menus.

If direct communication is required with the optional PW-LAN, security must be enabled to allow access to the Main Menu.

Step 3 - Relay Control Type Menu

The Relay Control Type Menu is the next step in programming PoolWarden and getting started. The Relay Control Type Menu sets each relay to the control type the relay will use. For Example: Will the ORP Relay for Pool 1 be using Liquid Chlorine, an Erosion Feeder or a Salt System? This is where the PoolWarden relays are set up to the appropriate way to control the installed equipment. From the Default Readings screen press the **Back** button to scroll down and select Relay Control Type, then select Pool1 or Pool2. Scroll down to the relay that needs to be changed and press the Enter key to select that relay. When changing a relays control type the Arrow buttons perform the following actions which is also indicated on the screen.

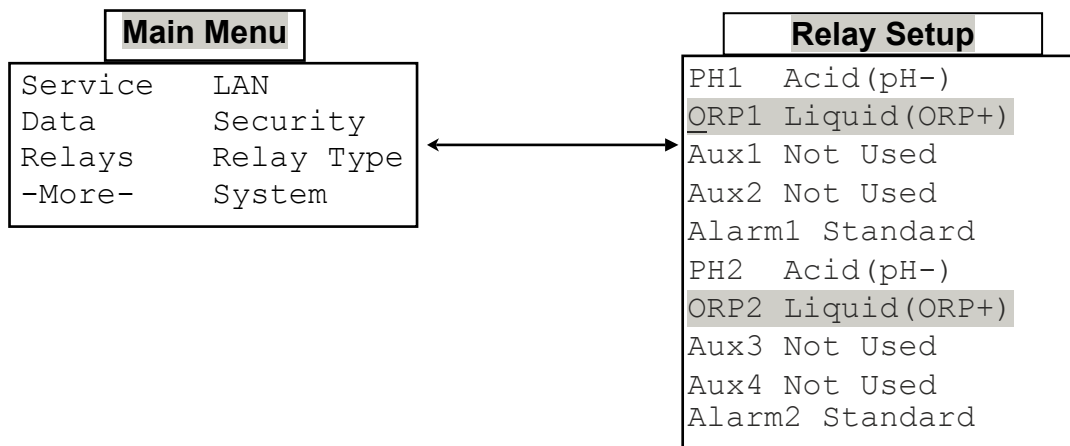
- ◆ Press the ► **Right Arrow** to cycle through all the control types for the current relay.
- ◆ Press the ◀ **Left Arrow** to save and update the new control type within PoolWarden. Note: The **Back** button will cancel the change, only the **Left Arrow** will change the control type. Note: To reset a single relay back to factory default values select that relay in this menu and the press the **Left Arrow**.
- ◆ Press the **Back** button to cancel and exit without making any changes.
- ◆ Relay Control Types: PoolWarden includes control types for sanitizer, pH and other types of control. The ORP relays can only use a sanitizer control type and the pH relays can only use a base or acid control type. The AUX relays can select any ORP and pH control type along with additional types which are listed in the following table.

Relay Control Types

ORP	pH	Aux	Aux	Alarm
Liquid(ORP+)	Acid(pH-)	Not Used	Superchlorination	Not Used
Feeder(ORP+)	Base(pH+)	Heater	Water Level	Standard
Cal Hypo(ORP+)		Feed Daily	Chiller	ORP %
Salt System(ORP+)		Alarm Out	PH/ORP Choices	

Step 4 - Relay Setup Menu (ORP, pH and Alarms)

The next step in getting started is to program all the set-points for the pH & ORP relays and the Alarm limits. The Aux1, Aux2, Aux3 & Aux4 Relays will be covered in a later section. From the Default Readings Screen press the **Back** button to access the Main Menu and scroll 3 rows down to “Relay Setup” and press **Enter**. Scroll up or down to change the settings for the desired relay or alarm.



ORP1 and ORP2 Relay Configuration

In the Relay Setup Menu scroll down to the ORP1 or ORP2 relay and press enter. The following lists all of the commands and what they do. The command values can be changed, but the commands themselves are only changed when changing the relay control type. When adding the TrueDPD or updating the software that has updated commands the relay control type must be updated for the list of commands to also be updated.

◆ **Manual Time 00:02:00:** Is the amount of time you can set a relay to turn on manually (Default Setting 2 Minutes). To turn the relay on manually you have to do so in the service menu which will be covered in the next section. When you turn on the relay manually in the service menu, the relay will be on for 2 minutes in this case. To change the time, simply enter the new time and hit the Enter Key to save.

◆ **LockOn Time 00:00:00:** This setting is only located in the ORP Relay menu. The factory default setting is zero "0". This is a setting for when the the ORP relay is in pH Lockout. It allows for some chlorine to feed into the pool for the programmed time instead of none at all while the relay is in pH Lockout. pH Lockout will be discussed in the Off If pH > 0.00 section. The "LockOffTime" below must be set as well to make sure there is a period of off time during the day. You would have to calculate how many gallons the pool would need in a day and then calculate how long the feed pumps need to be On and Off during the day to feed that amount.

◆ **LockOffTime 00:00:00:** This is a setting for the off time of the cycle when the the ORP relay is in pH Lockout. Both LockOn and LockOff allows for some chlorine to feed instead of none at all while the relay is in pH Lockout.

◆ **ORP Over Run (for erosion feeders and salt systems):** ORP Over Run allows for 0, 5, 10 or 15mv to be added to the setpoint, it will turn on at the setpoint, and off at the setpoint plus this value.

◆ **Proportional 10% (for liquid CL):** The Proportional value (Default Setting 10%) means that as the measured ORP reading gets to within 10% of the ORP setpoint, the amount of relay on-time will proportionally decrease as the reading gets closer and closer to the setpoint. Proportional feed helps to prevent chemical overshoot.

◆ **On If ORP < 700:** This is the ORP set-point and the factory default setting is 700. The relay will turn the chemical feed pump on if the measured ORP reading is less than 700.

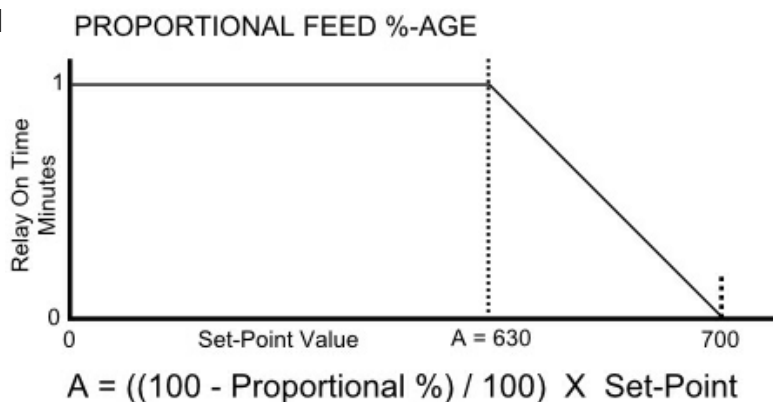
◆ **Off If pH > 0.00:** pH Lockout Command. The default setting is zero "0" or disabled. ORP is highly dependant on pH. In other words, a high pH reduces the killing effectiveness of the sanitizer and has a direct effect on lowering the ORP reading even though there may be an ample amount of sanitizer in the water. pH Lockout helps to prevent chlorine overfeed. A typical pH Lockout setting is 8.0 and will lockout the ORP relay when pH reaches 8.0 or higher. This command has been moved before the PPM control command if the TrueDPD sensor is enabled to only effect control from the ORP sensor.

◆ **On If PPM < 2.0 (Requires TrueDPD sensor):** This is the PPM set-point and the factory default setting is 2.0. The relay will turn the chemical feed pump on if the measured PPM reading is less than 2.0.

◆ **And if PPM > 0.0 (Requires TrueDPD sensor):** The TrueDPD sensor will read a 0.0 level if out of DPD reagent. Set this command to Yes if that is a possibility to not allow feeding with a 0.0 PPM level.

◆ **On Delay 00:00:20:** The on delay, in this case 20 seconds, is necessary to prevent the relay and hence the chemical feed pump from turning on and off frequently if the sensor measurement fluctuates back and

ORP1	Liquid(ORP+)
ManualTime	00:02:00
LockOn Time	00:00:00
LockOffTime	00:00:00
Proportional	10
On If ORP<	700
Off If pH >	0.0
On If PPM<	2.0
and If PPM> 0.0	Yes
On DELAY	00:00:20
On Time	00:01:00
MinTimeOff	00:07:00
Off if RLY On	None
Off If ORP>	0
Off if Flow Off	Flow1
SetOvrfeed	00:00:00
Overfeed	06:00:00



forth from 699 and 700. It means that the relay will not turn on unless the condition of “On If ORP < 700” is satisfied for at least 20 seconds - then the relay will turn on for the programmed “On Time 00:01:00” in this case 1 minute. To change the on delay time, simply press **Enter** and change the time and press **Enter** again to save the new setting. Enter 00:00:00 to disable.

- ◆ **On Time 00:01:00:** This is the total amount of time the relay will be ON if the “On If ORP < 700” condition has been satisfied. The default setting is 1 Minute. This command works in conjunction with the MinTimeOff Command below. If the ORP reading is not being maintained then more or less on time may be needed.
- ◆ **MinTimeOff 00:07:00:** This is the total amount the relay will be OFF if the “On if ORP < 700” condition has been satisfied. This is the amount of time allowed for chemical mixing in the pool and works in conjunction with the “On Time” Command above. Do not set to 00:00:00 if the On Time is not also set to 00:00:00 as they work together.
- ◆ **Off If RLY On -none:** The default setting is none or disabled. This feature prevents 2 relays being on at the same time. It means this ORP Relay will be Off if the pH relay is On. This is useful in cases where the chemical injection points are very close together and prevents the ORP relay injecting at the same time the pH relay is injecting. Simply press **Enter** to toggle through the selections.
- ◆ **Off If ORP > 0:** The default setting is 0mV or disabled. This feature prevents feeding sanitizer if the ORP reading reaches a high value. When using the TrueDPD and free chlorine as the main control, if the DPD reagent runs out the PPM reading will be low which can result in over-feeding. Set the Off if ORP value appropriately to protect against that condition.
- ◆ **Off if Flow Off - 1 or 3:** The ORP Relay will be turned off if “No Flow” is detected in Flow Switch Input 1 for Pool1 and if “No Flow” is detected in Flow Switch Input 3 for Pool2. **Note:** This setting can’t be changed as it relates to safety, pressing the **Right Arrow** to change has no effect.
- ◆ **SetOvrfeed 00:00:00:** This type of overfeed requires the measurement to approach the setpoint. If a feed tube is broken and the chemicals are going on the floor this type of overfeed protection will detect that and shut down the relay sooner than the daily overfeed. Calculate how much feed time is required for the setpoint to be reached when the sanitizer is at 0. When the Setpoint Overfeed is reached the relay status will display an “s”. The default value is 00:00:00 which is disabled, in order to use this feature calculate the amount of time required and enter that time.
 - When in Setpoint Overfeed, there are only 2 ways to reset it: 1) cycle power on the PoolWarden and 2) Manually fix the chemical imbalance so that the setpoint is approached within 5%.
 - When feeding sanitizer the ORP measurement will rise as sanitizer is being added. When the ORP is within 5% of the setpoint the Setpoint Overfeed timer will clear.
 - If it would take 2 gallons of liquid chlorine to raise the chlorine level from 0 to the desired value, calculate how much time that would be, and enter the time. This time should be quite a bit lower than the 24 hour Overfeed timer.
- ◆ **Overfeed 06:00:00:** All chemical feed relays include this overfeed feature. The Overfeed time represents the maximum amount of time a chemical relay will feed in a day from midnight to midnight. This must be set up properly to reduce the chance of feeding large amounts of chemicals in the event something goes wrong. The default time will most likely not be correct. Please follow the calculation below. The minimum value for Overfeed time is 1 minute, it can’t be disabled.
 - Calculate the total amount of chemical the pool would ever need in a 24 hour period. (Example: 10 Gallons would be the MOST liquid chlorine a pool would need on any given day).
 - Calculate the amount of time it would take the feed-pump to inject that total amount of liquid chlorine in a 24 hour period. **Example:** Limit to 10 gallons with a 50 Gallon Per Day (GPD) Fixed Rate Peristaltic Pump. 10 Gallons / 50 Gallons * 24 Hours = 4.8 hours or 04:48:00. You will need to adjust for variable pumps depending on the variable pump setting. Most variable pumps use a scale of 10 to 0. So if the pump is set on 8 then use 80% of the total GDP rate, in this case .80 x 50 GPD = 40 GPD.
 - Calculate the overfeed time with the following equation using the following example.....
Overfeed Time = (Daily Gallon Maximum) / (Pump GPD Rate) times (24 Hours)
Round up and set the overfeed time. It can be set for minutes and seconds for finer control.

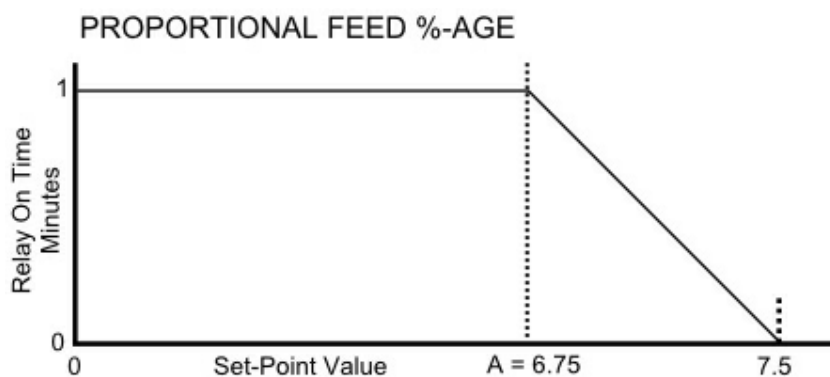
pH1 and pH2 Control Relays

In the Relay Setup Menu scroll down to pH1 or pH2 and press **Enter**. The following reviews each command within a pH Relay selection that is set up as Acid (change to base in the Relay control Types Menu). The other less common control types such as Base follow a very similar relay programming and command structure.

pH1	Acid(pH-)
ManualTime	00:02:00
Proportional	10
On If pH >	7.5
On DELAY	00:00:20
On Time	00:01:00
MinTimeOff	00:05:00
Off if RLY On	None
Off if Flow Off	Flow1
SetOvrfeed	00:00:00
Overfeed	02:00:00

◆ **Manual Time 00:02:00:** Is the amount of time you can set a relay to turn on manually (Default Setting 2 Minutes). To turn the relay on manually you have to do so in the service menu which will be covered in the next section. When you turn on the relay manually in the service menu, the relay will be on for 2 minutes in this case. To change the time, simply enter the new time and press **Enter** to save.

◆ **Proportional 10%:** The Proportional %-Age (Default Setting 10%) means that as the measured pH reading gets to within 10% (6.75 in this case) of the pH setpoint of 7.5, the amount of relay on-time will proportionally decrease as the reading gets closer and closer to the setpoint. Proportional feed helps to prevent chemical overshoot. To change the %-Age, simply press **Enter**, change the value and press **Enter** to save the new setting. To deactivate this feature set the %-Age to zero "0" and press **Enter** to save setting.



$$A = ((100 - \text{Proportional } \%) / 100) \times \text{Set-Point}$$

- ◆ **On If pH > 7.5:** This is the pH set-point and the factory default setting is 7.5. The relay will turn the chemical feed pump on if the measured pH reading is greater than 7.5. The relay will turn on for the programmed on time, in this case for 1 minute as set in the "On Time 00:01:00" command or less than 1 minute if the measured reading is within the proportional feed %-age of 10%. When feeding base, this command is the only difference and will be **On if pH < 7.5**.
- ◆ **On Delay 00:00:20:** The on delay, in this case 20 seconds, is necessary to prevent the relay and, hence the chemical feed pump, from turning on and off frequently if the sensor measurement fluctuates back and forth from 7.5 and 7.6. It means that the relay will not turn on unless the condition of "On If pH > 7.5" is satisfied for at least 20 seconds - then the relay will turn on for the programmed "On Time 00:01:00" in this case 1 minute. To change the on delay time, press **Enter** and change the time, press **Enter** to save the new setting. The value 00:00:00 disables the on delay.
- ◆ **On Time 00:01:00:** This is the total amount of time the relay will be ON if the "On If pH > 7.5" condition has been satisfied. The default setting is 1 minute. This command works in conjunction with the MinTimeOff Command below. If the pH reading is not being maintained then more or less on time may be needed.
- ◆ **MinTimeOff 00:05:00:** This is the total amount of time the relay will be OFF if the "On if pH > 7.5" condition has been satisfied. This is the amount of time allowed for chemical mixing in the pool and works in conjunction with the "On Time" Command above.
- ◆ **Off If RLY On -none:** The default setting is none or disabled. This feature prevents 2 relays being on at the same time. It means this pH Relay will be Off if the ORP relay is On. This is useful in cases where the chemical injection points are very close together and prevents the pH relay injecting at the same time the ORP relay is injecting. Simply press **Enter** to toggle through to the choices.

◆ **Off if Flow Off - 1 or 3:** The pH Relay will be turned off if “No Flow” is detected in Flow Switch Input 1 for Pool1 and if “No Flow” is detected in Flow Switch Input 3 for Pool2. **Note:** This setting can’t be changed as it relates to safety, pressing the **Right Arrow** to change has no effect.

◆ **SetOvrfeed 00:00:00:** This type of overfeed requires the measurement to approach the setpoint. If a feed tube is broken and the chemicals are going on the floor this type of overfeed protection will detect that and shut down the relay sooner than the daily overfeed. Calculate how much feed time is required for the setpoint to be reached when the pH is a full point off. When the Setpoint Overfeed is reached the relay status will display an “s”. The default value is 00:00:00 which is disabled, in order to use this feature calculate the amount of time required and enter that time.

❑ When in Setpoint Overfeed, there are only 2 ways to reset it: 1) cycle power on the PoolWarden and 2) Manually fix the chemical imbalance so that the setpoint is approached within 5%.

❑ When feeding acid the pH measurement will lower as acid is being added. When the pH is within 5% of the setpoint the Setpoint Overfeed timer will clear.

◆ **Overfeed 06:00:00:** All chemical feed relays include this overfeed feature. The Overfeed time represents the maximum amount of time a chemical relay will feed in a day from midnight to midnight. This must be set up properly to reduce the chance of feeding large amounts of chemicals in the event something goes wrong. The default time will most likely not be correct. Please follow the calculation below.

❑ Calculate the total amount of chemical the pool would ever need in a 24 hour period. (Example: 10 Gallons would be the MOST chemical a pool would need on any given day).

❑ Calculate the amount of time it would take the feed-pump to inject that total amount of chemical in a 24 hours. **Example:** Limit to 1 gallon with a 10 Gallon Per Day (GPD) Fixed Rate Peristaltic Pump. 1 Gallons / 10 Gallons * 24 Hours = 2.4 hours or 02:24:00. You will need to adjust for variable pumps

Alarm 1 and 2 Setup

In the “Relay Setup” menu are also the configuration settings for the alarm light on the PoolWarden enclosure lid. In the Relay Setup Menu simply scroll down to the Alarm1 or Alarm2 and press **Enter**. The following reviews each command within an Alarm Menu Selection.

◆ **On If ORP > 800:** The factory default setting is 800. The alarm will turn on if this condition is satisfied. To change the condition simply hit the Enter Key to enter a new value and hit the Enter Key again to save or enter “0” zero to disable.

◆ **On if ORP < 600:** The factory default setting is 600. The alarm will turn on if this condition is satisfied. To change the condition simply hit the Enter Key to enter a new value and hit the Enter Key again to save or enter “0” zero to disable.

◆ **On If pH > 8.0:** The factory default setting is 8.0. The alarm will turn on if this condition is satisfied. To change the condition simply hit the Enter Key to enter a new value and hit the Enter Key again to save or enter “0” zero to disable.

◆ **On If pH < 7.0:** The factory default setting is 7.0. The alarm will turn on if this condition is satisfied. To change the condition simply hit the Enter Key to enter a new value and hit the Enter Key again to save or enter “0” zero to disable.

◆ **On If Temp > 0:** The factory default setting is “0” zero or disabled. The alarm will turn on if this condition is satisfied. To change the condition simply hit the Enter Key to enter a new value and hit the Enter Key again to save.

◆ **On If Temp < 0:** The factory default setting is “0” zero or disabled. The alarm will turn on if this condition is satisfied. To change the condition simply hit the Enter Key to enter a new value and hit the Enter Key again to save.

◆ **On If Flow Off - none:** The factory default setting is “none” or disabled. The alarm will turn on if no flow is detected. Please Remember: Pool1 uses Flow Switch Input 1 or 2 (Default is 1) and Pool2 uses Flow

Alarm 1 or 2 Selected

On If ORP >	800
On If ORP <	600
On If pH >	8.0
On If pH <	7.0
On If Temp >	0
On If Temp <	0
On If Flow Off -	none
On If Overfeed -	YES
Off If Flow Off -	none
On Delay	00:10:00
MinTime On	00:00:10
MinTimeOff	00:00:10
Off If Time <	00:00:00
Off If Time >	00:00:00

Switch Input 3 or 4 (Default is 3). To turn the alarm status on if no flow is detected for Pool1 simply hit the Enter Key to change the value from “none” to 1 (Flow Switch Input 1) and hit the Back key to save. To turn the alarm status on if no flow is detected for Pool2 simply hit the Enter Key 3 times to change the value from “none” to 3 (Flow Switch Input 3) and hit the Back key to save.

- ◆ **On If Overfeed - YES:** The factory default setting is “YES”. The alarm will turn on if this condition is satisfied. To change the condition simply hit the Enter Key to change to NO and hit the Back Key to save.
- ◆ **Off If Flow Off - none:** The factory default setting is “none” or disabled. The PoolWarden will not send alarm notification if no flow is detected. Please Remember: Pool1 uses Flow Switch Input 1 or 2 (Default is 1) and Pool2 uses Flow Switch Input 3 or 4 (Default is 3). To turn the alarm status on if no flow is detected for Pool1 simply hit the Enter Key to change the value from “none” to 1 (Flow Switch Input 1) and hit the Back key to save. To turn the alarm status on if no flow is detected for Pool2 simply hit the Enter Key 3 times to change the value from “none” to 3 (Flow Switch Input 3) and hit the Back key to save.
- ◆ **On Delay 00:10:00:** The factory default setting is 10 Minutes. The alarm will only turn on if this condition is satisfied for at least 10 Minutes. This command prevents multiple alarms if the sensor reading is fluctuating back and forth. To change the command simply hit the Enter Key to enter a new value and hit the Enter Key again to save or enter “0” zero to disable.
- ◆ **Off If Time < 00:00:00:** This is a time of day command. The factory default setting is “0” zero or disabled. All alarm conditions will be OFF for the entire time of day until the time of day condition is met. If not 00:00:00, the alarm will be off from midnight until the time in this command.
- ◆ **Off If Time > 00:00:00:** This is a time of day command. The factory default setting is “00:00:00” or disabled. If not 00:00:00, the alarm will be OFF for the indicated time until midnight.

Alarm control types:

- Standard:** This is listed above and uses ORP values to set the alarm. Use this control type for the alarms if ORP Calibration is enabled in the “System Menu”.
- ORP %:** When the ORP Calibration is disabled the sanitizer levels are changed by changing the ORP setpoint. If the ORP setpoint is changed then the alarm values for ORP may also need to be changed to reflect this. Using the ORP % for the alarm control type uses a percentage of the setpoint rather than specific values so if the ORP setpoint is changed that is automatically reflected in the ORP part of the alarms. The default value is 10%, if the ORP setpoint is 700, then the alarm values would be 630 and 770 mv.

Step 5 - Service Menu

The Service Menu includes all items that a service technician needs to service a pool and is a critical next step in setting up PoolWarden. From the Default Readings Screen simply press the **Back** button to access the main menu and select the first line "Service" and press the **Enter** button to access the Service Menu. From here you will be able to manually turn on and off all relays, calibrate pH and ORP sensors, disable the relays for servicing and clear all the overfeed timers.

◆ **Relay Manual Mode:** Use the up and down arrow keys to scroll next to the relay that needs to be put into manual mode. Press the **Enter** button or the **Right Arrow** to put the selected relay into manual mode. There are three states that the relay can be in when in manual control:

- If the relay is currently ON, it will turn off for the amount of manual relay time in the relay setup. Once this time is finished the relay will go back to auto.
- If the relay is OFF, and not in manual OFF mode, it will turn ON for the manual relay time and return to auto.
- If the relay is OFF, and not manual mode, it will go back to auto.

◆ **Calibration Pool1 and Pool2:** Select the desired pool to calibrate and scroll to the item to calibrate. Manual Pool Measurements must be taken to calibrate each sensor. For best results the pool should be at the desired values when calibrating. The percentage to the right of the current reading is the amount of calibration and if it is at 99% that sensor is at the maximum calibration and may need to be replaced.

- pH: Enter the manually measured pH value. A pH sensor can be calibrated +/- 2 pH units.
- ORP: If the sanitizer level is higher than desired and the pH is at the setpoint then raise the ORP calibration slightly. If the sanitizer level is lower than desired and the pH is at the setpoint then lower the ORP calibration slightly. The ORP sensor can be calibrated +/- 200 mV. ORP sensors are affected by cyanuric acid, pH and other factors and it may take a few days to get it adjusted.
- Temperature: Enter the manually measured temperature. A temperature sensor can be calibrated +/- 25 degrees Fahrenheit.
- PPM: If the TrueDPD is connected there will be a selection for calibrating the free chlorine. When it is calibrated, the calibration is calculated on the next measurement cycle, if the PoolWarden power is cycled before that happens the calibration will be lost.

◆ **Disable Relays:** To make sure the chemical feeders do not turn on while servicing a pool. Press **Enter** up to 4 times to disable from 15 minutes to 60 minutes. Press the **Enter** key again to put the relays back to auto.

◆ **Clear Overfeed Times:** If an overfeed timer has been reached it will only clear/reset at midnight. There are times when servicing a pool that you may want to clear the overfeed timers to stop an alarm from tripping or to have the relay turn back on.

- The only way to clear the overfeed timers is to select Clear Overfeed in the "Service" menu or to wait till midnight when they automatically clear. Note: Cycling power on the PoolWarden will not clear the overfeed timers.
- The Setpoint Overfeed timers are not cleared when selecting the Clear Overfeed Times.

◆ **TrueDPD Manual:** If the TrueDPD is connected, this menu allows for manually controlling all of the functions of the TrueDPD which is useful to make sure everything is working properly and purging the DPD.

◆ **DPD Level 55%:** Displays the current DPD level. Press enter to change the value in 10% increments.

Service Menu

```
Relay Manual
Calibration P1
Calibration P2
Disable Relays
Clear Overfeed
TrueDPD PPM Manual
DPD Level 55%
```

Relay Manual

```
PH 1    00:00:00  OFF
ORP 1    00:00:00  OFF
Aux 1    00:00:00  OFF
Aux 2    00:00:00  OFF
PH 2    00:00:00  OFF
ORP 2    00:00:00  OFF
Aux 3    00:00:00  OFF
Aux 4    00:00:00  OFF
```

Calibration

```
Cal ORP1  650  -16%
Cal pH1   7.7  -5%
Cal Temp1 78   +12%
Clear Cal ORP1
Clear Cal pH1
Clear Cal Temp1
Cal PPM1  3.4  -6%
Clear Cal PPM1
```

COMMUNICATION - GETTING STARTED: LAN / ETHERNET

PoolWarden will support communication with a data server utilizing an optional Ethernet / LAN communication module to connect to a pool facilities network. The following section describes how a LAN Communication module is set up in PoolWarden in order to connect to a network with all the configuration steps necessary to successfully establish communication. If there isn't an Ethernet connection in close to the PoolWarden one of the following options may be required:

Network Setup

Data Server Setup
Network Setup
Information
Email
Client IP Security

- ◆ **WIFI:** An Ethernet to WIFI bridge can be purchased to enable WIFI. Follow the instructions that come with the bridge to set it up.
- ◆ **Ethernet over Power Line:** This approach works very well with very little to configure. Make sure the adapters are not plugged into a power strip. Follow the instruction that come with the bridge to set it up, there will be one in the router room, and one in the PoolWarden room.
- ◆ **Cellular:** This approach works very well but adds to the initial cost and the yearly cost as there is a cellular company monthly charge.
- ◆ **NOTE:** If the Ethernet cable is plugged in when the PoolWarden is on it will not try to establish the connection. Always cycle power on the PoolWarden as the connection process only occurs at startup.

Step 1 - The Communication Module

When the PoolWarden turns on it will automatically detect the PW-LAN if installed. The PoolWarden will first obtain the IP address of the data server and during this process displays an "N" (not connected) in the lower right corner of the display screen. Once the IP address is obtained the "N" will change to a "c" (connected) in the lower right corner.

DHCP Enabled

DHCP: Enabled
Automatic connection with dynamic IP Address assignment

Step 2 - Network Setup Menu

If only the data server feature will be used no changes are required, leave DHCP enabled. If the direct connection feature is also needed then DHCP may need to be disabled to configure the PoolWarden with a local static IP address.

DHCP Disabled

DHCP: disabled
Static IP Address 192.168.0.199
Gateway IP Address 192.168.0.1
Subnet Mask 255.255.255.0
Primary DNS 8.8.8.8

DHCP: Stands for "Dynamic Host Configuration Protocol". The default setting is "Enabled". When DHCP is enabled the network located at the pool facility will automatically assign an IP address to the communication module within PoolWarden. When enabled, there is nothing else to configure. This is also a convenient way to find an available local IP address. Once assigned by the local network it can then be switched to a static IP address with the same value that can be observed in the Communication / Information screen.

DHCP Disabled: When disabled the following items must be correctly entered and will be provided by the IT department at the facility.

- Static IP Address: Used for connecting to PoolWarden remotely.
- Gateway IP Address: Used for connecting to PoolWarden remotely.
- Subnet Mask: Default is 255.255.255.0 and does not need to be changed.

Step 3 - Client IP Security

You can enter up to 10 IP addresses which provide enhanced security for remote connections to the PoolWarden. When IP addresses are added, remote connections will only be allowed if the client IP address is on this list. This works for both remote and local IP addresses. You can also allow a range by using 255 as a mask. For example:

192.168.0.255 will allow all access from 192.168.0.(0 to 255).

If not using direct connect enter 1.1.1.1 as the first IP address for Client IP Security, this will disable any unexpected communication with the PoolWarden. When not on the list the connection is rejected and it will appear that it isn't even there.

Step 4 - DATA SERVER SETUP

Set the interval that the PoolWarden will send a data packet to the server. If the interval is 00:00:00 data will not be sent. Select Send Data Packet to immediately send a data packet. To disable sending data packets at night set a start and end hour.

Data Server Setup

```
Send Data Packet
Interval: 00:00:00
Start Hour: 0
End Hour: 0
On Alarm: No
```

Step 5 - INFORMATION

The information screen contains the IP address that the PoolWarden is using and the gateway IP address. The Mac value is also provided and the IT configuration may want to setup the routing using the Mac address. If they ask for this information it is available on this screen as well as on a sticker on the bottom of the PW-LAN card.

The Ver (software version) of the PW-LAN card is also displayed.

Information

```
Pkts:82 Ver 12
IP 198.168.0.200
GIP 198.168.0.1
Mac00:12:34:56:78:9A
```

Step 6 - EMAIL

The ability for the PoolWarden to send up to 4 emails has been implemented from PW-LAN version 12 and up. For lower versions Email will not send even though you can enter email addresses. The opening Email screen lists the 4 email addresses. To edit, position the cursor on the one to modify and press the **Right Arrow** or the **Enter** button.

Email

```
Email1 jo@gmail.com
Email2 ja@gmail.com
Email3 ji@gmail.com
Email4 je@gmail.com
```

Send on Alarm: Set to Yes to send an email when there is an alarm condition. An alarm email is only sent when the alarm turns on.

Send Now: Select to send an email right now for testing.

Email Address: The PoolWarden supports up to 30 characters and only part of the address is displayed on the screen. When editing the address will use two lines.

Send Hour 1-3: You can enter up to 3 different times to automatically have the PoolWarden send a data email.

Email Settings

```
Send on Alarm: Yes
Send Now
john@gmail.com
Send hour1 :13
Send hour2 :13
Send hour3 :14
```

COMMUNICATION: REMOTE CONNECTION

The PoolWarden is a web server and can be connected to any web browser which can be a computer, laptop, smart phone or any device with an Internet connection and a browser. To make the connection to the PoolWarden the router at the facility will need to be setup appropriately to route outside connections to the appropriate PoolWarden.

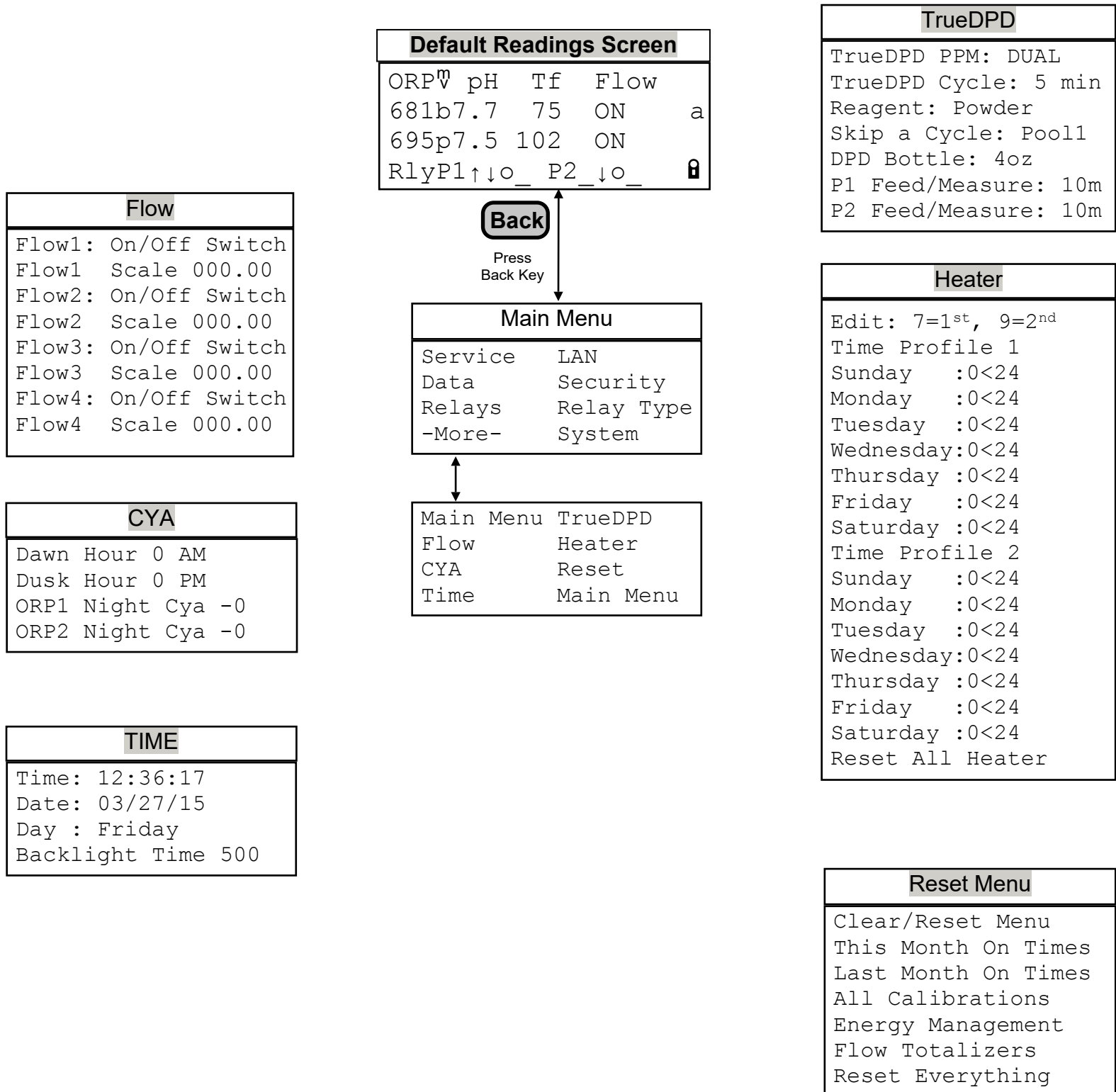
Edit Email Address

```
Support@controlomati
c.com
Upper Case      ^-Del
V-cancel       Back-Ins
```

The web browser will display a representation of the PoolWarden including the display and buttons with the ability to retrieve the configuration and the internally recorded data. In order to access the main menu to make any configuration changes Security must be enabled, if it isn't the main menu is disabled.

ADVANCED FEATURES

The rest of this manual will be dedicated to all of the Advanced Menus & Features which make PoolWarden one of the most versatile chemical controllers in the world. Please review each section carefully to understand each menu item. Simply press the **Back** button from the Default Readings Screen to gain access to the "Main Menu". Use the **Up & Down Arrows** to navigate to each sub menu item and press enter to go to that sub menu or selection. Accessing the Main Menu can be password protected and can be dependent on a security level if PoolWarden is security enabled in the "Security Setup" menu which was covered in the "PROGRAMMING - GETTING STARTED" section of this manual.



Data Recording Menu

This menu provides access to PoolWarden's internally recorded data. The data can be displayed visually on screen. Please note that this screen will only display readings, pH, ORP, Temp, Flow Status and Alarm Status. The internal memory has the ability to record 8,192 rows of data. Once the maximum memory has been reached, any new data will record over the oldest data. To access "Data Recording" simply press the **Back** button from the default readings screen and scroll down to "Data Recording" and press **Enter** and select "Go To Data".

◆ **Go To Data:** Before entering the actual Data a "Data Help" screen is displayed that provides a brief summary of the tips on how to scroll through the rows of recorded data.

0 Toggle line4: Pressing the Zero **0** button toggles line 4 on the display screen between the relay status for each reading and the Date, Time & Data Record Number.

#*10 Big Jump: This is the "Big Jump" by a factor of 10. If you press any number 1 through 9 and then the **Up or Down Arrow** it will jump through the data by a factor of 10 times that number. Example: If you press 8 then the up arrow it will jump forward through 80 rows ($8 \times 10 = 80$) of data. If you press 7 then the down arrow it will jump backward through 70 rows ($7 \times 10 = 70$).

Back -> Quit: Exit the Data and bring you back to the Data Recording screen.

↑+big: Pressing the **Up Arrow** will jump forward 30 rows of data. The up arrow also works in conjunction with the #*10Big Jump above. If any number between 1 through 9 is pressed followed by the up arrow then it will jump the data by a factor of 10 times that number.

> +1: Pressing the **Right Arrow** will move forward one "1" data row at a time.

< - 1: Pressing the **Left Arrow** will move backward one "1" data row at a time.

↓-big: Pressing the **Down Arrow** will jump forward 30 rows of data. The up arrow also works in conjunction with the #*10Big Jump above. If any number between 1 through 9 is pressed followed by the down arrow key then it will jump the data by a factor of 10 times that number.

◆ **Interval 00:00:00:** Set the data recording time interval. The default setting is 00:00:00 or disabled. Simply press **Enter** to scroll through the following data recording intervals.

00:00:00: Disabled, No Data Recording

00:05:00: Data will record in 5 minute intervals. Internal Memory will be full in 5.5 Days.

00:15:00: Data will record in 15 minute intervals. Internal Memory will be full in 85 Days.

00:30:00: Data will record in 30 minute intervals. Internal Memory will be full in 170 Days.

01:00:00: Data will record in 1 hour intervals. Internal Memory will be full in 341 Days.

◆ **Clear Data:** Simply scroll down to "Clear Data" and press **Enter** and the internal memory will reset to 0/8192.

◆ **Used 0 / 8192:** This shows how much internal memory is currently being used. If a number like 3150/8192 is seen in this screen, then that means 3150 rows of data have been recorded out of the available 8192 rows. Press **Enter** to immediately record data. If there is a lower case "o" on the fourth line then the data is in overflow mode and any new recorded data is erasing the oldest recorded data.

Serial Printer

If the serial printer is connected it will be automatically detected and enable the additional menu choices in the Data Recording menu. When the PoolWarden is turned on, as part of the startup process the serial printer will be listed after about 10 seconds, if it isn't listed make sure the printer is turned on and the wires are correctly connected on the PoolWarden connector. The serial printer must be turned on before the PoolWarden.

Once a day a header line will print with the name of the PoolWarden (setup in the System Menu) and the serial number. Then at the appropriate intervals the current measurements will be printed.

◆ **Serial Printer:** This line is information only. All items after it are for the serial printer.

Data Recording

```
Go To Data
Interval 01:00:00
Clear Data
Used: 808/8192
Serial Printer
Print Data
Print: Off
Print Last 7
```

Go To Data

```
Data Help      ↑+big
0 Toggle line4 > +1
#*10 Big Jump  < -1
Back -> Quit    ↓-big
```

- ◆ **Print data:** Print the current measurements now.
- ◆ **Print:** Selections are OFF, Every Hour and NOON
- ◆ **Print Last 7:** Prints the last 7 noontime measurements that are also displayed in the Handy Menu. There may be less than 7 if the measurements haven't been made yet or if the PoolWarden was turned off at NOON on some of the days.

System Menu

The System Menu is where many of the main operating system features are turned on or off. Please review and set each item according to your needs. To access the System Menu press **Back** from the "Default Readings Screen" and scroll down the Main Menu to System and press **Enter**.

- ◆ **Name:** Press **Enter** to change the name for the PoolWarden. This could be the name of the location or any name of choice. This name will be sent to the data server if communication is enabled and printed as the header line if there is a serial printer.
- ◆ **Units:** Press **Enter** to toggle between the English or Metric System.
- ◆ **ORP Cal:** Press **Enter** to Enable or Disable ORP Calibration. The default setting is Enabled. If disabled the ORP will not be able to be calibrated and any changes in sanitizer level require changing the setpoint.
- ◆ **PoolWarden (Dual):** This setting is normally entered by the factory when PoolWarden is purchased. However, there may be a need to set PoolWarden to Single Pool Controller or Dual Pool Controller.
- ◆ **Daylight Savings:** Press **Enter** to toggle between YES to enable daylight savings time or NO to disable daylight savings. The default setting is set to YES which means that PoolWarden will automatically adjust for daylight savings time each year.
- ◆ **Langelier pH +/- 0.0:** When the Langelier Index falls outside of the balanced range of -0.5 to +0.5, the pH set-point within PoolWarden will be adjusted by this pre-set factor to help keep the Langelier Index within the range of -0.5 to +0.5 (Balanced). To change the Langelier pH adjustment factor, simply press **Enter** to toggle through +/- 0.0, +/- 0.1, +/- 0.2 or +/- 0.3. The set-point within PoolWarden will be adjusted by this Langelier Index Adjustment Factor once the pH sensor reading has reached the existing set-point. To view the Langelier Index simply press the **Right Arrow** twice from the "Default Readings Screen". To perform a quick view of the current set-points simply press the **9** button when at the "Default Readings Screen". Langelier is enabled after manual measurements have been entered in the "Handy Menu".
- ◆ **Service QuickJump:** When set to ON, pressing the **Left Arrow** from the "Default Readings Screen" will jump to the "Service" menu without requiring a password even if security is enabled. Pressing **Back** will return to the "Default Readings Screen" and not the "Main Menu". Press 2 or 3 to access the setpoint and mixing time entry for ORP and pH. Pressing 2 or 3 are password protected.
- ◆ **Display Type: VFD:** Press **Enter** to cycle between VFD and LCD. The default display is the LCD type.
- ◆ **Overlay Color:** White or Blue. The numbers and arrows work the same for both, the letters and symbols below the numbers are different for both overlays.
- ◆ **Scroll Readings:** OFF or ON. When set to ON, when the PoolWarden goes to the default reading screen it will instead scroll through the last 7 noontime readings at a 5 second interval for each day. If the health department is doing an inspection and the data hasn't been transferred to the log the readings can be viewed on the PoolWarden without needing to touch a button.

System
Name: PoolWarden
Units: English
ORP Cal: Enabled
PoolWarden (Dual)
Daylight Savings No
Langelier pH +/-0.2
Service QuickJump On
Display Type: VFD
Overlay Color White
Scroll Readings OFF

TrueDPD Menu

If the optional TrueDPD PPM sensor is connected then use this menu to set up how it operates.

- ◆ **TrueDPD PPM:** Pool1 - Select Pool1, Pool2, Both or none.
- ◆ **TrueDPD Cycle:** This is the cycle time between measurements and can be set to 5 min, 15 min, 30 min, 1 Hour or 6 Hour.

◆ Reagent: Liquid/Powder - The TrueDPD supports two different reagents for making the measurement. The standard powder mix is low cost, accurate but darkens over time at higher temperatures. The Liquid DPD that is made from Lamotte doesn't require mixing with water and doesn't darken over time.

◆ Skip A Cycle: None, Pool1, Pool1&2, Pool2. Allows for doubling the cycle time on the selected pool. A pool may not need to be measured as often as a spa and this feature allows for skipping every other measurement.

◆ DPD Bottle: 4oz, 8oz or 16oz.

◆ P1 / 2 Feed Measure: OFF, 5m, 10m or 15m. The TrueDPD will make measurements at specific times based on the selected cycle interval. When a sanitizer feed cycle starts, a period of time after the sanitizer was added the free chlorine may have risen but the TrueDPD will still wait until the next cycle time. This feature allows for making a measurement based on the completion of the on time of a sanitizer feed cycle which helps to reduce overshoot and provides better control.

TrueDPD
TrueDPD PPM: DUAL
TrueDPD Cycle: 5 min
Reagent: Powder
Skip a Cycle: Pool1
DPD Bottle: 4oz
P1 Feed/Measure: 10m
P2 Feed/Measure: 10m

Flow Menu

◆ **Flow Menu:** Press **Enter** to enter the flow sensor setup screen. Select for each of the 4 flow inputs a standard on/off flow switch or a digital flow meter if one has been installed. If "Digital" is selected, then scroll down to "Flow# Scale" and enter the K-Factor (pulse / gallon) for the Digital Flow Meter and press **Enter** to save the new setting. When switching to Digital or to a switch, PoolWarden must be shut down and restarted for the change to take effect. If the TrueDPD is connected flow 4 can't be changed.

Flow
Flow1: On/Off Switch
Flow1 Scale 000.00
Flow2: On/Off Switch
Flow2 Scale 000.00
Flow3: On/Off Switch
Flow3 Scale 000.00
Flow4: On/Off Switch
Flow4 Scale 000.00

Heater

This menu includes items that are not required for the normal operation of PoolWarden and are considered advanced features.

◆ **Time Profile 1 and 2:** The Time Profiles section of the Advanced menu works in conjunction with setting up one of the Auxiliary Relays in the Relay Control Type menu to "Heater" and then creating Temperature Set-points in the Relay Setup menu. The Time Profiles allow for using the night time setpoint at different times of each day. Zero "0" and Twenty Four "24" are the default settings for each day and mean the time settings are disabled in this menu. Simply scroll down to the day and press the Seven "7" key to change the first time or the Nine "9" key to change the second time. The time is based on a 24-Hour Military Time.

◆ **Example:** This represents an example if the Auxiliary 1 Relay is set to "Heater" control type and the main Aux1 Relay Set-point is set to "On if Temp < 80" and the secondary Set-point is set to "Night Temp < 70". On Sunday in the Advanced Menu change the first number "0" to "6" (6:00am) and the second number "24" to "18" (6:00pm). This means that the main set-point of "On if Temp < 80" will be followed when the time is between 6:00am or 6:00pm on Sunday. If the time is less than 6:00am or more than 6:00pm on Sunday then the secondary set-point of "Night Temp < 70" will be followed.

◆ **Reset All Heater:** To reset to factory defaults all energy management settings

◆

Heater
Edit: 7=1 st , 9=2 nd
Time Profile 1
Sunday :0<24
Monday :0<24
Tuesday :0<24
Wednesday:0<24
Thursday :0<24
Friday :0<24
Saturday :0<24
Time Profile 2
Sunday :0<24
Monday :0<24
Tuesday :0<24
Wednesday:0<24
Thursday :0<24
Friday :0<24
Saturday :0<24
Reset All Heater

CYA Menu

Allows for the ORP to be reduced during night time hours to adjust for the natural ORP increase during the evening hours if Cyanuric Acid is being used in the Pool. Simply set the Dusk and Dawn hour (0 to 24 Hour Military Time) to when the sun rises and sets. Then enter the ORP Millivolt Adjustment Number in

CYA	
Dawn Hour	0 AM
Dusk Hour	0 PM
ORP1 Night Cya	-0
ORP2 Night Cya	-0

“ORP# Night Cya -0” that the pool normally experiences at night. What usually happens in this case is at night the ORP rises and PoolWarden will not feed any more sanitizer until the sun comes up the next day, but during the night the actual chlorine dropped so in the morning the chlorine level may be low. Lowering the ORP value at night will allow for sanitizer to still be fed even in the presence of cyanuric acid.

In order to set this value observe the ORP reading at noon and midnight with the same sanitizer level, if the cyanuric acid had no impact the ORP values would be the same. Subtract the midnight ORP reading from the noon ORP reading and this is the value that can be entered, enter a number less to be conservative.

Example: If the pool normally experiences a 125 Millivolt Increase between the hours of 7:00pm and 6:00am then enter “6” for the Dawn hour, 19 for the Dusk hour and 125 in “ORP Night Cya -125”, to be conservative enter 75 instead of 125. PoolWarden will now adjust the ORP Reading by -125 Millivolts to normalize the reading during the night time hours.

Reset Menu

- ◆ This Month On Times: PoolWarden keeps track of the total “ON” times for each relay for a running two month period. To clear the total “ON” times for the current month select “This Month On Times” and press Enter to clear
- ◆ Last Month On Times: PoolWarden keeps track of the total “ON” times for each relay for a running two month period. To clear the total “ON” times for last month select “Last Month On Times” and press Enter.
- ◆ All Calibrations: Clear all calibrations including pH, ORP and temperature, select “All Calibrations” and press Enter to clear.
- ◆ Energy Management (Heater): Reset all the Advanced Menu settings back to the default settings which disables this menu unit new settings are entered.
- ◆ Flow Totalizers: To clear the volume readings in the Flow Menu if a Digital Flow meter is installed select “Flow Totalizers” and press Enter to clear.
- ◆ Reset Everything: To Reset all settings back to factory defaults. This clears all calibrations and sets the relays back to the default control types. When selected, a Warning screen will display and you must press 9 to proceed or any other button to exit without resetting everything.

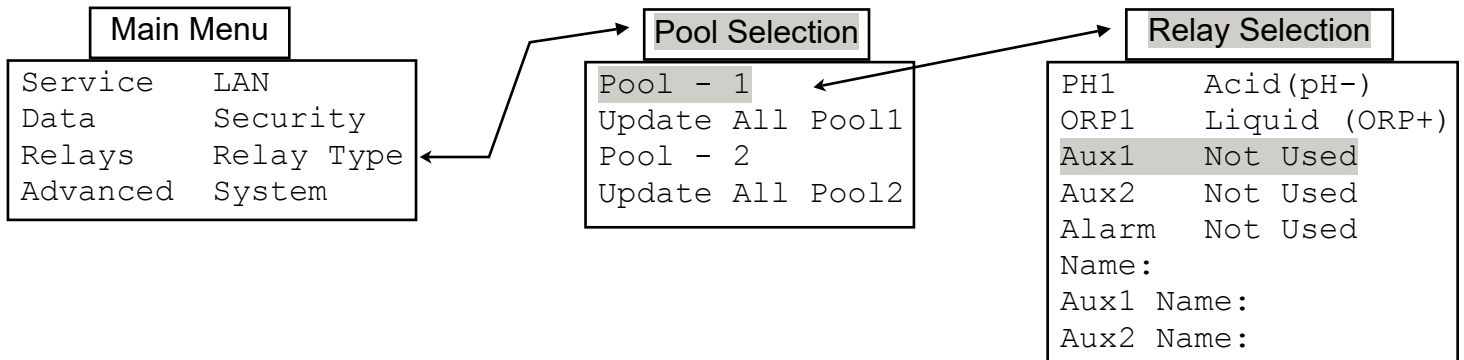
Reset Menu
Clear/Reset Menu
This Month On Times
Last Month On Times
All Calibrations
Energy Management
Flow Totalizers
Reset Everything

Time Menu

- ◆ **Time:** The time clock in PoolWarden is based on 00:00:00 military time. Simply press **Enter** and set the correct time and press **Enter** again to save the new time.
- ◆ **Date:** Simply press **Enter** and set the correct date and press the **Enter** key again to save the new date.
- ◆ **Day:** Press the Enter key to toggle through to the appropriate day of the week and press the Back key to save the new day of the week.
- ◆ **Backlight Time:** This is where the Backlight timer can be changed to preset times of 120, 180, 500 or 1000 seconds. This is the time PoolWarden will stay in a current menu before PoolWarden times-out since the last key was pressed and reverts back to the “Default Readings Screen” and resets the password entry status. The default setting for the Backlight timer is 120 seconds. To change, simply press **Enter** to cycle through the preset times then press the Back key to save the new time.

TIME
Time: 12:36:17
Date: 03/27/15
Day : Friday
Backlight Time 500

CHANGING RELAY TYPE



The two dry contact Auxiliary Relays per pool are a standard feature in PoolWarden. Please review this section to understand how to configure the programming within PoolWarden to control many of the pools additional equipment such as Heaters, Circulation Pumps, Water Levelers, Back Up Sanitizers, etc. Please note that both Auxiliary Relays can also manage the same standard pH and ORP control types that the main pH and ORP relays can manage. From the Main Menu select “Relay Type”, then select Pool1 or Pool2 and scroll down and select the Aux1 or Aux2 which are the auxiliary relays for Pool1. If Pool2 is selected then the Aux3 and Aux4 would be the auxiliary relays for Pool2. Once one of the Auxiliary Relays is selected the following “Change Control Type” menu will appear.

- ◆ **Change:** Press the **Right Arrow** “>” to scroll through the control types.
- ◆ **Save:** Press the **Left Arrow** “<” to save the selection.
- ◆ **Back:** Press the **Back** key to cancel out of this menu.

```

Change Control Type
< -save > -change
Back -cancel
> Not Used
  
```

Once saved the relay settings can be changed in the “Relay Setup” menu. Use the “Relay Type” menu to set pH control from Acid to Base, to select the type of sanitizer that is being used or to select from a number of choices for the AUX relays.

Heater Control Type

- ◆ **Manual Time 00:02:00:** Is the amount of time you can set a relay to turn on manually (Default Setting 2 Minutes). When you turn on the relay manually in the service menu, the relay will be on for 2 minutes in this case. To change the time press **Enter** and edit the time and press **Enter** to save.
- ◆ **On If Temp < 0:** This is the Main Temperature set-point and the factory default setting is zero “0” or disabled. The relay will turn the Heater on if the Temperature falls below the set point and will turn off once the set point is achieved.

Aux1 Heater Relay Selected

```

ManualTime 00:02:00
On If Temp < 0
Night Temp < 0
On Delay 00:01:00
MinTimeOn 00:02:00
MinTimeOff 00:02:00
Off if Flow Off - 1
Overfeed 10:00:00
  
```

- ◆ **Night Temp < 0:** This is the Secondary Temperature set-point and the factory default setting is zero “0” or disabled. This secondary set point works in conjunction with the Advanced Menu. The relay will turn the Heater on if the Night Temperature falls below the set point and will turn off once the set point is achieved.
- ◆ **On Delay 00:01:00:** The on delay, in this case 1:00 minute, is necessary to prevent the relay and hence the heater from turning on and off frequently if the temperature fluctuates back and forth from from the set-point. The relay will not turn on unless the setpoint condition is satisfied for at least 1:00 Minute - then the relay will turn on for at least the programmed “On Time 00:02:00” in this case 2 minutes.
- ◆ **MinTimeOn 00:02:00:** This is the total amount of time the relay will be ON if the Temperature dips below the setpoint. The default setting is 2 Minutes. This command works in conjunction with the MinTimeOff Command. This prevents the heater from kicking on and off frequently if the temperature is fluctuating around the set-point.

- ◆ **MinTimeOff 00:02:00:** This is the total amount of time the relay will be OFF if the Temperature reaches the set-point and the relay has been on at least the MinTimeOn. The default setting is 2 Minutes. This command works in conjunction with the MinTimeOn Command above. This prevents the heater from kicking on and off frequently if the temperature is fluctuating around the set-point. Never set this time to 00:00:00, that will keep the timers from properly resetting.
- ◆ **Off if Flow Off - 1:** This Aux1 Relay will be turned off if "No Flow" is detected in Flow Switch Input 1. Pool1 uses Flow Switch Input 1 and Pool2 uses Flow Switch Input 3. Never allow the heater to turn on if there is no flow. The heater will have it's only flow detection which will also keep that from happening.
- ◆ **Overfeed 10:00:00:** The Overfeed time represents the maximum amount of time a Heater can be on in a 24-Hour period from midnight to midnight. Calculate the maximum amount of total time the heater would be on in a 24-Hour period and enter the time here. The default time of 10:00:00 will most likely not be correct. This will prevent the Heater from continuously running if something goes wrong with the temperature sensor.

Feed Daily Control Type

Feed Daily can be used to turn on a piece of equipment at the same time every day of the week that or specific days. It can be used to perform the following:

- Turn on at a specific time and off at a specific time
- Can be enabled for any or all days of the week
- When it is on, it can also cycle on and off
- Can be disabled based on a flow switch being off

◆ **Manual Time 00:02:00:** The manual time for any relay can be set up to 23:59:58.

◆ **Day Of Week smtwtfs:** This is the ON Command for this control type, if all letters for the days of the week are left lower case, the relay will not turn on. To enable the relay to turn on select the Day of Week

command and press **Enter**, then select numbers 1 through 7 representing Sunday through Saturday and toggle between the lower case and uppercase letter of the week. Lower case is disabled and uppercase means the relay will be enabled or turned on on that day of the week.

◆ **Off If Time < 00:00:00:** This is a modifying command to the Day Of Week Setting and is where the relay will be off if the time of day is less than the configured time setting. The default setting is zero "00:00:00" or disabled. Enter the time based on 24-Hour Military Time and press **Enter** to save.

◆ **Off If Time > 00:00:00:** This is a modifying command to the Day Of Week Setting and is where the relay will be off if the time of day is greater than the configured time setting. The default setting is zero "00:00:00" or disabled. Enter the time based on 24-Hour Military Time and press **Enter** to save.

◆ **On Time 00:00:00:** This command is used to cycle the relay on and off continuously. Enter the desired on time for the cycle (such as 2 Hours or 02:00:00) and press **Enter** to save the setting.

◆ **MinTimeOff 00:00:00:** When the relay is going to cycle on and off during the on portion of the day this command controls how long it will be off. Once this off time has been reached the relay will turn back on for the On Time. If this cycling feature is going to be used do not leave either the On Time or the MinTimeOff at 0, they are used together for proper operation.

◆ **Off if Flow Off - 1:** The relay will be turned OFF if "No Flow" is detected in Flow Switch Input 1. Press Enter to cycle between Flow Switch 1, 2, 3, 4 and none.

Example: The commands listed in the above box for this section will have Aux1 cycling on for 30 minutes, and off for 30 minutes on Wednesday between 10AM and noon.

Aux1 Feed Daily Selected

ManualTime	00:02:00
Day of Week	smtWtfs
Off If Time <	10:00:00
Off If Time >	12:00:00
On Time	00:30:00
MinTimeOff	00:30:00
Off if Flow Off -	1

Alarm Out Control Type

Alarm Out is where an external alarm can be connected to an Auxiliary Relay and configured in this menu. This may be needed in cases where a more pronounced sound or light is needed.

Alarm Out

```
On if Alarm On - Yes
Off if Flow Off - 1
```

- ◆ **On if Alarm On - Yes:** When set to Yes the Aux relay will be on if the alarm light is on.
- ◆ **Off if Flow Off - 1:** The relay will be turned OFF if “No Flow” is detected in Flow Switch Input 1. Press Enter to cycle between Flow Switch 1, 2, 3, 4 and none. If the circulation pump turns off at night you may not want this additional alarm output to be on which can be detected by no flow.

Superchlorination

Use this relay control type to feed an increased amount of sanitizer once a week or a couple times a week. This relay control type is the same as the Feed Daily and only the new additional commands are discussed here.

Superchlorination

```
ManualTime 00:02:00
Day of Week smtwtfS
Off If Time < 22:00:00
Off If Time > 23:00:00
On Time 00:15:00
MinTimeOff 00:15:00
Off If ORP>700
Off If pH > 7.9
Off if Flow Off - 1
```

- ◆ **Manual Time 00:02:00:** The manual time can be used to test the sanitizer feed for superchlorination to make sure it is connected properly..
- ◆ **Day Of Week smtwtfS:** Set the days of the week to perform superchlorination.
- ◆ **Off If Time < 00:00:00:** Set the time to start the superchlorination.
- ◆ **Off If Time > 00:00:00:** Set the time to end the superchlorination.
- ◆ **On Time 00:00:00 and MinTimeOff 00:00:00:** The mixing times may not be needed, but for a smaller body of water you may want to feed sanitizer for 15 minutes and let it mix for another 15 with the relay OFF to give the sanitizer time to mix.
- ◆ **Off If ORP>700:** The setpoint for a superchlorination cycle is to turn off if the ORP is higher than an ORP setpoint. The feed cycle will continue until enough sanitizer has been added to reach this setpoint of the Off If Time value has been reached. If you are going to feed a set amount of chlorine based on time only set this value to 0 to skip it.
- ◆ **Off If pH> 7.9:** ORP is affected by pH and as the pH goes up the ORP value goes down. If when starting the superchlorination cycle the acid storage tank is empty the pH may be at a higher then desired value causing the ORP to be lower which could lead to feeding more sanitizer than desired. If you are going to feed a set amount of chlorine based on time and not using the ORP setpoint then set this value to 0 to skip it.
- ◆ **Off if Flow Off - 1:** The relay will be turned OFF if “No Flow” is detected in Flow Switch Input 1. Press Enter to cycle between Flow Switch 1, 2, 3, 4 and none.

Water Level Control Type

Water Level is where an external pool water level feed can be connected to an Auxiliary Relay and configured in this menu. If a water level switch is used it should be connected to Flow 2 for Pool1 and Flow 4 for Pool2. When the water is below the switch level then water should be added. The flow switch can be either on when the water is low or off when the water is low depending on the type of switch, read the following carefully to make sure you select the correct turn on condition.

- ◆ **Manual Time 00:02:00:** Is the amount of time you can set a relay to turn on manually (Default Setting 2 Minutes). To change the time, enter the new time and press **Enter** to save.
- ◆ **On if Flow On - none:** The Aux Water Level Relay will be turned on if “Flow” is detected in a Flow Switch Input. Set this command to the appropriate flow switch input if the switch is ON when the water is low. Note: If setting the On if Flow On to a switch value, leave On if Flow Off set to none.
- ◆ **On if Flow Off - none:** The Aux Water Level Relay will be turned on if “Flow” is detected in a Flow Switch Input. Set this command to the appropriate flow switch input if the switch is OFF when the water is low. Note: If setting the On if Flow Off to a switch value, leave On if Flow On set to none.

Aux1 Water Level

```
ManualTime 00:02:00
On if Flow On -none
On if Flow Off-none
Off If Time < 00:00:00
Off If Time > 00:00:00
Off if Flow Off-none
Overfeed 00:00:00
```

◆ **Off If Time < 00:00:00:** This command will keep the relay off if the time of day is less than the configured time setting. The default setting is zero “00:00:00” or disabled. Enter the time based on 24-Hour Military Time and press **Enter** to save. Leave this at 00:00:00 if it doesn’t matter the time of day to add water.

◆ **Off If Time > 00:00:00:** This command will keep the relay off if the time of day is greater than the configured time setting. The default setting is zero “00:00:00” or disabled. Enter the time based on 24-Hour Military Time and press **Enter** to save. Leave this at 00:00:00 if it doesn’t matter the time of day to add water.

◆ **Off if Flow Off - none:** The Aux Water Level Relay will be turned off if “No Flow” is detected in the Flow Switch Input indicated.

◆ **Overfeed 00:00:00:** The Overfeed time represents the maximum amount of time a Water Leveler can be on in a 24-Hour period from midnight to midnight. Calculate the maximum amount of total time the Water Leveler would be on in a 24-Hour period and enter the time here. The default time of 00:00:00 or disabled. This will prevent the possible overflow situations.

Time Based Water Level: If not using the flow input for water level but a time base such as 15 minutes a day, then set the On if Flow On - 1 or 3 to use the flow switch in the flow cell which will turn this relay on, and then use the time of day commands to set the amount of minutes to add water per day. You could also use the Feed Daily relay control type for more control such as selecting the days of the week to add water.

ORP Control Types

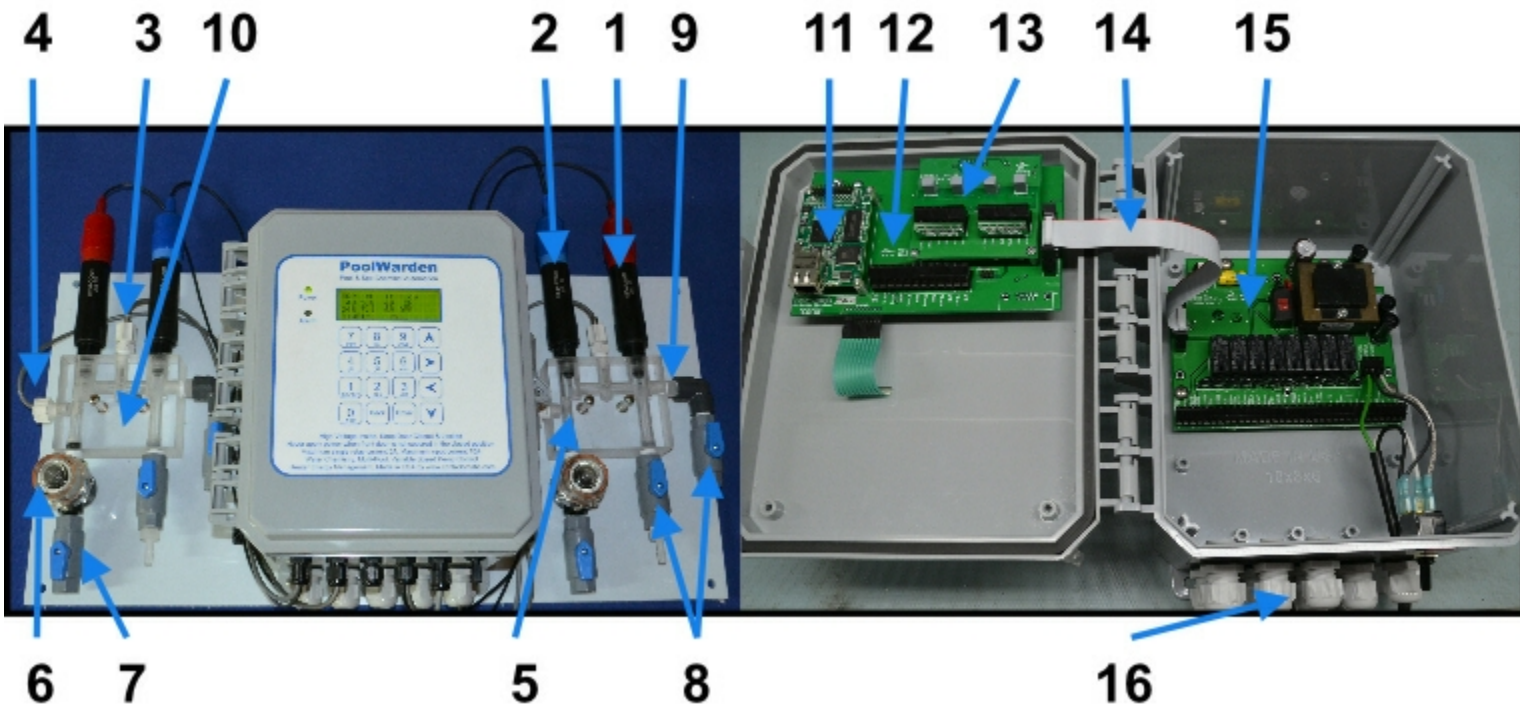
There are 4 control type selections for ORP: Liquid, Feeder, Cal Hypo and Salt System. Liquid and Cal Hypo have the exact same relay programming, and Feeder and Salt System have the exact same relay programming.

Proportional and ORP Over Run: For a feeder, proportional control isn’t needed because the relay will stay on until the setpoint is achieved. ORP Over Run allows for 0, 5, 10 or 15mv to be added to the setpoint, it will turn on at the setpoint, and off at the setpoint plus this value.

Liquid and Cal Hypo	Feeder and Salt System	
ManualTime	Same	Manual feed time
Proportional	ORP Over Run	
On If ORP<700	Same	ORP Setpoint
On Delay	Same	Turn on delay
On Time	MinTime On	
MinTimeOff	Same	When turning off, stay off at least this long
Off If pH	Same	PH Lockout
Off if RLY On	Same	Keep off if currently in a pH feed cycle
Off if Flow Off	Same	Only allow feeding if there is flow
SetOvrfeed	Same	Feed limit based on the setpoint being achieved
Overfeed	Same	Daily feed limit

On Time and MinTimeOn: For liquid, the On Time is part of the cycle, it will be on for the programmed On Time or less and then the MinTimeOff will start which allows the added chemicals to mix. For the Feeder, the MinTime On is the minimum amount of time the relay will be on, even if the setpoint is achieved. Note that the relay may be on longer than this time if the setpoint isn’t achieved within the programmed time.

Replacement Parts



Item	Part Number	Type	Description
1	ORP-COMP	Sensor	ORP Sensor, platinum band, red sensor body
1	ORP-COMG	Sensor	ORP Sensor, gold disk for salt water chlorinators
2	PH-COM1	Sensor	PH Sensor, blue sensor body
3	PW-T10K-3ft	Sensor	Temperature sensor, 3 foot cable
4	PW-Flow3	Sensor	Flow sensor detector, 3 foot cable
5	PW-FlowCell-MAG	Sensor	Flow sensor magnet
6	PW-Strainer	Flow Cell	Inlet water strainer with stainless steel screen
6	PW-Strainer-Screen	Flow Cell	Stainless steel screen for inlet water strainer
7	1250-070-01	Flow Cell	1/4" FNPTxFNTP, SMC 2-Way Ball Valves
8	1250-080-01	Flow Cell	1/4" Ball Valve FNPT x MNPT, SMC
9	1250-100-01	Flow Cell	1/4" NPT, PP Threaded Nipple
10	2070-010-01	Flow Cell	Machined PoolWarden flow cell acrylic block
11	PWLANC	Circuit Board	Ethernet communication module
12	2370-020-07	Circuit Board	PoolWarden motherboard
13	2370-130-06	Circuit Board	PoolWarden sensor card dual pool
13	2370-050-06	Circuit Board	PoolWarden sensor card single pool
14	2570-080-01	Cable	Motherboard to relay board interconnect cable
15	2370-120-10	Circuit Board	PoolWarden dual pool relay board (8 relays)
15	2370-040-10	Circuit Board	PoolWarden single pool relay board (4 relays)
16	1020-080-01	Cable	Cable grip, 1/2" NPT (.23-.47"), GRAY, bottom row
16	1020-070-01	Cable	Cable grip, 3/8" NPT (.20-.39"), GRAY, top row

Maintenance

PoolWarden Enclosure

The enclosure can be cleaned with a soft cloth that is moist with water. Take extra care when cleaning the clear display window. To clean the display window make sure the cloth hasn't been used to clean anything else or it may have grit which may scratch the clear screen.

The PoolWarden includes cable grips on the bottom side of the box. If any are not used make sure to fill them so that the opening is closed. If a cable grip is left open bugs may enter the inside and leave droppings and nests which should be removed.

Sensor Maintenance

The sensors must be clean to operate properly. The strainer in front of the flow cell will catch most debris but oils and chemical deposits will get through. Slow response, increased need to calibrate and inconsistent readings are indicators that the sensors need to be cleaned or replaced.

To clean the sensors, turn off both valves to the flow cell and carefully remove the pH and ORP sensors from the flow cell. The small white dots on the bottom of the sensor should be flush with the black sensor body and clearly visible. Use a soft brush and a mild detergent to remove any oil and contamination from the glass bulb and the small white dots. Do not let the sensors dry out as that may damage the sensor, after cleaning apply Teflon tape to the threads and reinstall the sensors.

ORP and pH Sensor Replacement

The PoolWarden ORP and pH sensors have a warranty to last at least 1 year and will most likely last from 1.5 to 3 years or longer. An indication that it is time to replace a sensor is the percentage listed on the calibration screen in the PoolWarden service menu. If the percentage is 99% then the sensor is not able to be properly calibrated and should be replaced. There is a date code on the sensor body that can also aid in determining if the sensor needs to be replaced. If one sensor needs to be replaced and both the ORP and pH sensor have the same date code it is recommended to replace them both.

Part Number	Type	Description
ORP-COMP	Sensor	ORP Sensor, platinum band, red sensor body
ORP-COMG	Sensor	ORP Sensor, gold disk for salt water chlorinators
PH-COM1	Sensor	PH Sensor, blue sensor body

Sensor Storage

During the installation of the PoolWarden make sure to the sensor caps. To store the sensors turn off both valves to the flow cell and remove the sensors. Add a little water to the sensor cap and hand tighten the sensor to the cap. The cap should have a small sponge that only needs to be moistened.

Cold Temperatures

The ORP and pH sensors should not be exposed to freezing conditions. If the outside temperature is below freezing this may damage the sensors and they should be removed to protect them. Always store them with their protective caps.

Always drain the water from the flow cell, strainer and tubing to to flow cell to prevent damage in freezing conditions.

Technical Support

Please contact ControlOMatic at 530-762-1627 for sales and support. Send support emails to support@controlomatic.com. The dedicated PoolWarden website with videos, tips, documents and more is:

www.poolwardentraining.com

Troubleshooting

Flow not registering even though the magnet is up

- ◆ Make sure the flow sensor detector wire is connected to the correct switch input. Pool 1 uses Flow 1 and Pool 2 uses Flow 3. On the readings display, the flow indication for Pool 1 is Flow input 1 and for Pool 2 is Flow input 3, this can't be changed. If you moved the Pool 1 flow sensor to Flow input 2 the display will still show the status of Flow input 1.
- ◆ Rotate the flow sensor $\frac{1}{4}$ turn. There is a polarity between the magnet and the flow sensor and rotating the sensor slightly may help.

Alarm light is on, but the readings are OK

- ◆ There are many factors that affect the alarm status. From the readings screen press the right arrow to enter the alarm conditions screen. This will list all of the factors from the alarm settings that are causing the alarm light to be on.

ORP and pH readings are way off

- ◆ If the ORP and pH sensors wires are swapped this will cause readings that are way off. The ORP sensor will read near 0 and the pH sensor will be maxed out. Check the wire connections.
- ◆ Check the circuit boards and make sure they are all properly seated in their connectors.
- ◆ Clean the sensors and check the date code.

ORP and pH readings are drifting

- ◆ The most common cause of sensor drifting is a poor earth ground connection to the PoolWarden. A good way to test the earth ground connection is to measure with a digital voltmeter one of the ground terminals on the main board in the lid to a piece of metal in the pump room.

Chemical feeders are not turning on

- ◆ The first test is to make sure they can turn on. Go to the service menu and select Manual Relay Mode and turn on the feeder to test. If it doesn't turn on then there may be a problem with the feeder, the wiring or even the relay.
- ◆ Try plugging the feeder into an alternate power source to make sure it can turn on.
- ◆ The setting for the relay control require a flow switch to be on and an overfeed timer to not be reached.

ORP varies from day to night with the same pH and free chlorine

The presence of cyanuric acid in pool water is a challenge for ORP sensors as they detect the water's ability to oxidize which cyanuric acid has an impact on and is dependant on the amount of sunlight hitting the water. The PoolWarden has an advanced feature allowing for an automatic decrease in the ORP value at night to help compensate for this effect (go to the advanced menu for more information). If there is cyanuric acid in the water then the following guidelines may help:

- ◆ Only calibrate the ORP sensor at the brightest time of the day. If you calibrate the sensor at night when the chlorine is all available that will then lead to an overfeed condition on the next day when the sun is out and the ORP drops.

Forgot Your Password

If you enabled the security feature and forgot your password all is not lost. Contact ControlOMatic with the serial number and proof of ownership and a password reset code will be provided that will clear all of the security passwords. Each PoolWarden has its own unique reset code and one that works on one PoolWarden will not work on another.

LIMITED WARRANTY

Models: This warranty applies to PoolWarden referenced here as “Controller”. ControlOMatic, Inc. Warrants the controller to be free from defects in manufacturing and workmanship for a period of Five (5) Years from the date of manufacture for the electronic main circuit board. All sensors and flow cells have a One (1) Year warranty. All other supporting equipment to the controller are individually covered by the specific equipment manufacturers warranty. Liability under this warranty is limited to the repair or replacement of any device or component which is returned to ControlOMatic within the warranty period by the original purchaser and found to be defective upon examination.

This warranty does not cover: (a) the purchaser’s labor or any servicing fees related to replacement of the defective product; (b) damage resulting from the use of this product in a manner inconsistent with normal use and the owners manual; (c) damage as a result of misuse, accident or neglect; (d) damage from improper testing, operation, or installation; (e) damage resulting from not operating the controller on a dedicated circuit or under conditions other than those recommended or at voltages or amperages other than those indicated on the controller and in the owners manual; (f) acts of mother nature (lightning, floods, earthquakes, etc); (g) modification of the controller in any way.

Defective parts should be returned to the local ControlOMatic Dealer. Any parts returned directly to ControlOMatic require a Return Material Authorization (RMA) code issued by a ControlOMatic Technician.

ControlOMatic makes no warranties, either expressed or implied, other than those stated above. No representative has the authority to change or modify this warranty in any way. Warranty Registration can be done at www.miniwarden.com or call 530-205-4520.

Any warranty claims should be directed to the following address:
ControlOMatic, Inc.
12659 Arbor In
Grass Valley, CA 95949
530-205-4520