SeaSide Automation

POOLWARDEN Plus
MINIWARDEN Plus

Automated Pool & Spa Chemical Controller
With WiFi, Ethernet, Bluetooth, HDMI & USB

Operation Manual

SeaSide Automation
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Manuals also available at:
https://www.seasideautomation.com/support/documents

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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. Safety of any system incorporating this equipment is the responsibility of the assembler of the system. 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.

IMPORTANT WARNING AND SAFETY INSTRUCTIONS

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 – Do not install load bearing leads and/or sensor cables longer than 3 meters.***

10 ***WARNING – Always mount PoolWarden in safe and dry area. Never mount PoolWarden above any other electrical equipment.***

11 ***WARNING – Install PoolWarden in a location that is not accessible to the public.***

12 ***WARNING – Pool and Spa Chemical Safety***

12.1 Never mix sodium hypochlorite and muratic acid!

12.2 When mixing acid and water, always add acid to the water, never add water to the acid.

13 **CAUTION – TEST THE GROUND FAULT CIRCUIT INTERRUPTER BEFORE EACH USE OF THE POOL/SPA**

14 **CAUTION – CONNECT ONLY TO A CIRCUIT PROTECTED BY A CLASS A GROUND FAULT CIRCUIT INTERRUPTER**

15 **WARNING – When using the TrueDPD free chlorine sensor, if it measures 0.0 (no chlorine) that will not cause the sanitizer relay to turn on to prevent over-chlorination. This may happen if the DPD reagent bottle is empty.**

16  **Do not dispose in trash. Please visit www.seasideautomation.com for recycling information.**

[redacted]

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/MiniWarden Overview

SeaSide Automation, with over 25 years of technological leadership in Pool & Spa Chemical Control Systems, congratulates you on your chemical controller selection. PoolWarden measures pH, sanitizer and temperature on up to two bodies of water (MiniWarden one body 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 240 VAC to control chemical feed equipment using relays to keep the pool or spa water in balance. Water measurements are taken continuously while internal relay programing determines if chemical adjustments are needed. PoolWarden also contains additional dry-contact auxiliary relays that can be used to control heaters, pumps, chlorine backup and external alarm notifications. The MiniWarden has the above features except it is for one pool only and does not have auxiliary relays. The sanitizer relay on the MiniWarden can be switched between VAC and dry contact.

System Components

- **Plus CONTROLLER:** Micro computer running the Linux operating system.
- **INTERFACE:** 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.
- **MEMORY:** Hard drive is 16 GB MicroSD which preserves all internal programming in case of power loss.
- **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). MiniWarden includes 2 relays - 1 for pH and 1 for ORP.
- **SENSORS:** ORP, pH, Temperature, flow and optional free chlorine.
- **SECURITY:** A lockable enclosure and three levels of password security protection (Admin, Service and Guest) for both local onsite and remote offsite interaction with the controller.
- **COMMUNICATION:** Connection to the Internet for direct monitoring, setup, and data interface via WIFI and Ethernet.
- **DATA:** Unlimited data recording.
- **HEATERS:** Auxiliary relays can control pool heaters with up to two set-points for each day to facilitate energy management (PoolWarden only).
- **PUMP CONTROL:** Auxiliary relays can be setup as a simple timer for controlling the on/off state of main pumps (PoolWarden only).
- **OVERFEED PROTECTION:** PoolWarden is designed with 2 types of overfeed protection. Standard overfeed limits the amount of time a relay can turn on feed equipment in a 24-Hour period.
- **SPAN CONTROL:** Proportionally reduces the on-time as the measurement gets closer to the set-point to prevent overshoot.

PoolWarden and MiniWarden Plus Versions

This operation manual covers both PoolWarden and MiniWarden and they will both be referred to as PoolWarden. The MiniWarden/PoolWarden plus version use the same software and share many of the same features. Any differences will be indicated with (PoolWarden only).

PoolWarden Dual: Sensors and relays will display with a "1" or "2" indicating pool 1 or pool 2. Examples are ORP1, PPM2, Alarm1, …

PoolWarden Single and MiniWarden: Sensors and relays will display without a number because there is only one pool.

Plus Conversion: To make a MiniWarden/PoolWarden a Plus install the PW-Plus communication module and in the Handy Menu enter the code 1927192766. You will need to update all settings. To remove the Plus simply remove the communication module and follow the on screen instructions.

Maximum Electrical Specifications

ITEM	DESCRIPTION	LIMIT
Input Voltage	Maximum input AC voltage	240 VAC, 50-60 Hz
Input Current	Maximum input current	10 A
Relay Voltage	Maximum relay voltage	240 VAC
Relay Current	Maximum Relay Current	2.5 A
Standby Current	Maximum operating current	0.1 A Max
Fuse Rating	F1	5A, 250V, 05x20
Fuse Rating	F2	5A, 250V, 05x20
Fuse Rating	F3	1A, 250V, 05x20
pH	Measurement of pH	4.22 to 9.98
ORP	Oxidation Reduction Potential	0 to 999 mV
Free Chlorine - PPM	With optional TrueDPD sensor NSF Certified Range	0 to 6.0 PPM 10%
Free Chlorine - PPM	Extended non-NSF Certified Range	6.0 to 9.5 PPM 20%

Environmental Specifications

ITEM	DESCRIPTION	LIMIT
Elevation	Not to be used above	2000 m
Temperature	Minimum/Maximum Operating Temperature	30/110 °F
Temperature	Water temperature measurement.	32 to 122 °F
IP Rating	Suitable for Outdoor Use	IPX3
Pollution	Pollution Degree	2

Certifications

Certified to NSF/ANSI Standard 50

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

Models and Options

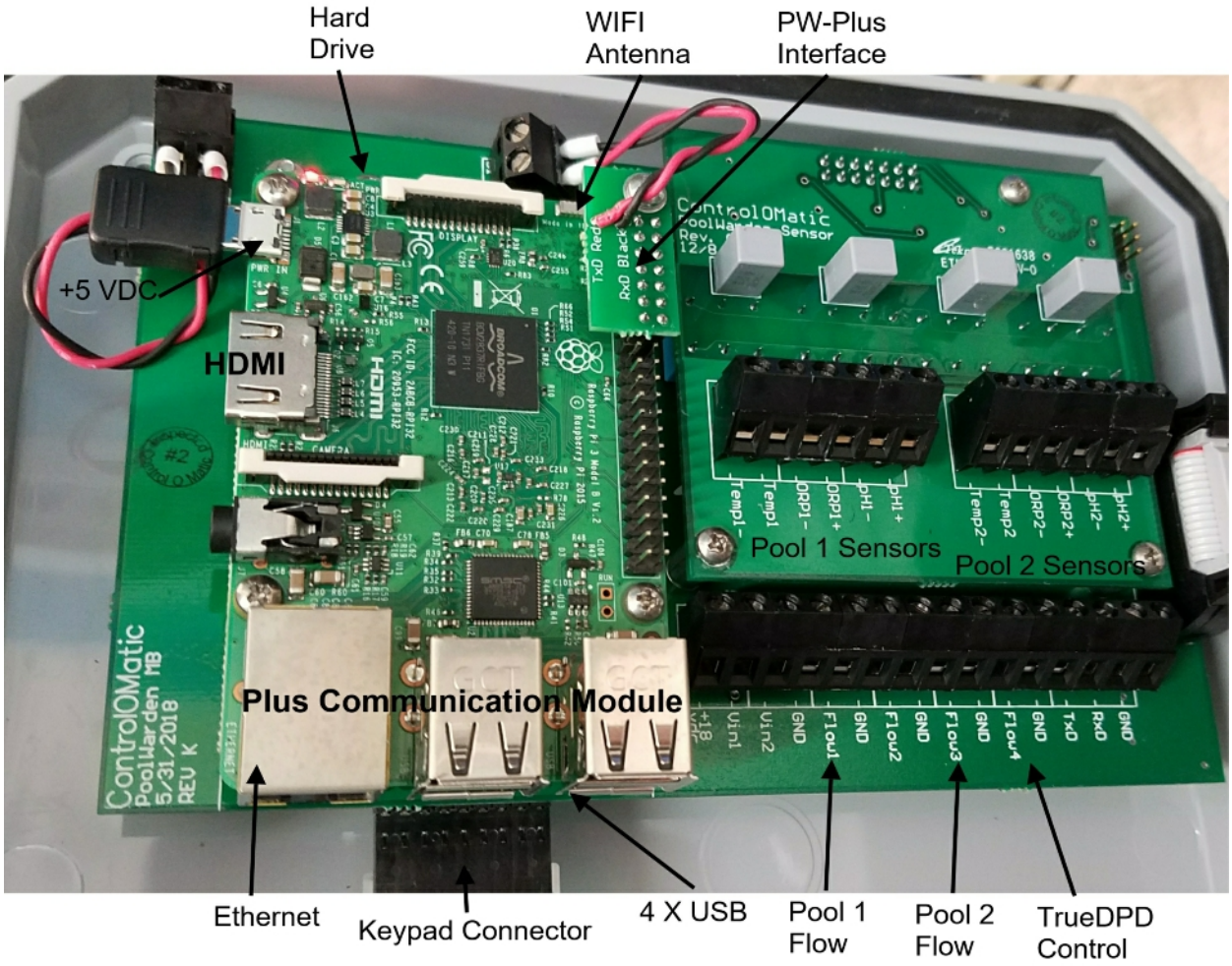
ITEM	DESCRIPTION
PW–SFC	Single pool PoolWarden controller with flow cell and sensors
PW-DFC	Dual Pool PoolWarden controller with flow cell and sensors pre mounted on white back panel
PW-SMTD	Single pool PoolWarden controller with flow cell and sensors pre mounted on white back panel
PW-DMTD	Dual Pool PoolWarden controller with flow cell and sensors pre mounted on white back panel
MW-FC	MiniWarden with Flow Cell, ORP, pH, Temp sensors and Flow switch
MW-MTD	Flow Cell, sensors, 33' of 1/2” flow tubing, 4x Jaco fittings, mounted on 24”x12” panel
PW-Plus	Add the communication option to make the PoolWarden/MiniWarden a Plus.
TrueDPD	Adds free chlorine measurement using the DPD colorimetric method. This is available as a single and dual sensor.

PoolWarden / MiniWarden Plus Features

The PoolWarden+ uses an advanced communication module that controls the operation of the system. An Internet connection is required for time, date and data functions. A Linux based operating system provides significant functionality advances including the ability to connect a computer monitor, keyboard and mouse.

Features

- ♦ 64bit ARMv7 Quad Core Processor
- ♦ 1GB Ram
- ♦ Built in WiFi, Ethernet and Bluetooth
- ♦ 4 x USB 2 ports
- ♦ Full size HDMI for external monitor, 1920x1200
- ♦ CSI camera port
- ♦ Micro SD port for a hard drive, 8GB
- ♦ Internet connection required for time, date and data. There is no setting for time, date and daylight savings - it is automatic from the Internet.
- ♦ Easy software updating
- ♦ Built in web browser, with external monitor
- ♦ Unlimited data recording
- ♦ Data saved in SQLite3 database, easy to retrieve
- ♦ Built in data server for direct connect
- ♦ Supports both mixing time or cycle time relay control
- ♦ PH and ORP Control span simplifies proportional control
- ♦ Daily data reporting
- ♦ Removal of the PW-Plus module causes the PoolWarden/MiniWarden to revert back to the WS version without communication



Operation

Keyboard

This section reviews all the navigation features associated with keyboard.

- **Back:** From the main readings display the **Back** button provides access to the main menu where all of the configurations are. If 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 menu and pressing it enough times will get back to the readings display.
- **Enter:** The **Enter** button provides access to most menus and sub menus and allows you to accept or save an entry.
- **Numbers:** The number keys allow entry of numbers only. If there is a '.' Or ':' in the number the cursor may skip over it to highlight the next number. When entering a number, the cursor will skip to the next number automatically.
- **Characters (Text):** Some values require text entry and the alphanumeric values are shown on each button as capital letters. The cursor does not skip to the next letter, press the right and left arrow to position the cursor. Press the same button consecutively to cycle through all the letters and number. The ordering is the number, then lower case, then upper case and then back to the number. The current selections that use text include: Name, Pool1 and Pool2 in the Setup menu, SSID and Password in the Internet WIFI menu, and the AUX relays for the PoolWarden only.
- **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 vise-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.

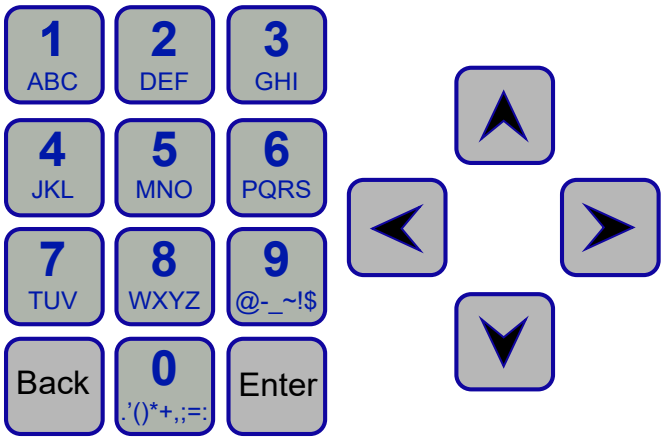
Entering Values

To change values press the **Enter** key and edit the value using the keyboard. Press **Enter** to save the new setting or **Back** to abort the change. Some changes cycle through the values, continue to press **Enter** or **Right Arrow** to cycle to the desired setting.

When making changes they will be saved to memory when the controller's back light turns off which is 2 minutes from the last button press. Press the 5 button on the readings screen to immediately turn the back light off and save the changes.

MiniWarden Keyboard

PoolWarden Keyboard



Default Readings Screen

The Default Readings Screen is displayed after power up and when a button isn't pressed for 2 minutes. 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.

PoolWarden+ Dual TrueDDPD

```
PPM ORPmV pH  Tf Flow
1.5 681 7.7  75 1:_a
3.2 695 7.5 102 3:d
RlyP1↑↓o  P2_↓o  23%
```

PoolWarden+ Single

```
ORPmV pH  Tf     Flow
681 7.7  75      _:_a

RELAY↑↓o          23%
```

- **Row 1 (Column Header):** The first row is a column header and defines what you find below that particular column header. Example: 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.
- **Row 2 (Current Measurements Pool1):** The current real time measurements and status for Pool 1. Example for Pool 1: ORP=681, pH=7.7, Temperature (Tf) = 75 degrees Fahrenheit, Flow switch 1 is ON. The "a" on the far right indicates that Pool1 is in alarm.
- **Row 3 (Current Measurements Pool2, PoolWarden only):** The current real time measurements and status for Pool 2. Example for Pool 2: PPM = 3.2, ORP = 695, pH = 7.5, Temperature (Tf) = 102 degrees Fahrenheit, Flow switch 3 is 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);
  - **PoolWarden Dual: RlyP1:** ORP1, pH1, Aux1, Aux2 **P2:** ORP2, pH2, Aux3, Aux4
  - **PoolWarden Single: RELAY:** ORP1, pH1, Aux1, Aux2
  - **MiniWarden: RELAY:** ORP1, pH1
  - _ : An underline indicates the relay is OFF and not in an active feed cycle. If there is no underline for the Aux relay then the relay isn't setup for control.
  - ↑ : 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. Note that cycling the power doesn't clear the overfeed time. Select Clear Overfeed Times in the service menu to reset the timer.
  - 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). Select Clear Overfeed Times in the service menu to reset the timer.
  - The letter 'b' next to an ORP reading indicates ORP is in pH lockout and the feature of feeding sanitizer at a fixed rate of minutes per hour is on (not available with TrueDPD or MiniWarden).
  - The letter 'p' next to an ORP reading indicates ORP is in pH lockout and is off.

  When the PoolWarden is turned on a time 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 readings prior to controlling the relays.
- **Other Symbols Defined:**
  - The letter "a" on the right will display when the Pool alarm is on.
- **Flow Status:** The flow will either be ON or OFF with the standard flow sensor. 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.
  - Pool1: 1:2, Both flow switch 1 and 2 are on. 1:_, Flow switch 1 is on, 2 is off.
  - MiniWarden with TrueDPD: 1:d, Flow switch 1 is on and 2 is used for TrueDPD commands.
  - Pool2 with TrueDPD: 3:d, Flow switch 3 is on and 4 is used for TrueDPD commands.
- **PPM Display on Error:** When the TrueDPD has an error the PPM is set to a high value so that it will not start a sanitizer feed cycle. If that happens the PPM value will display as "—".

PoolWarden/MiniWarden Menu Structure

Simply press the **Back** button from the 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.

Menus

Indexes

```
Langelier and Ryzner
Enter measurements in
the Handy menu to
enable the index
```

UP Press Up Key

2: ORP Quick Menu

3: pH Quick Menu

Readings Screen

```
ORP(m V) pH   Tf     Flow
681 7.7   75     1:_a
695 7.5 102     3:_a
RlyP1↑↓o_ P2_↓o_
```

Down Press Down Key

Handy Menu

```
Daily Noon Data
Past Data
Enter Measurements
Relay Information
About Screen
Enter a Code
Startup Screen
```

Startup Screen

```
PoolWarden+ Pool/Spa
Chemical Automation
SN:790860 11/20/20
11/23/20 11:15:58
```

TrueDPD Readings Screen

```
PPM ORP(m V) pH   Tf Flow
1.5 681 7.7   75 1:_a
2.5 781 7.3 104 3:da
RlyP1↑↓o_ P2_↓o_ 55%
```

Right Press Right Key

Alarm Screen

```
Pool 1 Active Alarms
On if PPM < 1.0
```

Right For alarms on Pool 2

Back Press Back Key

Main Menu

```
Service    Internet
TrueDPD    Security
Relays     Printer
CYA        Setup
```

Service

```
Relay Manual Mode
Clear Overfeed Times
Disable All Relays
Calibration Poo1
Calibration Poo2
```

TrueDPD

```
Manual Control
Reagent: Powder
DPD Bottle: 4 oz
Pool1 Cycle:00:30:00
Pool2 Cycle:01:00:00
Pool1 Sanitizer:  Cl
Pool2 Sanitizer:  Cl
```

Relays

```
Ph1   ORP1   AUX1
AUX2  Alarm1
Ph2   ORP2   AUX3
AUX4  Alarm2
```

CYA

```
from Dusk Hour    0PM
Night Time Setpoints
ORP1   0  Orp2   0
to Dawn Hour      0AM
```

Internet

```
Data Server Setup
Information
WIFI Connect
Software Update
```

Security

```
Master          0
Operator        0
Service 1       0
Service 2       0
```

Printer

```
Print Interval 4 hrs
Print Data Now
Print Last 7 Days
Printer MAC Address
  00:11:22:33:44:55
Remove Printer
Print Setup
Turn On Pairing Mode
Set Bluetooth Name
```

Setup

```
Units: English
Pools: 2 (Dual)
Names Menu
Advanced Menu
Aux1: Not Used
Aux2: Not Used
Aux3: Not Used
Aux4: Not Used
Factory Defaults
PH/ORP Ctrl: Mixing
TrueDPD: Enabled
Time Zone - Pacific
Unused Rly Cmds:Show
Alarm Deltas: On
P1 pH LKout min/hr 0
P2 pH LKout min/hr 0
```

Information Menus

PoolWarden has 6 information screens (handy, alarm, Langelier index, setpoint, special information and TrueDPD) which are all accessible directly from the Readings Screen. The information screens are NOT password protected.

Handy Menu

Press ▼ **Down Arrow** or **Enter** from the default readings screen.

- **Daily Noon Data:** Allows scrolling through the noon time readings beginning with the last recording. The right and left arrow change the days. If the controller isn't on at noon there will be no reading saved.
- **Past Data:** This menu provides access to PoolWarden's internally recorded data. The data can be displayed visually on screen.
  - **Back** - > Quit: Exit the Data and bring you back to the Data Recording screen.
  - ↑: Pressing the **Up Arrow** will jump forward 20 rows of data.
  - >: Pressing the **Right Arrow** will move forward 1 data row at a time.
  - <: Pressing the **Left Arrow** will move backward 1 data row at a time.
  - ↓: Pressing the **Down Arrow** will jump backward 20 rows of data.
- **Enter Measurements**: The following manually taken pool measurements: PPM, pH, ALK, Hardness and CYA can be entered here. If PoolWarden is communication enabled then the data will be sent / stored at www.PoolWarden.com with time stamps of when the measurements were made.
- **Relay Information:** Displays current information about the relays. When a relay should be on and isn't turning on this screen helps to diagnose why the relay isn't turning on.
  - Line 1: Includes the name of the relay and the current status: "v" is in the off part of an active cycle, "^" is in the on part of an active cycle, "_" not in an active cycle - relay is off. Press the right and left arrows to switch relays.
  - OnToday: The length of time the relay has been on today. This can be cleared in the Service menu.
  - MonthOn: The total hours and minutes the relay has been on for the month.
  - Cnt: The time the relay has turned on in the day.
  - TMR: The current cycle timer. If the relay should be on the timer is typically counting, if not counting then refer to the relay setup to see why it isn't turning on.
- **About Screen:** List the total hours the unit has been on, total number of power up cycles, data packets sent and other information.
- **Enter a Code**: Allows for the entry of a factory code that can clear the passwords or put the controller in a demonstration mode.
- **Startup Screen:**
  - Line 1: Model - PoolWarden or MiniWarden
  - Line 2: Name of the location if entered
  - Line 3: The serial number and software date
  - Line 4: Current date and time are displayed

Relay Information

```
Relay Name pH      v
OnToday   00:32:56
MonthOn 0000:32
Cnt 99  TMR 00:04:13
```

About Screen

```
Version     1.95
Updated On: 04/20/18
Serial Number 790860
05/02/18 11:51:42
On Cycles:       203
On Time:      157:02
Packets Sent:    284
Data Records:   1066
```

Startup Screen

```
PoolWarden+ Pool/Spa
Downtown Pool
SN:790860 04/30/18
05/02/18 12:00:15
```

Alarm Screen

Press ► **Right Arrow** from the readings screen to access the alarm menu. The alarm screen shows all the conditions that are or will cause the alarm light to be on. If the alarm light is off and there are conditions listed in the alarm screen then the alarm delay hasn't been reached yet. The alarm delay requires the alarm on condition to exist for a period of time before the alarm actually turns on.

Alarm conditions are set up in the Relay Setup Menu.

For the PoolWarden dual pool controller, press the **Right Arrow** a second time for the alarm conditions on pool 2.

Setpoints

Press the 9 key from the readings screen to show current set-points.

Special Information

If there is anything to report there will be a "4" in the lower right corner of the readings screen. Press the 4 button to see the information.

- ♦ WIFI IP address will always be listed.
- ♦ If the ORP is being reduced from the cyanuric acid that will display
- ♦ If unable to connect to the Internet.

Langelier / Ryzner Index

To enable, enter the Alkalinity and hardness in the Handy Menu, Enter Measurements. To view the index, press the **Up Arrow** from the readings screen. If either the Alkalinity or hardness are 0 the index will not display. Press the up arrow again to cycle between indexes.

Langelier / Ryzner

```
Langelier Index
Enter measurements
In the Handy menu
To enable the index
```

TrueDPD Information - Option

Press "6" for the TrueDPD information screen. Appendix F covers TrueDPD.

Quick Menus

Quick access to the most common settings for pH and ORP control. This is also password protected and for the service password these limited settings can be changed.

- ♦ Press "2" from the readings screen for the Quick ORP Menu
- ♦ Press "3" from the readings screen for the Quick pH Menu

Press "2"

Quick ORP with PPM

```
ORP1 Quick Settings
ORP Setpoint      700
PPM Setpoint      2.0
MaxTime On   00:01:00
MinTimeOff   00:05:00
ORP2 Quick Settings
ORP Setpoint      700
PPM Setpoint      2.0
MaxTime On   00:01:00
MinTimeOff   00:05:00
```

Press "3"

pH Relay Settings

```
ORP1 Quick Settings
Acid Setpoint     7.5
MaxTime On   00:00:30
MinTimeOff   00:05:00
ORP1 Quick Settings
Acid Setpoint     7.5
MaxTime On   00:00:30
MinTimeOff   00:05:00
```

Main Menu

The main menu is password protected and where all the configurations take place. Press the **Back** button from the readings screen. If security is enabled a password will be required.

Main Menu	
Service	Internet
TrueDPD	Security
Relays	Printer
CYA	Setup

Main Menu - Service

The Service Menu includes common items to service a pool including manually feeding chemicals and calibration.

Service Menu

```
Relay Manual Mode
Clear Overfeed Times
Disable All Relays
Calibration Pool1
Calibration Pool2
```

- **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.
  - ❑ If the relay is currently ON, it will turn off for the manual time and then go back into auto control.
  - ❑ If the relay is OFF, it will turn ON for the manual time and return to auto control.
  - ❑ If the relay is OFF and in manual mode, it will return to auto.

Relay Manual Mode

```
PH1    00:00:00 OFF
ORP1   00:00:00 OFF
Aux1   not used
Aux2   not used
PH2    00:00:00 Off
ORP2   00:00:00 Off
Aux3   not used
Aux4   not used
```

- **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. This selection also clears the number of times the relay has turned on during the day and the setpoint overfeed timer.
  - ❑ Cycling power does not clear the overfeed timers.
  - ❑ The Setpoint Overfeed timers are also cleared when selecting the Clear Overfeed Times.
- **Disable All Relays:** Press **Enter** or **Right Arrow** to increment the hours off from 0 to 13. When the relays are disabled, the readings screen bottom row will display “RLY Off 03:30:53” showing how much longer until the relays go back to automatic control.

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
```

- **Calibration Pool1 and Pool2:** Select the desired pool to calibrate and scroll to the sensor to calibrate. Manual Pool Measurements must be taken to calibrate each sensor. For best results the pool should be at the setpoints 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. When calibrating, press **Back** or **Down Arrow** to cancel and **Enter** to save the new calibration. The current value displayed in the calibration screens is the un-calibrated sensor.

Calibrate pH

```
Calibrate pH1
Current: 7.7
Range 4.2 to 9.8
  v-Cancel
```

  - ❑ 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. If the sensor need a lot of calibration it may need to be relocated closer to the water inlet from the pool.
  - ❑ PPM: If the TrueDPD is connected there will be a selection for calibrating the free chlorine. Refer to appendix F for more information.
  - ❑ Clear Cal: Removes the calibration and the reading is immediately updated.

Main Menu - TrueDPD

See appendix F.

Main Menu - Relays

The PoolWarden Aux relays are covered in the Setup section and Appendix A. From the Readings Screen press the **Back** button to access the Main Menu and select Relays. The relays are controlled with commands that can be enabled or disabled. Any command that has a value of 0 is disabled. The values listed are the defaults. When using the Cycle control type, please refer to appendix B. Only Aux relays that have been setup will display. Scroll to the appropriate relay and press **Enter** to edit the settings.

Relay Setup Menu

```
pH1     ORP1
        Alarm1
pH2     ORP2    ORP
Level   Alarm2
```

pH Relay Settings

```
ManualTime   00:02:00
pH Control Span   0.3
Acid Setpoint     7.5
Base Setpoint     0.0
On DELAY     00:00:20
MaxTime On   00:00:30
MinTimeOff   00:05:00
Off if RLY On none
Off if Flow Off FS 1
SetOvrfeed   00:00:00
Overfeed     01:00:00
```

Relay Setup: pH1 and pH2

In the Relay Menu scroll to pH1 or pH2 and press **Enter**. The following reviews each command within a pH Relay.

- **Manual Time 00:02:00:** Is the amount of time you can set a relay to turn on manually.
- **PH Control Span:** Select 0.0, 0.2, 0.3 or 0.4. When the measurement is greater than the span away from the setpoint the on time will be the full on time. When the measurement is between the setpoint and the span away from the setpoint the on time will be decreased to reduce overshooting the setpoint. When set to 0.0 the on time will not be adjusted. Press **Enter** or **Right Arrow** to cycle the values.
- **Acid Setpoint 7.5:** The relay will turn on if the measured pH reading is greater than 7.5.
- **Base Setpoint 0.0:** The factory default setting is 0.0 (disabled). When set, the relay will turn on if the measured pH reading is less than the value. Note: One of the two setpoints must be 0.0.
- **On Delay 00:00:20:** The turn on delay requires the setpoint condition to be met for an extended period of time before turning the relay on. The value 00:00:00 disables the on delay.
- **Max Time On 00:00:30:** When the relay turns on this is the maximum time before it turns off. If the pH reading is not being maintained then more or less on time may be needed. The maximum time may be less if the pH control span is used.
- **MinTimeOff 00:05:00:** This is the minimum amount of time the relay will be OFF after it was on. Allows for chemical mixing.
- **Off If RLY On -none:** The default setting is none or disabled. This feature prevents 2 relays being on at the same time. This is useful in cases where the chemical injection points are very close together and prevents the pH relay from being on at the same time the ORP relay is on. Simply press **Enter** to toggle.
- **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**: Setpoint overfeed requires the measurement to reach the setpoint to clear. 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.
  - ❑ Setpoint Overfeed can be cleared by manually fixing the chemical imbalance or clearing the overfeed timers in the Service menu.
- **Overfeed 01:00:00:** The Overfeed time represents the maximum amount of time a relay can be on 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 and the default time will most likely need to be adjusted.

1. Calculate the total amount of chemical the pool would ever need in a 24 hour period.
2. 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 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 10 GPD = 8 GPD.
3. Calculate the overfeed time with the following equation using the following example…..
   Overfeed Time = (Daily Gallon Limit) / (Pump GPD Rate) times (24 Hours)

ORP1 and ORP2 Relay Configuration

In the Relay Setup Menu scroll to ORP1 or ORP2 and press enter. If the TrueDPD is enabled there will be PPM commands.

ORP Settings

```
ManualTime  00:02:00
ORP Control Span  40
ORP Setpoint     700
PH Lockout       0.0
On DELAY    00:00:20
MaxTime On  00:01:00
MinTime On  00:00:00
MinTimeOff  00:05:00
ORP High Limit     0
Off if Flow Off FS 1
SetOvrfeed  00:00:00
Overfeed    01:00:00
```

with TrueDPD PPM

```
ManualTime  00:02:00
ORP Control Span  40
PPM Control Span 1.0
ORP Setpoint     700
PH Lockout       0.0
PPM Setpoint     2.0
On DELAY    00:00:20
MaxTime On  00:01:00
MinTime On  00:00:00
MinTimeOff  00:05:00
PPM High Limit   0.0
ORP High Limit     0
Off if Flow Off FS 1
SetOvrfeed  00:00:00
Overfeed    01:00:00
```

- **Manual Time 00:02:00:** Is the amount of time you can set a relay to turn on manually.
- **ORP Control Span:** Press Enter to cycle between 0, 10, 20, 30, 40 and 50 mv. If the measurement is less than the span below the setpoint then the relay will be on for the full on time and if in between the setpoint and the span the on time will be proportionately decreased. If the measurement is greater than the setpoint the relay will be off. Span control helps to prevent chemical overshoot.
- **PPM Control Span:** Press Enter to cycle between 0, 0.5, 1.0, 1.5 and 2.0 ppm. If the measurement is less than the span below the setpoint then the relay will be on for the full on time and if in between the setpoint and the span the on time will be proportionately decreased. If the measurement is greater than the setpoint the relay will be off. Span control helps to prevent chemical overshoot. If both PPM and ORP spans are used, the higher calculated on time will be used.
- **ORP Setpoint 700:** The relay will turn on if the ORP is less than 700.
- **pH Lockout 0.0:** The pH Lockout default setting is zero “0” or disabled. ORP is highly dependant on pH. A high pH reduces the effectiveness of the sanitizer and has a direct effect on lowering the ORP 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 (keep from turning on) the ORP relay when pH reaches 8.0 or higher. This command doesn’t effect the PPM setpoint. In the setup menu a feed time in minutes per hour can be selected to allow some feeding of sanitizer during pH lockout, this feature is only available if the TrueDPD isn’t enabled.
- **PPM Setpoint 2.0:** The relay will turn on if the measured PPM is less than 2.0. As a Safety the PPM must also not be 0.0. If the DPD reagent is out or something is wrong with the TrueDPD it may measure 0.0.
- **On Delay 00:00:20:** The turn on delay requires the setpoint condition to be met for an extended period of time before turning the relay on. The value 00:00:00 disables the on delay.
- **Max Time On 00:01:00:** When the relay turns on this is the maximum time before it turns off. If the sanitizer level is not being maintained then more or less on time may be needed. The maximum time may be less if the sanitizer span is used. Use Max Time On for liquid sanitizer.
- **Min Time On 00:00:00:** This is the minimum amount of time the relay will be ON if the measurement is below the setpoint. Use this command for salt water chlorine generators and chlorinators. With this type of on time, when the relay turns on it will be on until the setpoint is reached and for at least the on time specified. Span isn’t used. Note: Max Time On and Min Time On can’t both be 00:00:00 and one is required to be 00:00:00.

- **MinTimeOff 00:05:00:** This is the total amount the relay will be OFF in the off part of the cycle and is part of the mixing time. This command can't be disabled.
- **PPM High Limit 0.0:** Prevents feeding sanitizer if the PPM reading reaches a high value.
- **ORP High Limit 0:** Prevents feeding sanitizer if the ORP reading reaches a high value.
- **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.
- **SetOvrfeed 00:00:00**: Setpoint overfeed requires the measurement to reach the setpoint to clear. 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 starting from 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.
  - ❑ Setpoint Overfeed can be cleared by manually fixing the chemical imbalance or clearing the overfeed timers in the Service menu.
- **Overfeed 01:00:00:** 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.

Alarm 1 and 2 Setup

The Relay menu includes the alarm settings for the alarm light on the enclosure lid. Scroll to Alarm1 or Alarm2 and press **Enter**. To use delta values based on the setpoint rather than absolute values turn on Alarm Deltas in the Setup menu.

Absolute Sensor Alarms

- **High Alarms:** The alarm will turn on if the sensor is greater than the value.
- **Low Alarms:** The alarm will turn on if the sensor is less than the value.

Delta Sensor Alarms

Delta alarms are handy if you often change the setpoints. In that case the alarm limits automatically change without needing to also change the alarm limits. Temperature doesn't use delta alarms.

- **ORP+: Setpoint + 100:** The alarm will turn on if the sensor is greater than the ORP setpoint + the value. Press Enter to cycle between 0, 50, 100, 150, 200 and 250.
- **ORP-: Setpoint - 100:** The alarm will turn on if the sensor is less than the ORP setpoint - the value. Press Enter to cycle between 0, 50, 100, 150, 200 and 250.
- **PPM+: Setpoint + 3.0:** The alarm will turn on if the sensor is greater than the PPM setpoint + the value. Press Enter to cycle between 0.0, 0.5, 1.0, 1.5, 2.0, 2.5 and 3.0.

- **PPM-: Setpoint - 1.0:** The alarm will turn on if the sensor is less than the PPM setpoint - the value. Press Enter to cycle between 0.0, 0.5, 1.0, 1.5, 2.0, 2.5 and 3.0.
- **pH+: Setpoint + 0.4:** The alarm will turn on if the sensor is greater than the pH setpoint + the value. Press Enter to cycle between 0.0, 0.1, 0.2, 0.3, 0.4 and 0.5.
- **pH-: Setpoint - 0.4:** The alarm will turn on if the sensor is less than the pH setpoint - the value. Press Enter to cycle between 0.0, 0.1, 0.2, 0.3, 0.4 and 0.5.

Remaining alarm conditions

- **On If Flow Off FS 1:** The alarm will turn on if no flow is detected. Pool1 uses Flow Switch Input 1 and Pool2 uses Flow Switch Input 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 FS 1 (Flow Switch Input 1). 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 FS 3.
- **On If Overfeed - YES:** The alarm will turn on if the daily overfeed or setpoint overfeed has been reached for the indicated pool including the pH, ORP and Aux relays.
- **If DPD Below 10%**: With the TrueDPD enabled, this will turn the alarm on if the DPD reagent bottle drops below 10%. Make sure to set the value in the TrueDPD information screen.
- **If DPD Error:** If there is an error detected by the TrueDPD sensor such as the clear voltage below 3.50 turn the alarm on.
- **Off If Flow Off - none:** The PoolWarden will not send alarm notification if no flow is detected. If the main pump is off then you may not want to get alarm notifications.
- **On Delay 00:10:00:** The alarm will only turn on if this condition is satisfied for at least 10 Minutes. This command prevents multiple alarms if the sensor readings are fluctuating back and forth.
- **Min Time On 00:00:10:** The alarm will be on at least this long giving time for notifications to be sent out.
- **Min Time Off 00:00:10:** When the alarm turns off, it will be off at least this long.
- **Off If Time < 00:00:00:** This is a time of day command. Used to disable the alarm in the morning. If not 00:00:00, the alarm will be off from midnight until the time in this command. Use this command if you don’t want notifications at night.

Absolute Alarms

Alarm Settings	
ORP High Alarm	800
ORP Low Alarm	600
pH High Alarm	8.0
pH Low Alarm	7.0
Temp High Alarm	0
Temp Low Alarm	0
On if Flow Off	FS 1
On if Overfeed	Yes
Off if Flow off	none
On DELAY	00:10:00
MinTime On	00:00:10
MinTimeOff	00:00:10
OffIfTime<	00:00:00
OffIfTime>	00:00:00

with TrueDPD PPM	
ORP High Alarm	800
ORP Low Alarm	600
PPM High Alarm	7.0
PPM Low Alarm	1.0
pH High Alarm	8.0
PH Low Alarm	6.0
Temp High Alarm	0
Temp Low Alarm	0
On if Flow Off	FS 1
On if Overfeed	Yes
Off if Flow off	none
If DPD Below 10%	Yes
If DPD Error	No
On DELAY	00:10:00
MinTime On	00:00:10
MinTimeOff	00:00:10
OffIfTime<	00:00:00
OffIfTime>	00:00:00

Delta Alarms

with TrueDPD PPM	
ORP+: Setpoint	+ 100
ORP-: Setpoint	- 100
PPM+: Setpoint	+ 3.0
PPM-: Setpoint	- 1.0
pH+: Setpoint	+ 0.4
PH-: Setpoint	- 0.4
Temp High Alarm	0
Temp Low Alarm	0
On if Flow Off	FS 1
On if Overfeed	Yes
Off if Flow off	none
If DPD Below 10%	Yes
If DPD Error	No
On DELAY	00:10:00
MinTime On	00:00:10
MinTimeOff	00:00:10
OffIfTime<	00:00:00
OffIfTime>	00:00:00

Main Menu - Cyanuric Acid - CYA

ORP Is effected by cyanuric acid and during the day the ORP measurement will drop and at night it will go up for the same chlorine and pH level if there is cyanuric acid in the water. The higher the concentration the larger the ORP change. At night the ORP increases and the controller will not feed any more sanitizer until the sun comes up the next day, but during the night the actual chlorine may drop so in the morning the chlorine level may be low. Increasing the ORP setpoint at night will allow for sanitizer to still be fed even in the presence of cyanuric acid.

CYA - Single Pool

```
From Dusk Hour   0PM
Night time Setpoints
ORP    0
to Dawn Hour     0AM
```

CYA - Dual Pools

```
From Dusk Hour   0PM
Night time Setpoints
ORP1   0  Orp2   0
to Dawn Hour     0AM
```

- **from Dusk Hour 0 PM:** Use the CYA ORP setpoint from this hour at night. Select from 0, 5, 6, 7, 8, 9, and 10 PM. Set to 0 to not adjust until after midnight.
- **ORP1:** Enter the ORP setpoint for pool 1.
- **ORP2:** Enter the ORP setpoint for pool 2.
- **to Dawn Hour 0 AM:** Continue in the morning until this hour. Select from 0, 5, 6, 7, 8, 9, and 10 AM. Set to 0 to only adjust before midnight and not the morning.

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.

When the ORP is being reduced, the status will be indicated in the info screen, press 4 from the readings screen. If the hour matches the ORP will be reduced, if set to 10 AM, the ORP will be reduced until 10:59:59 AM.

Main Menu - Internet

The MiniWarden+ and PoolWarden+ include built in WiFi, Ethernet and Bluetooth. An Internet connection is required for accurate time and date. See appendix G for connection information.

Internet Menu

```
Data Server Setup
Information
WIFI Connect
Software Update
```

Data Server Setup

- **Send Data Packet:** Send data to the server to make sure it is working.
- **Interval:** The choices are 0 (no data), 15, 30, 60, 120 and 240 minutes. Note: Data will be sent to the data server at the specified interval in line with the actual time and stored into the internal database. Data recording is based on this interval in the Internet setup.
- **Start Hour:** Enter the hour to start sending data. Use this feature if you don't want to send data at night.
- **End Hour:** Enter the hour to stop sending data
- **On Alarm:** Send a data packet if the alarm turns on

Data Server Setup

```
Send a Data Packet
Interval  30 min
Start Hour    0
End Hour      0
On Alarm    No
```

Information

- **Lan and WiFi MAC address:** Some routers use the MAC address to grant access.
- **Lan and WiFi IP address**: The assigned IP address for both are listed.

WIFI Connect

- **SSID**: Enter the name of the network. Use a smart phone to list the available networks and to verify the correct spelling. The limit is 20 characters.
- **Pass**: Enter the network password. The limit is 20 characters.
- **Security**: The type of security protocols is in the works.
- **Update**: Performs the following: save the setup, update the WIFI settings and re-start the controller. For additional information refer to appendix G.

Software Update

Software updating in the field is supported with an Internet connection. Other methods include replacing the Micro SD hard drive or a memory stick in a USB port.

Software Update

```
PoolWarden Ver 1.95
Date 05/08/18
_Check for Updates
```

- **Select Check for Updates:** Press the Enter button.
- **Update To:** If there is a new version the selection to update will be displayed and press the Enter button to update. May take a couple minutes depending on the connection.
- If there are no updates that will also be displayed.
- The controller will automatically re-start after the update.

Main Menu - Security

Assign up to 4 passwords to the various personnel who will be working with or servicing PoolWarden. The main menu is protected while the Handy Menu, alarm screen and setpoints are not Password Protected. There are 3 levels of access that are defined below. Scroll to the level and assign up to a 6 digit password (numbers only) and press **Enter** to save. Entering zero "0" will disable a password. The master password is required if security is used.

Security Menu

```
Master                0
Operator              0
Service 1             0
Service 2             0
```

- **Master:** Access to all menus within PoolWarden including ability to add, delete, or change passwords. If the password has been lost, please read the troubleshooting section at the end of this manual.
- **Operator:** Access to all menus except the Security menu.
- **Service:** Access to the Service and quick ORP and pH.

Service Level

```
Service
Quick ORP
Quick pH
```

Main Menu - Printer

Bluetooth receipt printers are supported. Make sure the printer is on and select Find Printer - allow a couple minutes. Note: Multiple controllers can share the same printer, if there are multiple in the room and you do not want to use a specific printer turn it off first.

Printer

```
Print Interval OFF
Print Data Now
Print Last 7 Days
Printer MAC Address
  No Printer
Find Printer
Print Setup
```

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

- **Print Interval:** Press Enter to cycle through OFF, 30 min, 60 min, 4 hrs and Noon.
- **Print Data Now:** Print the current measurements now.
- **Print Last 7 days:** Prints the last 7 noontime measurements. There may be less than 7 if the measurements haven't been made yet or if the controller was turned off at NOON on some of the days.
- **Printer MAC address:** Will either show the printer MAC address or "No Printer".
- **Find Printer:** Select to find the Bluetooth printer. Allow about a minute and make sure the printer is on. If a MAC address is listed, this will display as "Remove Printer".
- **Print Setup:** Print out the current configuration.

Main Menu - Setup

The Setup 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.

- **Units:** Press **Enter** to toggle between the English or Metric System. This is for the display of temperature only.
- **Pools (PoolWarden):** Press **Enter** to toggle between single and dual pool mode. This setting is normally entered by the factory when PoolWarden is purchased.
- **Names Menu (PoolWarden Only)**
  - **Location**: Enter a descriptive name for the location
  - Pool1: Enter a descriptive name, ex: Main Pool
  - Pool2: Enter a descriptive name, ex: Kiddie Pool
  - AUX1-4: Enter a descriptive name
- **Aux1-4 (PoolWarden Only):** The pH and ORP relays are fixed in what they can control while the Aux relays have many types of equipment that can be connected. See appendix A for more information and the control types.
- **Factory Defaults:** Reset all settings back to factory defaults. Warning screen to press “9” to proceed.
- **pH/ORP Ctrl:** Mixing or Cycle. WARNING: Changing the control type resets all settings to factory default. See appendix B for more information on cycle control. Warning screen to press “9” to proceed.
- **TrueDPD:** Enabled or Disabled. Only enable if the TrueDPD external sensor box is installed and connected. WARNING: Changing this resets the ORP and Alarm relays to factory default. Warning screen to press “9” to proceed.
- **Time Zone:** Enter the appropriate time zone or the time will not be correct.
- **Unused Rly Cmds**: This setting makes the controller easier to program. When a relay setting is 0 that setting is skipped. Ex. For pH control, if Base Setpoint = 0 there is no reason to even see that command. Changing this setting to “Hide” will hide all of the commands that are 0 making the list of settings shorter. This also makes changing the settings safer because if the setting “Base Setpoint = 0” is not shown it can’t be accidentally changed.
- **Alarm Deltas:** Setting to “Yes” will use a value that is added to the setpoint as the alarm condition. When changing the setpoint the alarm will remain a consistent value away from the setpoint. For more information see the “Alarm 1 and 2 Setup” in the Relay Menu. Changing this will bring up the warning screen to press “9” to proceed as it will reset all alarms to factory defaults..
- **P1/2 pH LKout min/hr 0 (Poolwarden Only):** When in pH lockout most controllers disable sanitizer feed completely. The PoolWarden allows for a backup control when in pH lockout by feeding from 1 to 9 minutes every hour (0 disables). This feature isn’t included with the TrueDPD as the PPM measurement will be in control.

PoolWarden Setup no PPM

```
Units: English
Pools: 2 (Dual)
Names Menu
Aux1: Not Used
Aux2: Not Used
Aux3: Not Used
Aux4: Not Used
Factory Defaults
pH/ORP Ctrl: Mixing
TrueDPD: Disabled
Time Zone - Eastern
Unused Rly Cmds:Show
Alarm Deltas: On
P1 pH Lkout min/hr 0
P2 pH Lkout min/hr 0
```

MiniWarden Setup

```
Units: English
Name: MiniWarden
Pool1: Pool
Factory Defaults
pH/ORP Ctrl: Mixing
TrueDPD: Enabled
Time Zone - Pacific
Unused Rly Cmds:Show
Alarm Deltas: On
```

Appendix A: Auxiliary Relays (PoolWarden Only)

The two auxiliary relays per pool can be used to control 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. The type of control is selected in the setup menu.

Many of the values in these control types are 0 and if the “Hide Unused Relay Commands” is active most of the commands will not be visible. Make sure to change to “Show Unused Relay Commands” the first time setting up a new type.

Auxiliary Relays
Not Used
PH
Sanitizer
Heater
Alarm Out
SuperChlor
Water Level
Chiller
Feed Daily

- Not Used: This relay isn’t used
- pH: The same acid/base setup as the pH relays
- Sanitizer: Same as the ORP relays
- Heater: Use to control a heater, temperature control
- SuperChlor: Setup an aux relay for super chlorination
- Water Level: Control a solenoid to keep the pool at the proper level
- Chiller: Temperature control, but keeping the water cooler
- Feed daily: Very flexible and can be used to control the main circulation pump

Heater & Chiller Control Type

Heater Control	
ManualTime	00:02:00
Heater Setpoint	80
On Delay	00:01:00
MinTimeOn	00:02:00
MinTimeOff	00:02:00
Off if Flow Off FS 1	
Overfeed	05:00:00

- **Manual Time 00:02:00:** Is the amount of time you can set a relay to turn on manually.
- **Heater Setpoint:** This is the Main Temperature setpoint 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.
- **Chiller Setpoint:** This is the Main Temperature setpoint and the factory default setting is zero “0” or disabled. For a chiller the relay will turn on when the temperature is higher than the setpoint to cool the water down.
- **On Delay 00:01:00:** The on delay helps 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.
- **MinTimeOn 00:02:00:** This is the minimum amount of time the relay will be ON if the Temperature drops below the setpoint.
- **MinTimeOff 00:02:00:** This is the minimum amount of time the relay will be OFF after it has been on.
- **Off if Flow Off - 1:** Do not turn the heater on if there is no flow in the selected flow sensor.
- **Overfeed 05:00:00:** 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.

Alarm Out Control Type

Alarm Out	
On if Alarm On	Yes
Off if Flow Off FS	1
OffIfTime<	00:00:00
OffIfTime>	00:00:00

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

- **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
- **Off If Time < 00:00:00:** Turn off if the time is less than the value. Use this command if you don't want notifications at night.
- **Off If Time > 00:00:00:** This is a time of day command. If not 00:00:00, the alarm out will be OFF for the indicated time until midnight. Use this command if you don't want notifications at night.

Superchlorination

Super Chlorination	
ManualTime	00:02:00
DayOfWeek	smtwtfs
MaxTimeOn	00:00:00
MinTimeOff	00:00:00
OffIfTime<	00:00:00
OffIfTime>	00:00:00
Orp High Limit	700
PPM High Limit	0.0
Off if Flow Off FS	1

Use this relay control type to feed an increased amount of sanitizer once a week or a couple times a week. This is a fixed feed and doesn't turn off based on chemical levels being reached.

- **Manual Time 00:02:00**: The manual time can be used to test the sanitizer feed for super-chlorination.
- **Day Of Week smtwtfs**: Set the days of the week to perform super-chlorination. Note: With this command it will be on the entire day, use the Off if Time </> to limit the actual time of the day. To change the days press numbers 1-7 to toggle a specific day. Note: The relay will be on the entire day selected, use the commands below to set a specific time on the selected days.
- **MaxTimeOn**: The relay will be on for this amount of time. Calculate how much chlorine to add and set the time appropriately.
- **MinTimeOff**: After the relay has been on it will be off for at least this amount of time. Use this command to spread out the chemical feed time.
- **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.
- **ORP High Limit 700:** Turn off if the ORP exceeds this value.
- **PPM High Limit 0.0:** Turn off if the PPM exceeds this value.
- **Off if Flow Off - 1**: Do not super-chlorinate if the flow is off.

Water Level

Water Level is where a pool water fill 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 or 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.

- **Manual Time 00:02:00**: Manual feed time.
- **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**: 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.

Water Level	
ManualTime	00:02:00
On if Flow On	none
On if Flow Off	none
OffIfTime<	00:00:00
OffIfTime>	00:00:00
On 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 value. 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. 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.

Feed Daily Control Type

Feed Daily can be used to turn on a piece of equipment at the same time every day 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

- **Manual Time 00:02:00**: Manual turn on control.
- **Day Of Week smtwtfs**: Turn on for the selected days, 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.
  Note: Internet is required for correct time and date.

Feed Daily	
ManualTime	00:02:00
DayOfWeek	smtwtfs
On IfTime<	00:00:00
On IfTime>	00:00:00
MaxTime On	00:00:00
MinTimeOff	00:00:00
OffIfTime<	00:00:00
OffIfTime>	00:00:00
Off if Rly On	none

- **On If Time < 00:00:00**: Turn the relay on when the time is less than the value.
- **On If Time > 00:00:00**: Turn the relay on when the time is greater than the value.
- **MaxTimeOn 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 using MaxTimeOn, MinTimeOff must also be set to complete the cycle. Once this off time has been reached the relay will turn back on for the On Time.
- **Off If Time < 00:00:00**: The relay will be off if the time is less than the value.
- **Off If Time > 00:00:00**: The relay will be off if the time is greater than the value.
- **Off if Rly On none**: The relay will of off if the indicated relay is on. This command is use full if there are two pumps and only one should be on at the same time.

Appendix B: Cycle Times vs. Mixing Times

Mixing Time Control

A variable on time and a fixed off time make up the cycle. You have complete control on both of the times which makes it more flexible but there are two values to set instead of just a single value.

Cycle Time Control

A fixed cycle time is all that is needed. The cycle times are 1, 2 and 3 minutes. The On and Off time always add to the cycle time so that is fixed. Depending on the measurement, the setpoint and the span the on time will be adjusted. As the on time increases the off time decreases to keep the cycle the same.

Appendix C: Maintenance

Enclosure

The enclosure can be cleaned with a moist soft cloth. 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.
Plug any unused cable grips on the bottom side of the enclosure. 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 & pH Sensor Replacement

The 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 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

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 SeaSide Automation for sales and support. Send support emails to support@seasideautomation.com. The support line is 530 212-3497

Appendix D: 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. 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 ¼ turn. There is a polarity between the magnet and the flow sensor and rotating the sensor slightly may help. If there is a black mark on the sensor, rotate it so the mark is up.

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 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. 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 if 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 waters 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 there is cyanuric acid in the water. 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 controller has it's own unique reset code and one that works on one controller will not work on another.

Visit www.seasideautomation.com for videos and more troubleshooting ideas.

Appendix E - TrueDPD Free Chlorine Measurement

The **TrueDPD** is an option that adds a free chlorine measurement to the PoolWarden and MiniWarden. The measurement uses the DPD method and is not affected by pH, cyanuric acid, saltwater chlorine generators or any other variables that affect ORP and amperiometric sensors. For installation instruction please refer to the installation manual.

Features

- ♦ Single and two pool versions
- ♦ Uses low voltage power supply, 12 Vdc
- ♦ Uses about ¼ cup of pool water per measurement, water is not return back to the pool
- ♦ Low cost powder reagent, simply mix with distilled water
- ♦ Will automatically add a second drop of reagent if needed
- ♦ Will not start a chlorine production cycle if the measurement is 0 (for example if out of reagent)
- ♦ Adds free chlorine PPM to the PoolWarden and MiniWarden. Control on both PPM and ORP
- ♦ Safety relay command added to disable chlorine feed if the PPM is too high

DPD Bottle Fill

The TrueDPD comes with a 4 ounce bottle for the reagent. Also available are 8 and 16 ounce bottles. Over time the reagent darkens which can impact the readings. If using the larger bottles please contact us for instructions on obtaining a liquid reagent.

1. Remove the bottle from the TrueDPD. Hold the lid and twist the bottle to keep the tube from twisting.
2. Rinse out the bottle with distilled water. Make sure to not get any of the liquid from the bottle on your hands, wear protective rubber gloves.
3. **CLEANING:** Fill the bottle with tap water and place back into the TrueDPD. Turn the system on and go to the TrueDPD menu - manual operation menu and run a continuous purge for 60 seconds. This will clean out the tubes. Remove the bottle and any remaining water.
4. Add 0.5 grams of the DPD powder to the empty bottle using the small supplied spoon. Keep spoon dry.
5. Fill the bottle to the neck with distilled water, no need to fill all the way to the top. If TrueDPD is in a location over 80 degrees Fahrenheit the DPD mixture will get dark over time. Do not use tap water.
6. Replace the bottle back into the TrueDPD and tighten the lid.
7. IMPORTANT: Prime the DPD pump. From the readings screen press 6 for the TrueDPD status screen and press 2 “Purge” to start a 3 second on cycle, make sure it turns off - note: if currently in a measurement cycle pressing 2 will not purge. Observe the liquid progressing down the tube and entering the measuring chamber. Then press 3 “Meas” to start a measurement cycle.
8. While still in the TrueDPD information screen, press the **Up Arrow** to set the DPD reagent level, this will be reported in the data and on the readings screen. The **Up Arrow** decreases the level by 10% with each press.
9. When using DPD powder, replace when the bottle is dark (black). Reagent life is approximately 8 days. The life lowers with increasing temperature, make sure the TrueDPD is not installed in direct sunlight.
10. **IMPORTANT**: Open chlorine containers can cause premature reagent and equipment failure due to off gassing of chlorine. Make sure the TrueDPD box is sealed and closed. Proper room ventilation helps.

TrueDPD Information Screen

Press the 6 key from the readings screen to access the TrueDPD information screen.

- ♦ **CLRv:** The clear voltage, must be greater than 3.50 and less than 4.90 volts dc. If the clear voltage is out of this range, the PPM will not be measured and set to 9.8 PPM to indicate an error condition.
- ♦ **DPDv:** The voltage after the DPD reagent has been added. If the DPDv is greater than the clear voltage the PPM will not be measured and set to 9.8 PPM to indicate an error condition.

TrueDPD Information

```
CLRv DPDv PPM   P1
4.30 2.45 3.6 c55
4.31 3.45 1.6 v3.98
Err  purg  meas
```

- **P1 / 2:** The current pool being measured.
- **C##:** The current seconds count in the measurement cycle. A full cycle takes about 82 seconds.
- **V#.##:** The current measured voltage
- **Err:** Displays if there has been any errors in the measurement, press 1 or 7 to view.
- **Purg:** After replacing the DPD reagent, select "purg" by pressing 2 to turn the DPD pump on for about 4 seconds which will purge the tubes with fresh reagent.
- **Meas:** Press 3 to start a measurement cycle.
- **DPD Bottle Level:** The percentage of DPD reagent left. Press the **Up Arrow** to change the value in 10% increments.

TrueDPD Error Screen

```
-- Pool1 DPD errors
-ClearV below 3.5v 2
 Times, PPM = ---
-ClearV below DPDv
-DPDv was 0
-DPDv varying 10
-- Pool2 DPD errors
-ClearV above 4.9v 2
  Times, PPM = ---
```

TrueDPD Error Screen - Option

If "err" displays on the TrueDPD Information screen, press 1 or 7 to view the past errors. Viewing the errors clears the error status and any listed errors that have occurred since the last time viewed.

- — Pool DPD errors
- ClearV below 3.5v: The voltage was low one time, on the second attempt the clear voltage was above 3.5.
- ClearV below 3.5v 2 times, PPM = - - - : On the second attempt to make a measurement the clear voltage was still below 3.50, the measurement was canceled and the measurement set to - - -.
- ClearV above 4.9v: The voltage was high one time, on the second attempt the clear voltage was below 4.9.
- ClearV above 4.9v 2 times, PPM = - - -: On the second attempt to make a measurement the clear voltage was still above 4.90, the measurement was canceled and the measurement set to - - -.
- ClearV below DPDv: Warning - Notification that the DPD voltage was above the clear voltage. If there is no sanitizer or the PDD bottle is empty this can happen and is a warning.
- DPDv was 0: Warning - Notification that after adding the DPD reagent the voltage dropped to 0. This can happen if the sanitizer is very high. The TrueDPD is accurate from 0 to around 8.0, if the DPDv is 0 the sanitizer is above 8.0 and high.
- DPD Varying #: The TrueDPD requires two consecutive measurements to be close. This warning is the number of times since the last time the error screen has been viewed that an additional measurement was made because the DPDv varied over the previous measurement. This can happen if the sanitizer level changed. If unable to make 2 consecutive close measurements in 6 attempts the PPM will be set to - - - and the measurement aborted.

TrueDPD Menu

```
Manual Control
Reagent: Powder
DPD Bottle: 4 oz
Pool1 Cycle: 5 min
Pool2 Cycle: 5 min
```

Main Menu - TrueDPD

The TrueDPD is an optional piece of equipment that can be enabled in the Setup menu.

- **Manual Control:** 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.
- **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 is Lamotte 1B (P-6741) and lasts up to 90 days in heat. It is available on Amazon and for this reagent the shelf life date is important. ControlOMatic does not carry this reagent because of the shelf life. Liquid reagents from other companies will not work with the TrueDPD, only Lamotte 1B.
- **DPD Bottle**: 4oz, 8oz or 16oz. A 4 oz bottle has enough reagent for about 1800 measurements.
- **Cycle:** The cycle time between measurements and can be set to 10 min, 20 min, 30 min, 1 hour, 2 hour, 4 hours or 6 hours. Set to 0 to not make a measurement.

Manual Operation

The TrueDPD should be manually operated to verify correct operation after installation and from time to time. Select Manual Control in the TrueDPD menu to manually control the TrueDPD. Note that when some of the manual actions are turned on, the stirring motor and green LED may turn on. On the circuit, the right LED labeled Flow will flash about every second.

Manual Control	
1=DPD	9=DPD Purge
2=Flow1	4=Flow2
3=AllOFF	5=AllOn
6=Stir	v=4.25

1. 1 = DPD: Pressing number 1 will manually feed a drop of DPD.
2. 2,4 = Flow: Pressing numbers 2 or 4 will turn on a water flow pump.
3. 3 = AllOFF: Will turn off anything that may be on in the TrueDPD except for the green LED.
4. 5 = AllOn: Will turn on everything to run continuously.
5. 9 = DPD Purge, this will turn on the DPD pump to purge the lines and you must press 3 to stop it. Select this option to prime the DPD pump when re-filling the bottle.

Voltage: When the sensing chamber is clear the voltage should be between 3.5 and 4.9 V (3.50 is the minimum). There is a small adjustment dial inside the TrueDPD that is used to set this voltage. When some DPD is added and the sensing chamber water turns pink this voltage will drop. The amount that it drops is an indication of the free chlorine level. Do not adjust when the door is open in direct sunlight.

Manual Cycle: To operate a manual cycle, turn on the flow to clean out the sensing chamber with the water to be measured, the magnet will also be spinning and after 20 seconds press 3 to turn the water flow off. The clear voltage should be between 3.5 and 4.9 V. Press number 1 two times to feed two drops of DPD, press at least 1 second apart. Observe the voltage dropping and leveling off after 20 to 40 seconds. When done turn on a flow to clean out the sensing chamber.

PPM Calibration

The following conditions prohibit calibrating the PPM. In order to calibrate the conditions must be corrected.

- ♦ The TrueDPD is currently making a measurement, wait until finished.
- ♦ The displayed PPM is ”- - -”. A valid measurement is required to be able to calibrate.
- ♦ There must be enough chlorine in the water for the DPD voltage to be at lease 1.0 volt below the clear voltage which is about 0.5 PPM. If the chlorine is low calibrating the PPM is disabled.
- ♦ Using MPS will temporarily give a false chlorine PPM reading as well as a high ORP level. When using MPS, verify chlorine level manually for 24-48 hours.
- ♦ Free chlorine measurement is limited to 9.5 PPM. When shocking with chlorine, PPM reading may not read correctly for 24 hours until the free chlorine drops below 9.5 PPM.

Maintenance / Troubleshooting

- ♦ **Clear voltage drops over time:** The most common cause is the flow cell chamber is dirty. This most likely happens if the controller is turned off during a measurement after a drop or two of the DPD reagent has been added. 1: Replace liquid in reagent bottle with fresh water, 2: Go to the TrueDPD manual control and press 9 to run fresh water through the reagent tube for at least 2 minutes, 3: Turn the water in valves off and disconnect both tubes to the injector, 4: Unscrew the injector by hand, 5: With a Q-tip wipe the sides of the sensing chamber until clean, 6: Hand tighten the injector back in place - **IMPORTANT: Never tighten the injector with a wrench! IMPORTANT: The small tube on the top of the injector must be on the left side when done,** 7: Reconnect the injector tubes, 8: Refill the reagent bottle with reagent, 8: Open the water in valves, 9: From the readings screen press 6 for the TrueDPD info screen and press 2 to purge the reagent - at this point the sample chamber is filled with reagent, 10: **IMPORTANT: Press 3 or 9 to start a measurement cycle to clean out the chamber.** If there is no flow in the pool the measurement will abort and the chamber will need to be flushed using the TrueDPD manual control.
- ♦ **Pump tube replacement:** The peristaltic pump top simply twists off, there is no need to remove the pump!

Appendix F: Connecting to the Internet

The MiniWarden+ and PoolWarden+ operate using the Raspbian operating system. In most cases access to the operating system isn't required. In the following cases access to the operating system will be needed:

1. Set a static IP address
2. Don't know the name of the SSID

In order to connect the following additional items are required:

1. Mouse and Keyboard
2. Computer monitor with HDMI cable

Connecting to the Internet is similar to connecting any computer. In some cases a search may be needed depending on the application.

Service Types

There are 2 service methods for viewing data and/or making configuration changes, all require the Internet.

1. **Remote Data Server (RDS):** The controller sends data to https://www.poolwarden.com at a selectable rate. The RDS can be logged into from any Internet computer for viewing past data, past calibrations, past entered measurements and setting up alarm and text notifications. There is a yearly charge for the RDS per controller. The account can have any number of controllers.
2. **Local Data Server (LDS):** When the controller sends data to https://www.poolwarden.com, it also saves the data internally. The LDS supports viewing past data, making configuration changes, and manual relay control for the specific controller only. In the past this was called Direct Connect. This may require additional network setup for remote access.

Remote Data Server (RDS) And the Firewall

The controllers send data to the remote server at a specific rate using standard FTP (file transfer protocol). The controllers FTP uses ports 20 and 21 and the high value ports 50,000 to 51,000. In order to send data these ports must be open in the routers firewall.

Local Data Server (LDS)

In order to connect to the LDS the IP address is required.

- **Local Connection:** Enter the local IP address into a web browser to connect to the controller. The controller uses port 3000 and the address needs to be in the form 192.168.0.43:3000. A static IP is recommended but not required if you have easy access to the controller to obtain the address.
- **Remote Connection:** The router or network controller needs to route a remote request to the local IP address of the controller. One way to accomplish this is with port forwarding. A remote port can be used to accomplish this such as 173.195.186.60:1460 to 192.168.0.43:3000. A static IP is required for the controller so that it is always the same. If the local address changes in the controller the port forward would also need to be updated.
- **TeamViewer:** The PW-Plus communication module has TeamViewer pre-installed. This allows for making a connection with no change to the network or knowledge of the IP address. The TeamViewer ID for the controller should be in the comment section when logged into www.poolwarden.com. When using TeamViewer, the controllers desktop will display and then simply open the web browser on the controller for access to data and making changes.

Connecting with Ethernet

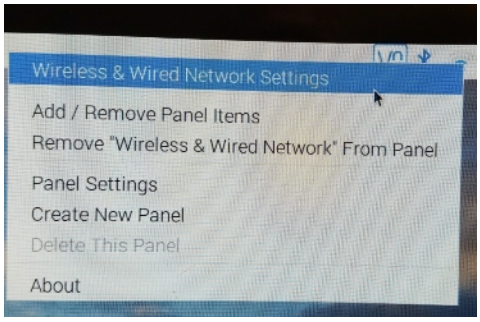
Route the Ethernet cable into the controller and connect to the communication connector. Route the cable through a cable grip, if it doesn't fit add the connector to the cable after it is routed into the inside of the enclosure.

Connecting with WiFi

The plus version includes built in WIFI and the antenna is on board. An external antenna can't be added. When selecting the installation location verify that the controller will connect with WIFI before installing.

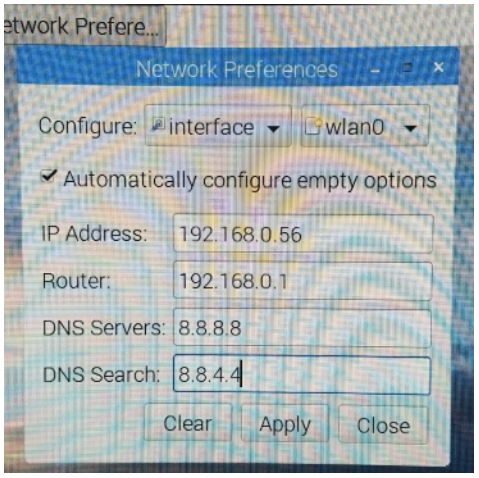
Setting a Static IP Address

If the network card supports MAC ID routing a static IP address may not be required. The MAC ID for the WIFI and Ethernet are listed in the Internet Menu under Information.



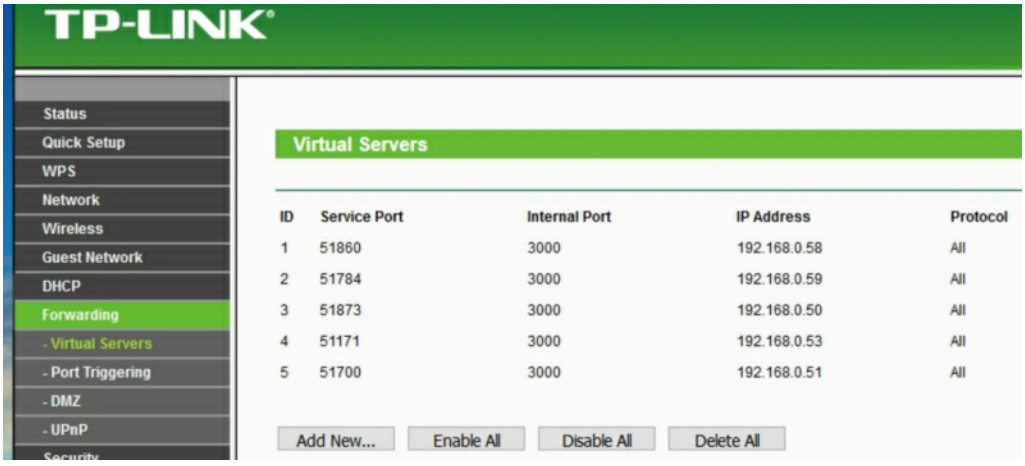
This is only required if you want to connect to the controller directly. The IP address can change from time to time and when set to static it will always be the same. The static IP address is usually assigned by the IT department.

- Connect a monitor and keyboard to the PW-Plus communication board.
- If the monitor doesn't display properly, cycle power and the monitor type should be detected at power up.
- Right click on the WiFi / Network icon in the upper right corner of the screen.
- Select "Wireless & Wired Network Settings" from the menu.
- In the right select next to configure interface eth0 for Ethernet or wlan0 for WiFi. There may be other choices as well.
- Enter the static IP address and the router's IP address, the DNS addresses can be left blank.
- Select Apply, if the static IP address is different than the current address reboot the system.



Setting Up Remote Access

Remote access allows a connection from off site to the controller. This will typically require the IP address of the facility and will be provided by the IT department. If there are many controllers on the same IP address or the IP address is also used for other connections a dedicated port should be selected for each controller. The following shows port forwarding using the TP-Link 300M wireless N router for 5 controllers all sharing the same outside IP address.



To Connect: Local IP address: 192.168.0.53:3000 or Remote IP address: 173.195.186.62:51860

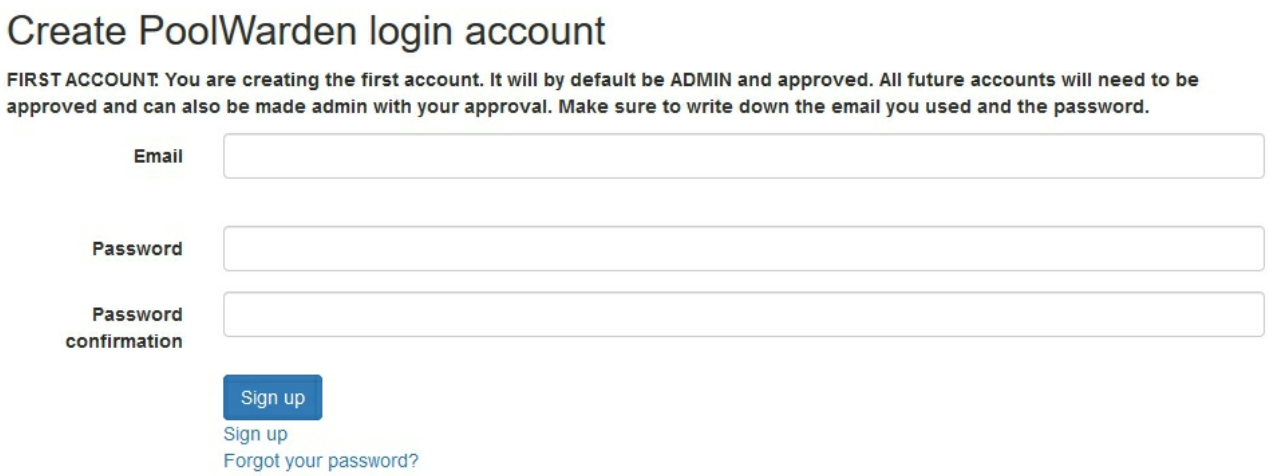
These IP addresses can be entered in www.poolwarden.com to make connecting easier. Log in and select "PW Config" and then select the appropriate unit and enter the addresses in the "Network Configuration" area.

If entered, on the "PW Config" screen where all the models are listed in the columns "Local IP" and "Remote IP" a "connect" link will be available to connect in a new window.

ConnectingTo The Local Data Server

Connect using any web browser from a computer, smart phone, notepad, … When connecting for the first time you will be prompted to create the master account. Enter an email and password to create the account

After login, a screen that shows the current measurements along with a field to enter a password. To advance past this screen the password must be entered which is any of the 4 security passwords as setup in the units main menu, security menu. If the security feature was not setup and all of the passwords are 0 then no further screens are available. To advance the security feature must be enabled.

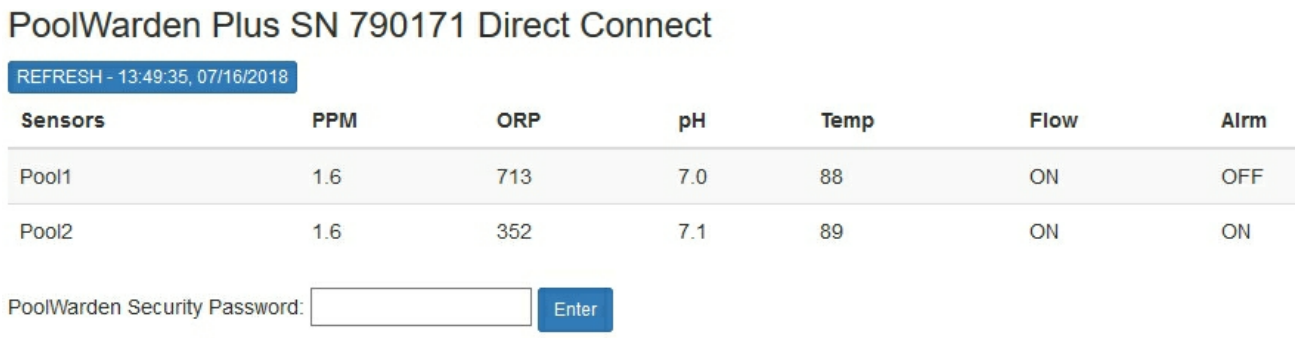


Add Login Account

To create a new account first logout. From the Log in screen select “Sign up” and enter the new account email and password information. Then log back in with the main account, enter the controllers password, select “Admin” and then select the new email that was just added. Enter any desired information and make sure to check the “Can Login” checkbox.

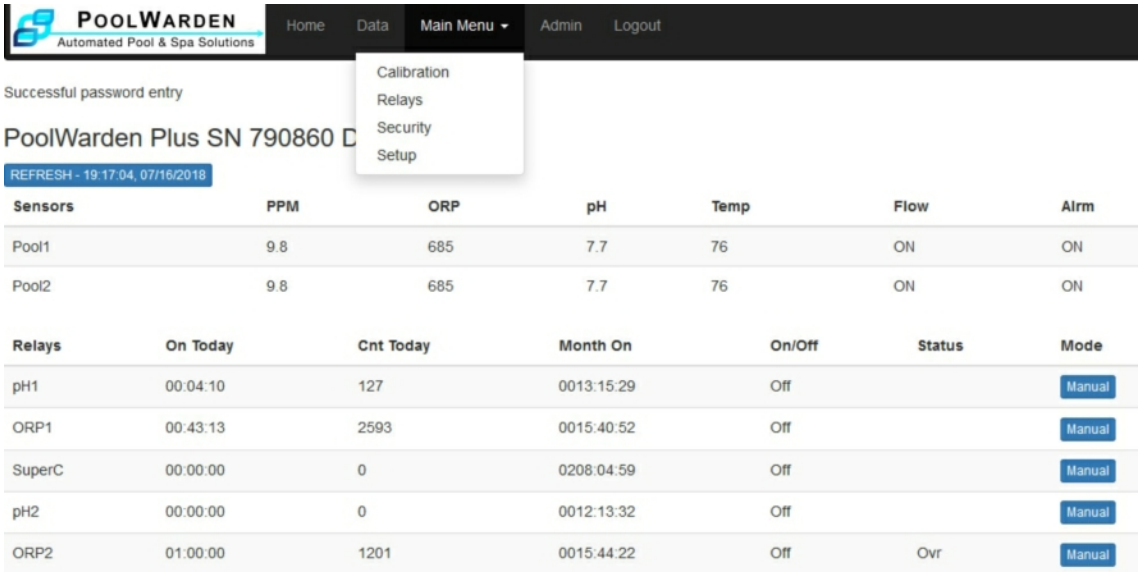
LDS (Local Data Server) Main Screen

Once signed in with the correct password a screen that shows all the measurements, relay information and a menu will be displayed. The screen doesn’t automatically update, to see updated information press the “REFRESH” button. After pressing “Manual” to put a relay into manual mode, press “REFRESH” a few seconds later to see the updated status.



Sensors	PPM	ORP	pH	Temp	Flow	Alrm
Pool1	1.6	713	7.0	88	ON	OFF
Pool2	1.6	352	7.1	89	ON	ON

When communicating directly with the controller, the controller buttons and screen will be locked out for 2 minutes since the last web access. This prevents changes being made locally and remotely at the same time. IMPORTANT: When making changes to the controller using the buttons, the changes are saved when the backlight turns off which is 2 minutes since the last button press. If web access occurs during this time the changes will be lost as the web interface loads from the database. After making changes, press the 5 button from the readings screen to immediately save the changes if that is a concern.

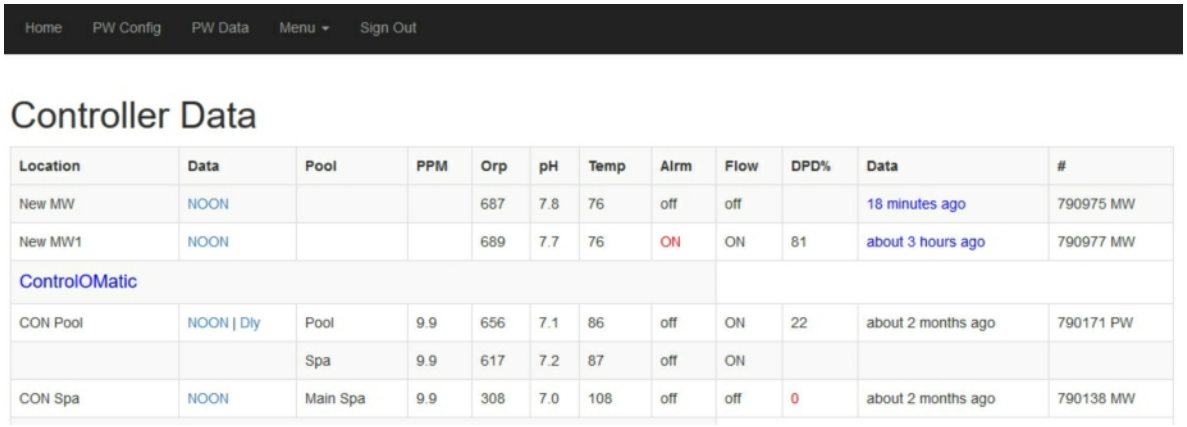


Remote Data Server

From any Internet connected computer go to https://www.poolwarden.com and log in. If you can't log in or don't have an account you must contact SeaSide Automation with the serial number's of the controllers in your account. Only SeaSide Automation can make a new account. If the controller is supplied by a dealer of SeaSide Automation, ask your dealer to make you a log in account.
Once logged in, a summary screen will display showing all the controllers with the last data and the alarm conditions.

Noon Data Summary

To view a summary of the data for a specific controller select NOON or Dly (PoolWarden Only) in the Data column. Selecting NOON will list the measurements at noon for the current and previous days. Select the day in the Weekday column to view the data for a specific day.



The controller must send data at noon for the data to be recorded. The PW-Plus has accurate time and noon will always be accurate. For the non Plus versions of the controllers time is manually entered and is often not accurte, in this case noon data may not be recorded.

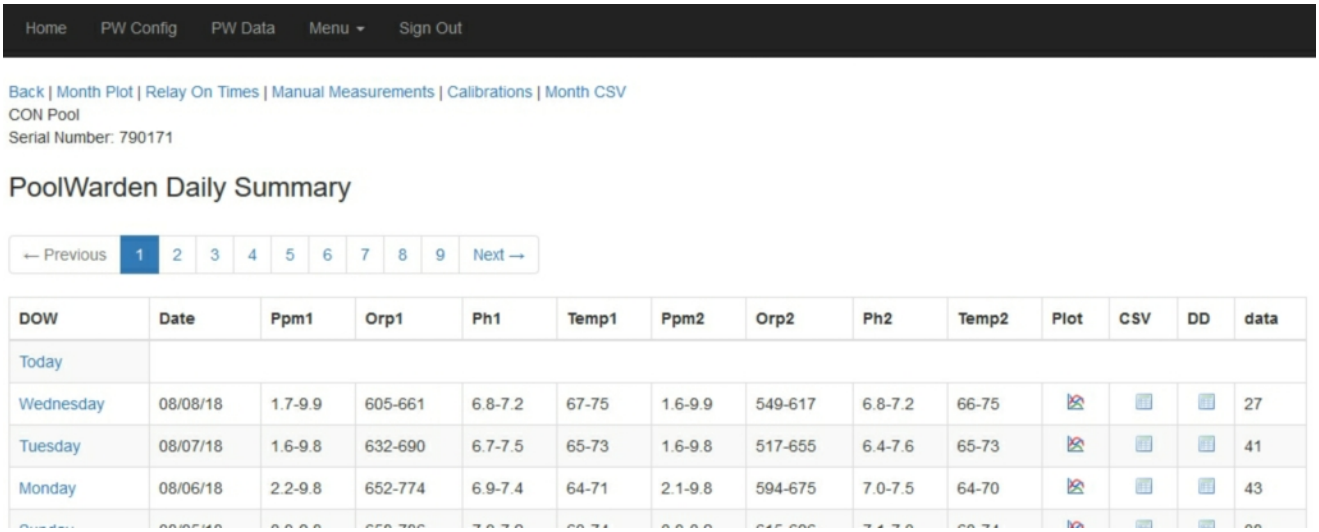
Daily Data Summary Screen

The daily summary screen for the PoolWarden only lists the range (minimum and maximum) of the measurements for each day. Select the day in the DOW column to view data for a specific day.

Summary Screen Features

Links that may display on the summary screens:

- **Plot**: Graphically display the data
- **CSV**: Export the data to a standard CSV file
- **DD**: Email the data for the day to the entered emails

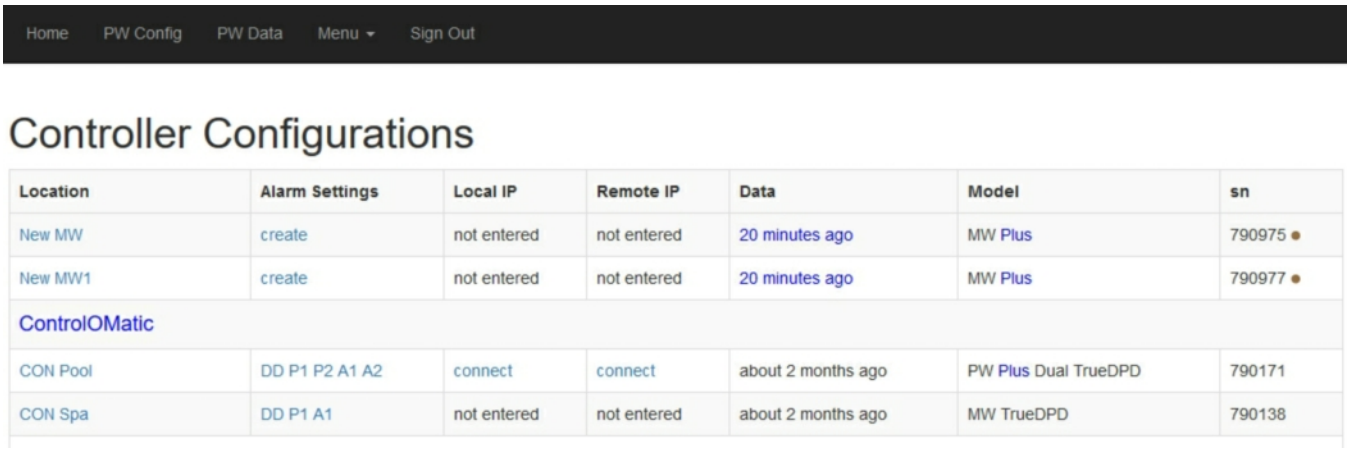


- **Month Plot**: Graphical plot of the data for the month. The plot includes the minimum and maximum sensor value for each sensor
- **Relay On Times**: Lists the monthly on time for each relay. May also include a link to the cost view, if a dollar amount has been entered for each relay for an hour of on time
- **Manual Measurements**: If measurements have been entered in the controller they are time stamped and can be viewed
- **Calibrations**: When the controller is calibrated, that information is time stamped and can be viewed
- **Month CSV**: Export the data for the current month to a standard CSV file

PW Configuration Screen

The controller configuration screen is for admins of the account and requires granted access to be able to view. If you don't have the PWConfig link and need it please contact the company that setup your account.

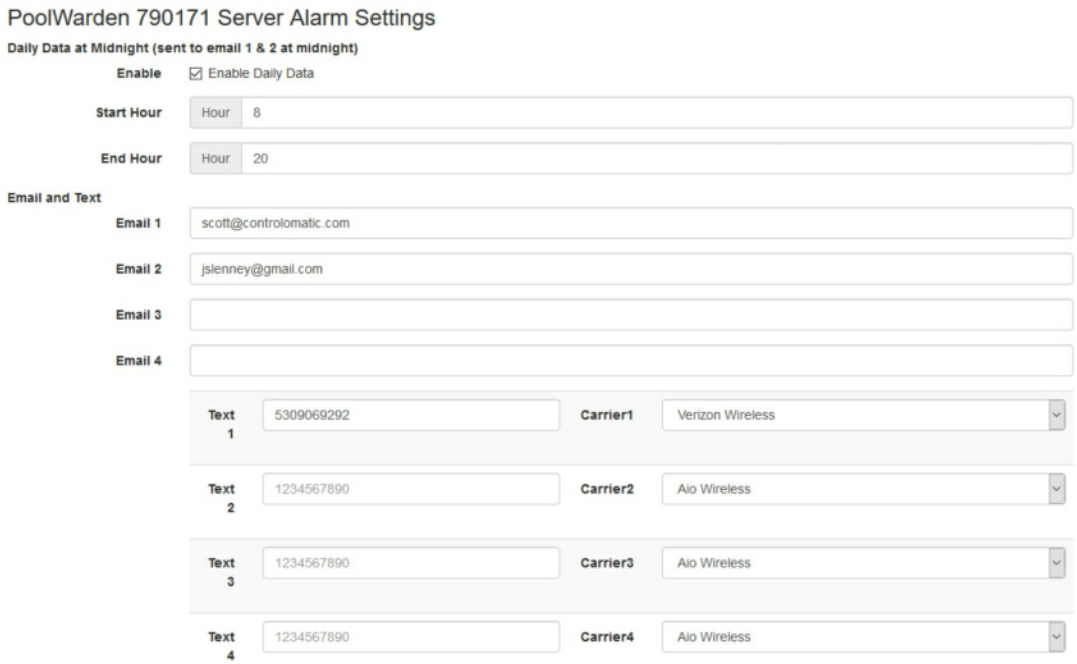
To enter controller specific information select the link in the Location column. Important entries are the location name and time zone. If the PoolWarden was updated from a single to a dual or if the TrueDPD was added that is also set in the screen.



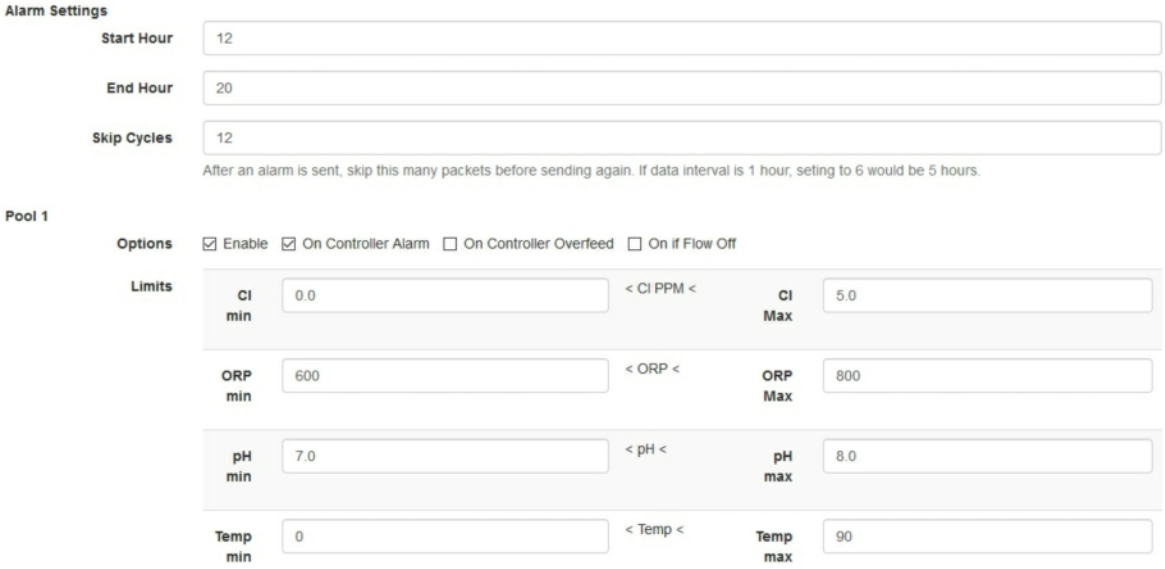
Alarm Settings - Email and Text Messages

To enable the alarm features select the link in the Alarm Settings column.

- **Daily Data at Midnight:** Check to enable this feature for emails 1 and 2. Enter a start and end hour to limit the data.
- **Email and Text:** Enter up to 4 emails and 4 phone numbers for text messages. When the data is received and added to the database it will also be compared to the alarm settings and then determine if emails and text messages should be sent.



- **Alarm Settings Hours**: Enter a start and end hour to limit the time for sending emails and texts. If the pool is off at night there may not be a need to get alarms during that time.
- **IMPORTANT: Skip Cycles:** - when an alarm condition is met and emails and texts have been sent enter the number of future measurements to not send emails or texts on. If the data interval is 1 hour, entering 6 would skip the next 5 data packets. You may not want to get alarm messages with every data packet, especially if you have many controllers. If the skip cycles is currently active and a data packet is received with no alarm conditions met then the skip cycle will reset and the next data packet with alarm conditions met will sent emails and texts.
- **Pool Conditions Enable:** Check enable to include this pool in the alarm conditions.
- **Pool Conditions On Controller Alarm:** Check to include if the controller alarm for the pool is on. If this is checked the limits in the data server are still checked unless the value is 0.
- **Pool Conditions On Controller Overfeed:** Send emails and texts if the pool is in overfeed.
- **Pool Conditions On if Flow Off:** Send emails and texts if the pool circulation pump is off.
- **Pool Conditions Limits:** Enter alarm limits for the sensors that can be different than the alarm values in the controller. A common practice is to have wider alarms in the controller than in the data server so that a service company will get a text notification and perhaps fix the problem before the alarm light turns on in the controller.



LIMITED WARRANTY

Models: This warranty applies to PoolWarden referenced here as “Controller”.
SeaSide Automation LLC Warrants the controller to 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 two (2) Year warranty. All other supporting equipment to the controller are individually covered by the specific equipmentmanufacturers warranty. Liability under this warranty is limited to the repair or replacement of any device or component which is returned to SeaSide Automation 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 SeaSide Automation Dealer. Any parts returned
directly to SeaSide Automation require a Return Material Authorization (RMA) code issued b a SeaSide Automation Technician.

SeaSide Automation 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.

Any warranty claims should be directed to the following address:

SeaSide Automation
12933 Drummer Way
Grass Valley, CA 95949
530-487-5007