

AQUAWORX IPC™ PANELS installation manual 2010

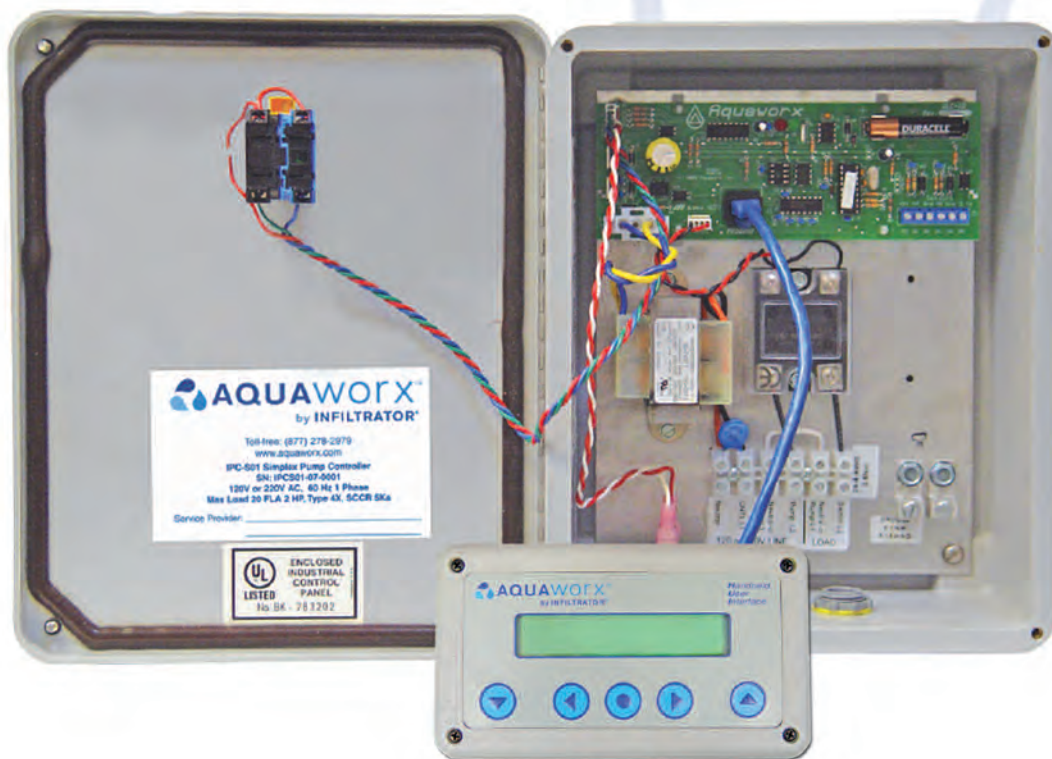


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See www.aquaworx.com for current warranties.

AQUAWORX IPC PANEL INSTALLATION INSTRUCTIONS

The Aquaworx IPC (Intelligent Pump Control) Panel provides an innovative approach to pump control. Designed specifically for the onsite industry, the IPC Panel leverages simple pressure transducer technology for the enhancement of pump system performance, and ease of installation. Relying on an embedded microprocessor in the pump controller and a floatless pressure transducer in the pump chamber, the IPC Panel monitors liquid levels, controls pumping time intervals, and logs events in real time. Using the Mountable and Removable Controller (MARC) as the user interface, the IPC Panel offers a cost-effective solution with expanded capability.

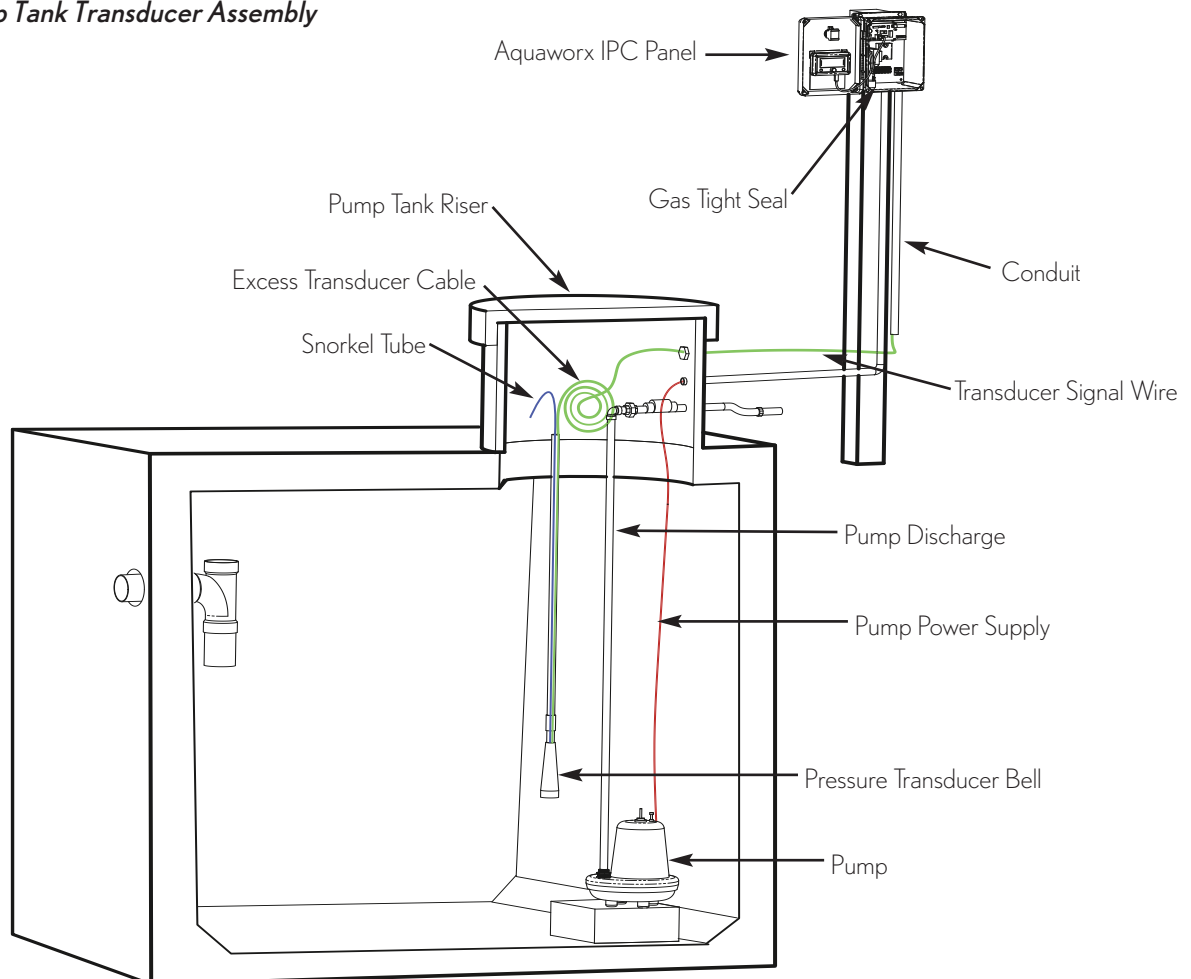
Aquaworx offers four models of the IPC Panel; Simplex, Duplex, Sand Filter, and Telemetry to meet a variety of system design requirements. The Simplex Panel has the ability to time control a single pump, while the Duplex Panel can control two pumps in an alternating design with independent timing. The Sand Filter Panel has the ability to time control two individual pumps having independent level sensors, allowing for a design which will simultaneously time dose a treatment system and drain-field. The Telemetry Panel allows for access to the panel for remote monitoring and operation. All four IPC Panel models have the option of including a built-in MARC 2.

I. General

Unpack the Aquaworx IPC Panel and check for any visible damage both external and internal. Also verify that there are no cracks or damage to the pressure transducer bell. *Note: You will need to identify the number on the pressure transducer bell as it is needed during the MARC 2 setup.* Notify Aquaworx immediately at 1-877-278-2979 if any damage has occurred.

ALL INSTALLATIONS MUST BE COMPLETED IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODE.

Figure 1: Pump Tank Transducer Assembly



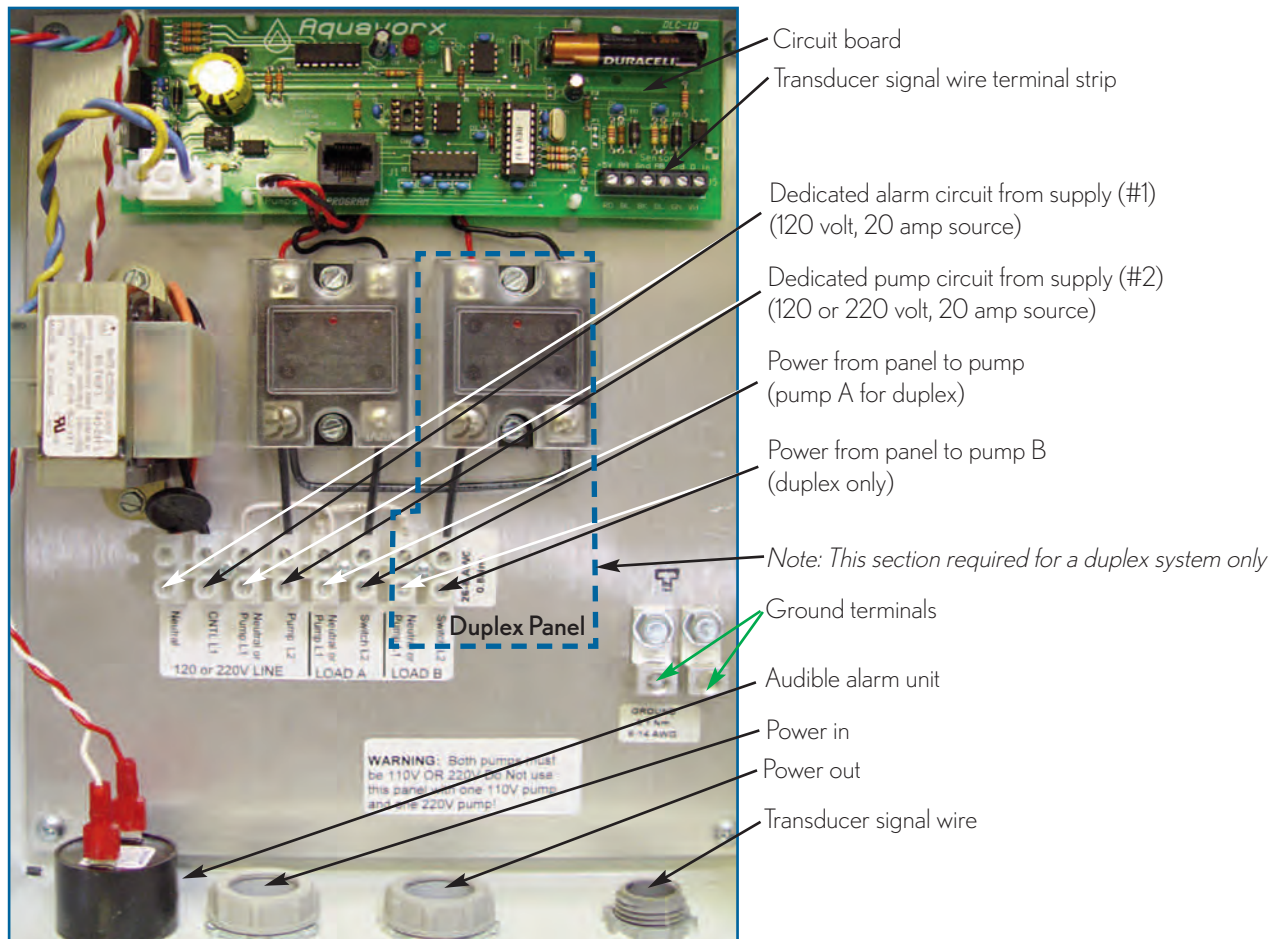
II. Installing the IPC Panel

Note: A qualified electrician must perform all wiring.

The following components and tools may be required for installation:

- Screwdriver (sm and med size flat head)
- Pipe cutter and tape measure
- Fish tape
- Wire strippers/cutters
- Electrical tester
- Drill
- 3/4" to 1" screws
- 1" PVC coupler
- Step bit
- Hole saw
- Electrical conduit
- Electrical tape
- Splice box for pump connection
- Waterproof wire connectors
- 1" PVC (for transducer handle, amount determined by tank depth (6' length typical))

Figure 2: IPC Panel Wiring Setup and Transducer 3-Wire Connection



1) Mount the IPC Panel to the wall or post. Position the IPC Panel so that the power supply enters the IPC Panel through the bottom approximately 1" to the right of the audible alarm unit.

2) On Simplex Panels drill two holes (3 holes for duplex) in the bottom of the enclosure spaced approximately 2" apart and in line with the audible alarm unit. When facing the panel, the order of conduit connections from left to right is shown below, as well as illustrated in **Figure 2**:

Power in - 2 dedicated 20 amp circuits from house to power the panel, 120V (1) and pump, 120V or 220V(2)

Power out - power supply from panel to pump

Transducer signal wire - signal transmission from panel to pump

NEMA 4X fittings must be installed in each field-drilled hole to retain the integrity of the enclosure's 4X rating.

3) Power to pumps: run the panel (s) power wires from the IPC Panel to the septic tank riser. Connect the wiring in the splice box using water-tight connectors. Connect pump wires to the IPC Panel by carefully following the wiring diagram enclosed with the panel. A gas-tight seal (see Figure 1) is required to prevent corrosive septic gases from migrating into the IPC Panel.

4) Power to controller: wire the supply circuit to the panel. Aquaworx recommends that the panel be wired to two designated circuits. An external disconnect should be incorporated into the supply circuit and mounted within easy reach of the IPC Panel. Note: Site specific codes have final authority on external wiring requirements.

III. Installing the Pressure Transducer and Bell Assembly

The pressure transducer bell assembly replaces the traditional float tree assembly. The 1" PVC stand pipe may be mounted by applying the same methods used to install a float tree assembly.

1) Determine the position of the pressure transducer bell assembly. The pressure transducer bell assembly must be mounted so that it allows the liquid level to pump below the bottom of the pressure transducer bell. This allows the pressure transducer bell to get a fresh air bubble.

2) Feed the transducer signal wire and snorkel tube through the 1" PVC stand pipe and glue to the pressure transducer bell using a 1" tee. The length of the stand pipe when secured should position the bottom of the pressure transducer bell above the top of the pump.

3) Cut off the snorkel tube approximately 9" lower than the top of the stand pipe and secure it to the transducer signal wire. The snorkel tube should be positioned in the form of an upside-down U as high as possible in the riser. This allows the snorkel tube to create an air lock in the event of a flooded tank.

4) Note the Z-bias value labeled on the side of the pressure transducer bell. Later in the set-up, you will be instructed to program the Z-bias into the IPC Panel.

5) Run the transducer signal wire back to the IPC Panel and connect to the transducer signal wire terminal strip. Connect Red to RD, blue to BL and black to BK (first three positions). Make sure to leave enough cable in the riser to allow for removal of the pressure transducer bell assembly during maintenance. The transducer signal wire is rated for direct burial. However, it can be run in a conduit. Site specific codes have final authority on installation requirements.

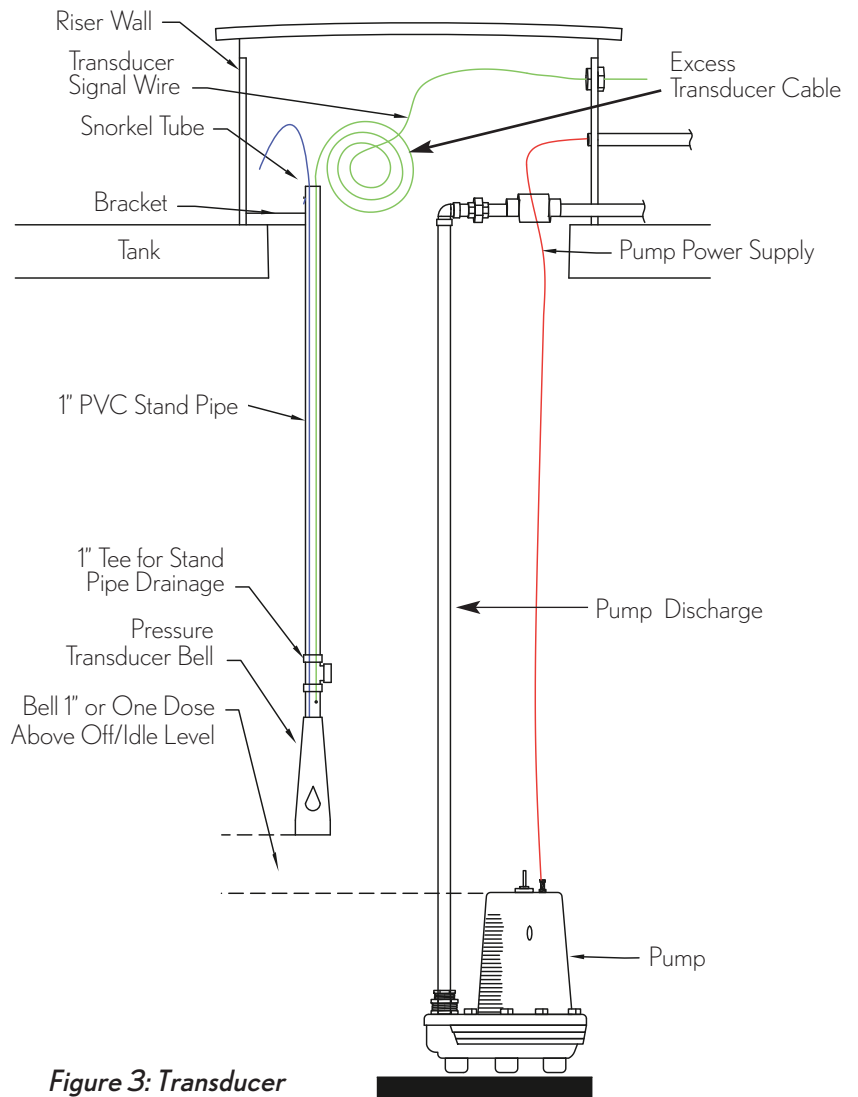


Figure 3: Transducer

Note: Do not attach the pressure transducer bell assembly to the pump discharge pipe. Do not pinch or crimp the snorkel tube tubing.

IV. Panel Alarm Codes

A) **Visual Status Indicator** - the indicator light on the front of the panel displays current system status by flashing in unique 8 second patterns. If the light does not flash for 8 seconds there is a problem with the pump controller.

Patterns:

On solid = The system is experiencing a high-level alarm condition

1 short flash = The system is idle

1 long flash = The system is pumping

2 short flashes = The system is waiting for the off time to expire

B) **Audible Status Indicator**

The sounds convey event conditions that require attention. To silence the panel press the push to silence button on the front of the IPC Panel. The following Morse Code characters communicate specific system conditions:

Morse Code P . _ _ . = Controller was just powered up

On Continuous = The water level is above the high-level set point

Morse Code "S" . . . = The level sensor is not communicating with the controller

Figure 4: IPC Panel with Visual Alarm



C) **Manual Pump/HOA Feature**- the push to silence button may be used to manually operate the pump in case a MARC 2 is not available.

Steps:

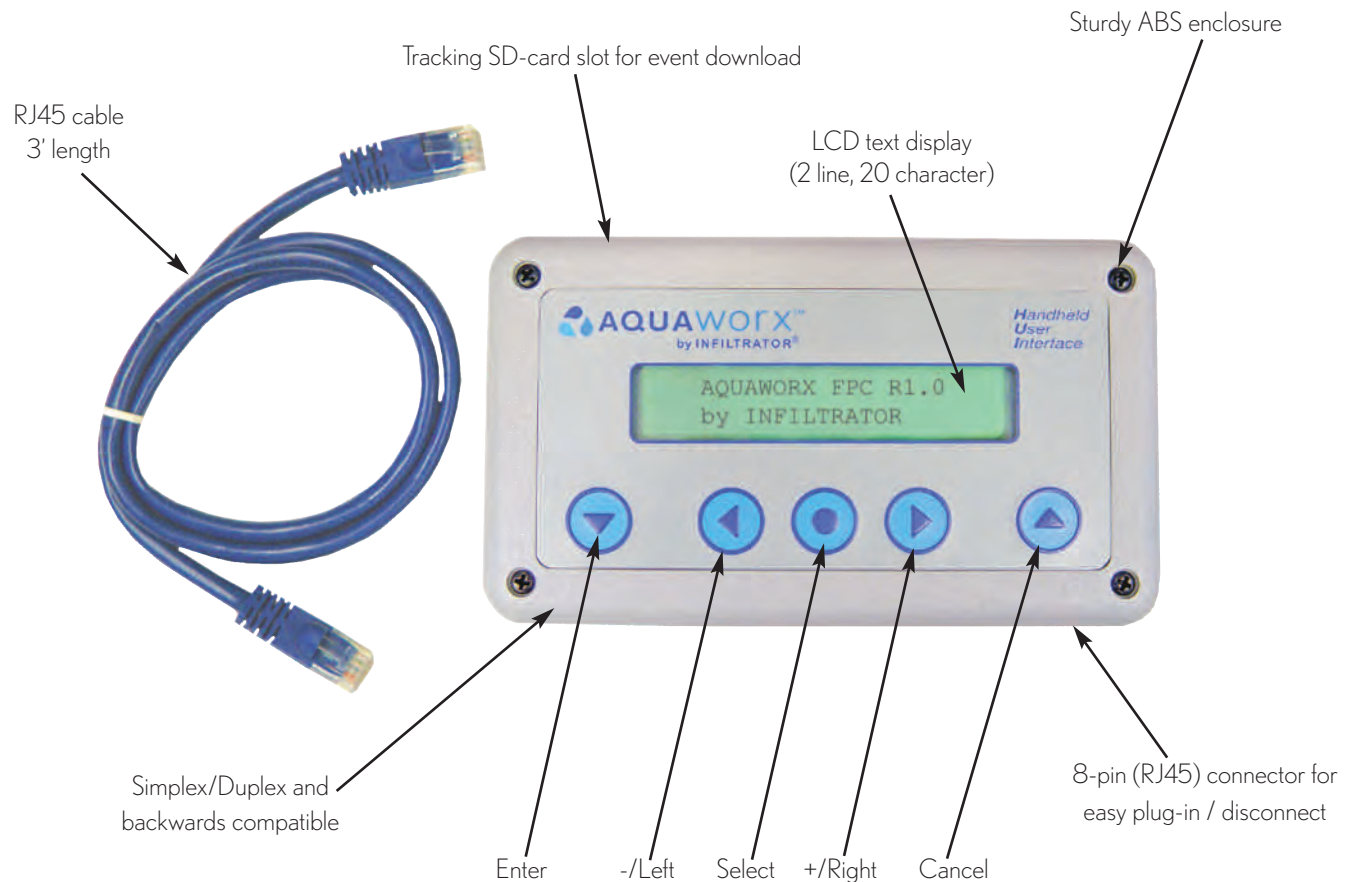
- 1) Hold the alarm button down (continuously)
- 2) Turn off the power to the panel by throwing the breaker or disconnecting the wires from the transformer (Blue and Yellow).
- 3) Turn the power back on and release the alarm button. The alarm should now only have a single flash.
- 4) The pump will power on by holding the alarm button down, and will turn off when released.
- 5) To return to automatic operation, the panel should go through another power cycle without holding down the alarm button.

AQUAWORX MARC OPERATING INSTRUCTIONS

I. General

The MARC is a handheld device that is specifically designed to program the Aquaworx IPC Panel product line. The MARC has the ability to mount inside the IPC Panel making it readily available for that individual panel. Alternatively, it can be removed for use with multiple panels. Removing the MARC has an additional benefit of minimizing the ability of unauthorized persons to inadvertently adjust the system settings. The MARC connects to and communicates with the panel using a standard RJ45 cable (included). The MARC includes a SD memory card slot, allowing the user to capture and download system events and settings onto a removable card. This provides the operator with a history of system function, which is critical to troubleshooting and maintaining a pump-driven system.

Figure 5 The MARC



II. MARC Plug-In and Start-Up

1. Plug RJ45 cable into bottom of MARC unit
2. Plug other end of RJ45 cable into panel connector
3. LCD screen will display

Note: The MARC receives its power from the IPC Panel and does not have a power source of its own.

III. Controller Passwords and Login Setup

You will first need to login to the controller for anything other than status viewing.

1. Press the select buttons to access login window.

Controller Passwords:

- ALL = Lowest, Default Setting = "0000"
- SIMPLEX = Installer for Simplex Setting = "1000"
- DUPLEX = Installer for Duplex Setting = "2000"
- ADVANCED = Installer for ATU/Sandfilter = "3000"
- ADMIN** = Factory Setup Program/Change
- ** ADMIN log-in not applicable for general use

2. Use select arrows to scroll through the password options. Pick from All, Simplex, or Duplex. *Note: Admin is used for advanced set-up functions and program updates only. Call Aquaworx for more information.*
3. Push Enter button to activate password entry.
4. Scroll to the correct value. Press select to advance through digits. Continue using the arrows to set the appropriate values.
5. Push the enter button to accept once the four digit code is complete. Once logged in, the user will have access to the menus shown below.

IV. Menu Functions Available by User

Below is a list of menu functions available to each user. See **Figure 7** for complete MARC menu mapping.

ALL = The "ALL" user may access these menus:

- LOGIN
- STATUS "A"

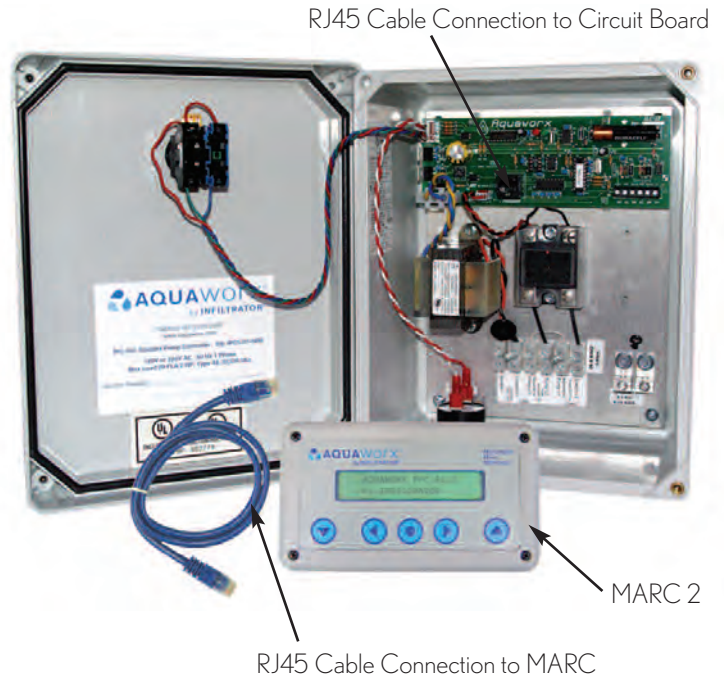
SIMPLEX = The "SIMPLEX" user may access the above menus in addition to the following menus:

- A) STATUS "A"
- B) EVENTS
- C) MANUAL "A"
- D) AUTO
- E) PUMP "A" SETTINGS
- F) MODE SETTINGS
- G) TIME SETTINGS
- H) SD CARD SETTINGS

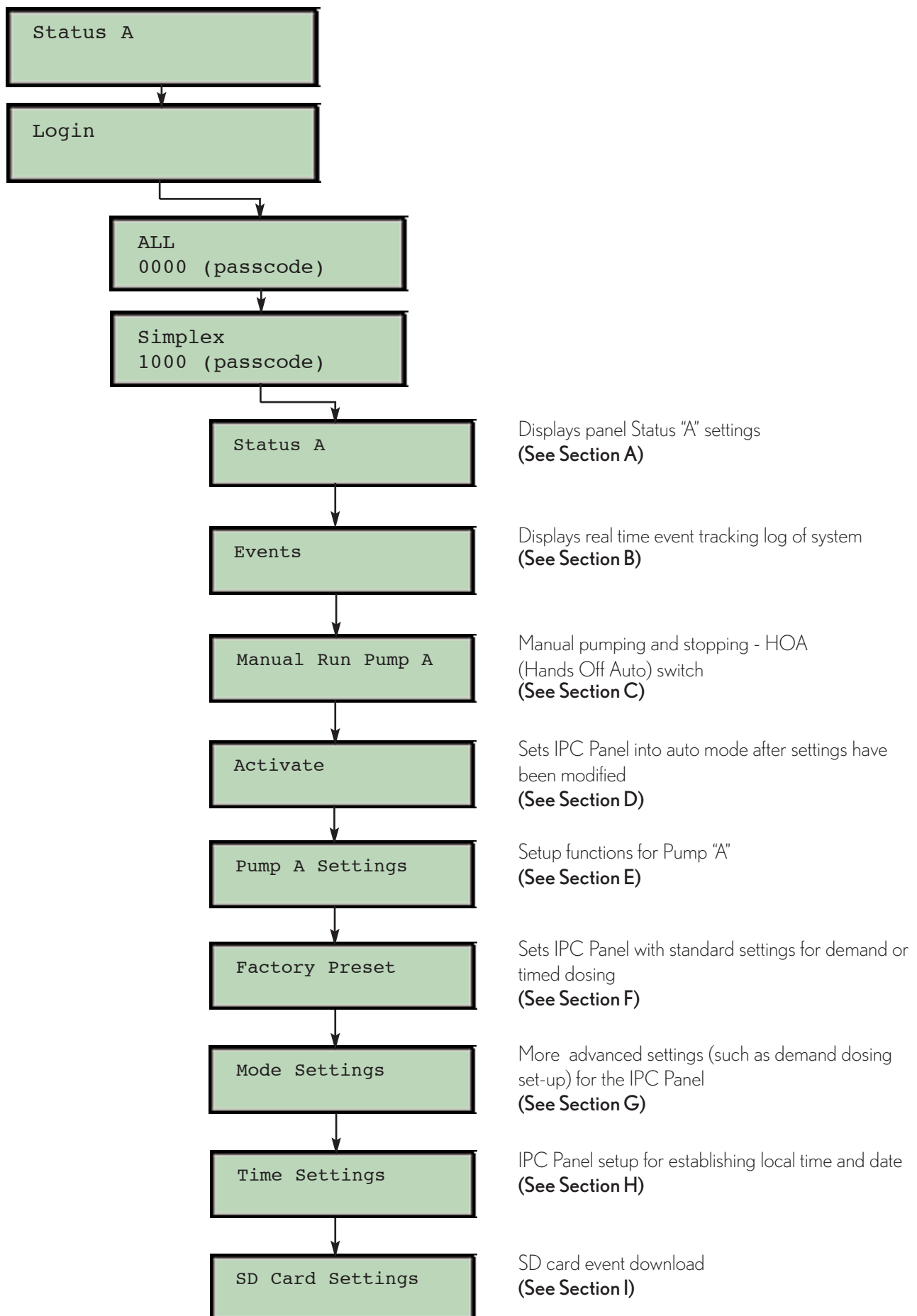
DUPLEX = The "DUPLEX" user may access the above menus in addition to the following menus:

- STATUS "B"
- MANUAL "B"
- PUMP "B" SETTINGS

Figure 6: IPC Panel with the MARC

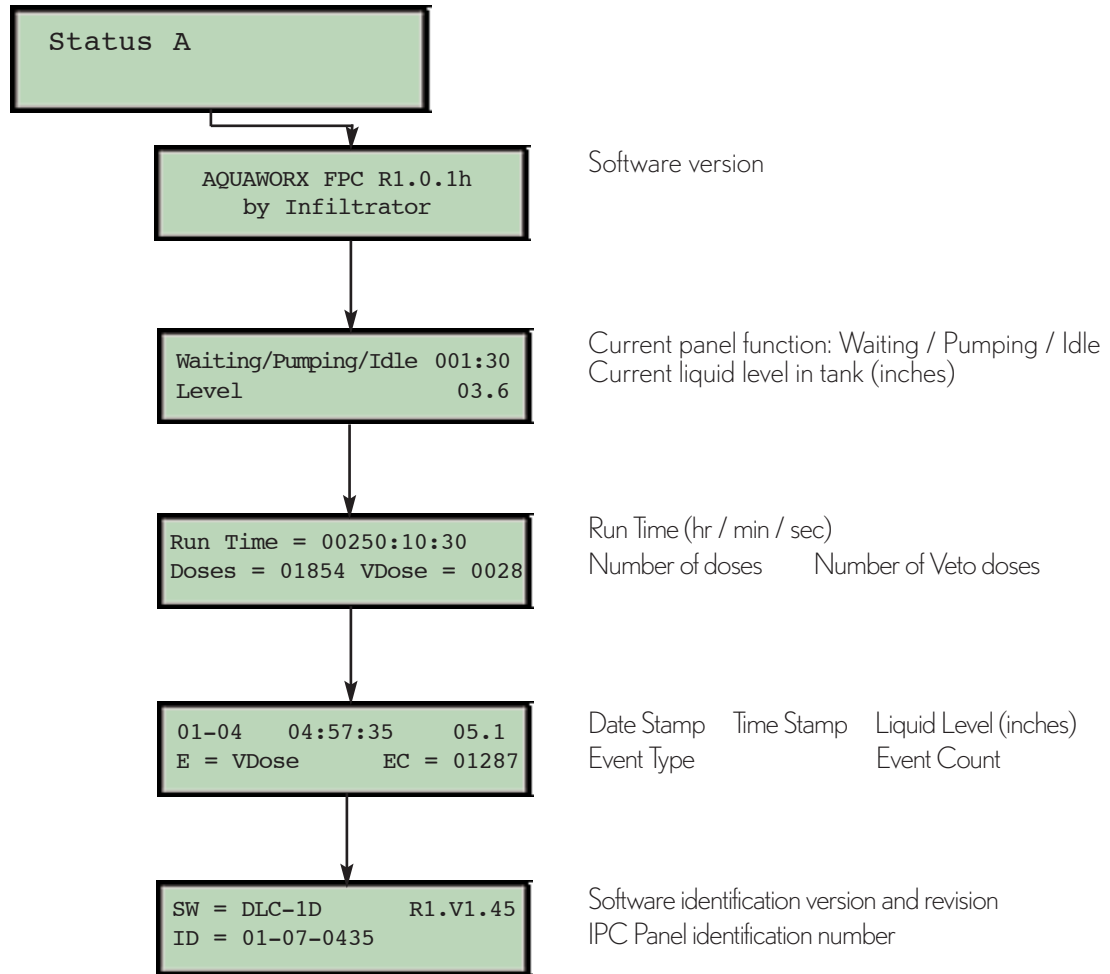


V. Controller Menu Options

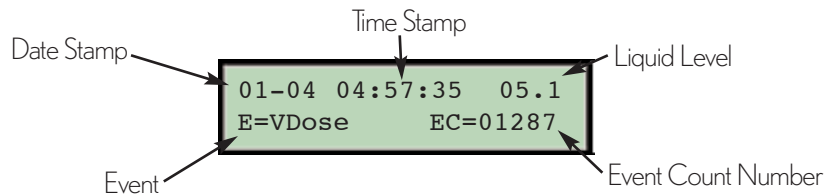


Section A) STATUS: This is a read-only set of sub-menus that allow the user to view the IPC Panel status in real-time and program functions as it runs through the programmed parameters. The IPC Panel identification number and software version can be found in this menu.

Note: Status "B" is an available menu option on Duplex panels.



Section B) EVENTS: Is a read-only set of sub-menus that allows the user to view the events logged into the system (up to 4,000 events). The LCD screen details the date, time, liquid level, event code and event count number.



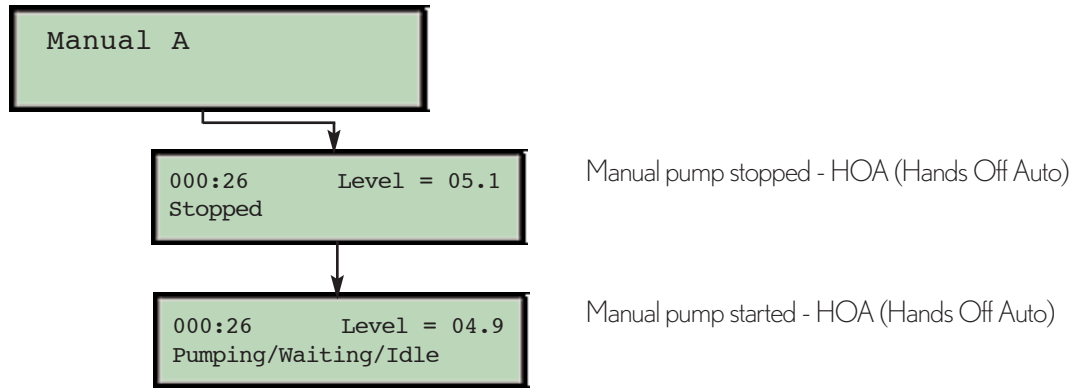
Event code abbreviations and definitions:

- PWRUP = Panel was powered up
- PWRDN = Panel was powered down
- PWRGL = Power glitch
- PWRUM = Power up manual
- ADOSE = Pump A dose
- VDOSE = Veto dose
- BDOSE = Pump B dose
- ACLEAR = Auto clear dose
- MANON = Pump turned "ON" manually
- MANOF = Pump turned "OFF" manually
- AUTO = System turned to auto mode
- SWARN = Sensor warning - check for broken wire or bad connection
- HIGHL = High level alarm
- A-ACK = Alarm acknowledged
- STATS = Status view selected during pumping

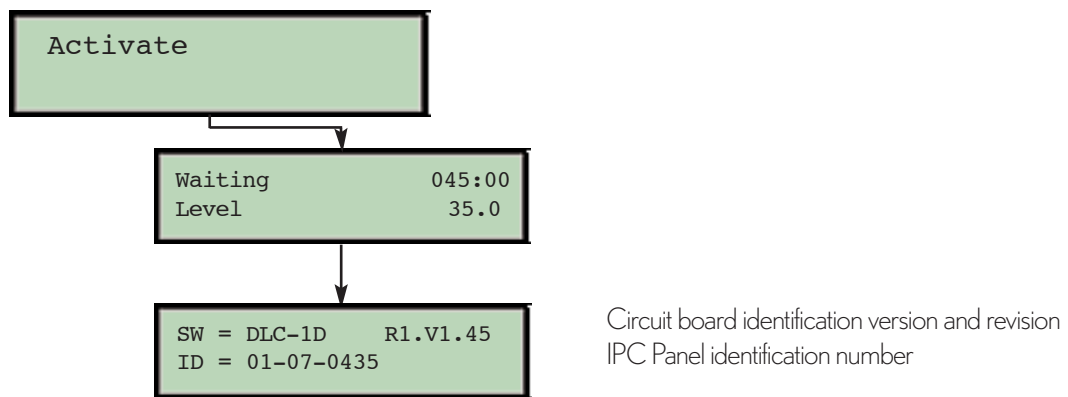
Section C) MANUAL "A": Allows the user to manually operate the pump. The LCD screen details how long the pump runs and the real-time liquid level in the tank.

MANUAL "B" (Duplex only): Allows the user to manually operate a second pump. Just as in Manual "A", the LCD screen details how long the pump runs and the real-time liquid level in the tank.

The screen display for Manual "A" and Manual "B" are similar, as follows:



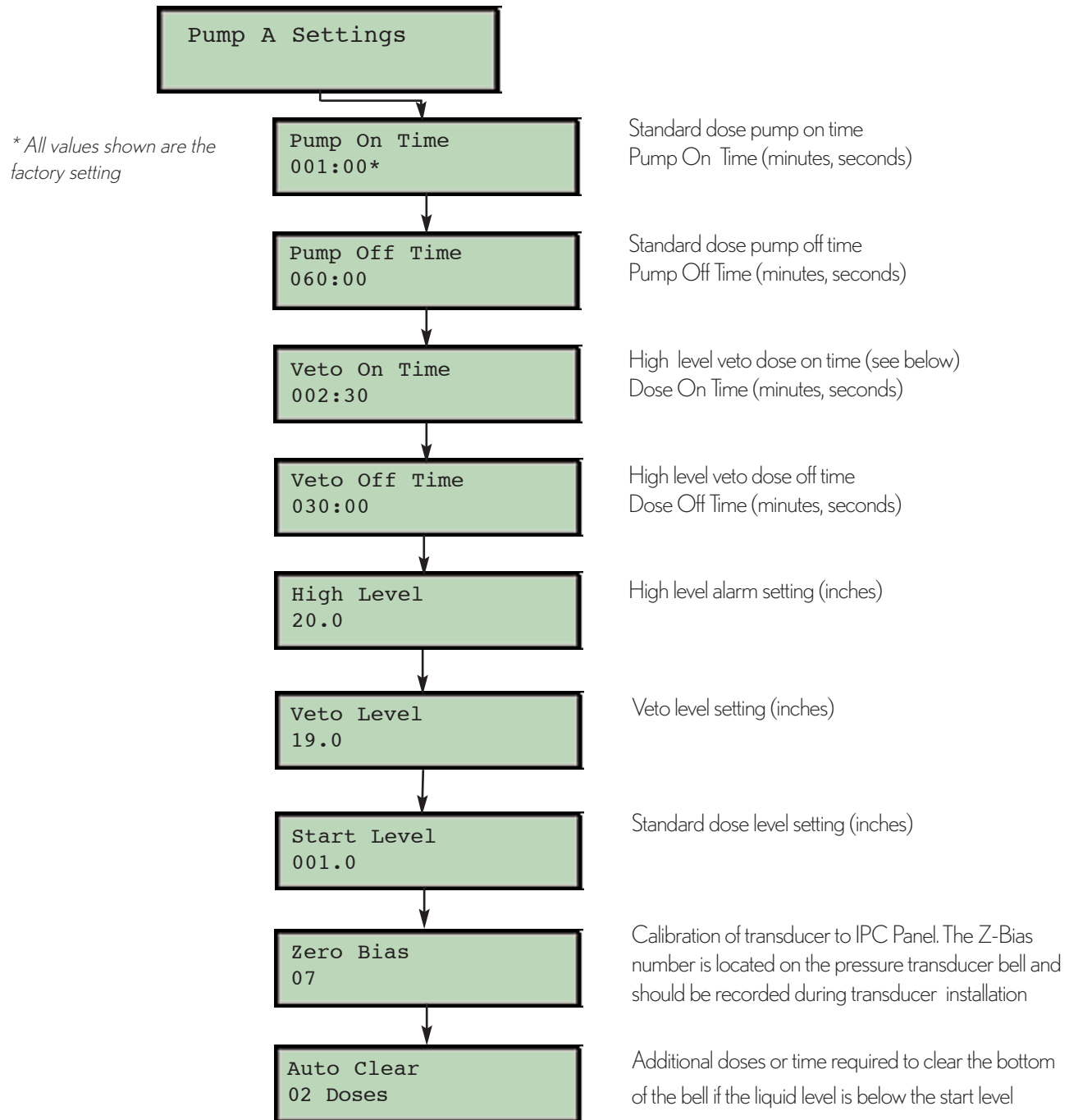
Section D) ACTIVATE: Allows the user to actuate or upload the controller settings to the IPC Panel.



Note: Once panel is set to Auto mode, it will return to the Status menu.

IMPORTANT: AUTO must be selected after all SETTINGS changes for the new settings to be saved to the processor.

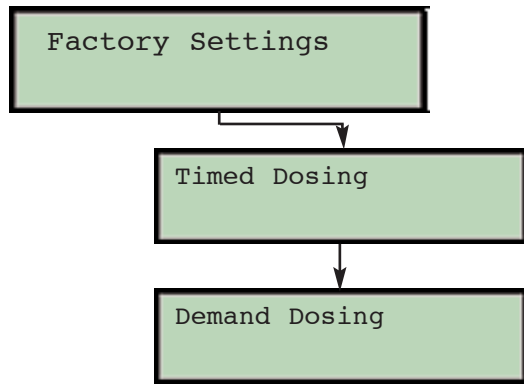
Section E) PUMP "A" SETTINGS: Allows the user to set all pump run parameters. *Note: Pump "B" settings allow the user to set parameters for a second pump (only for use on a Duplex panel or sand filter).*



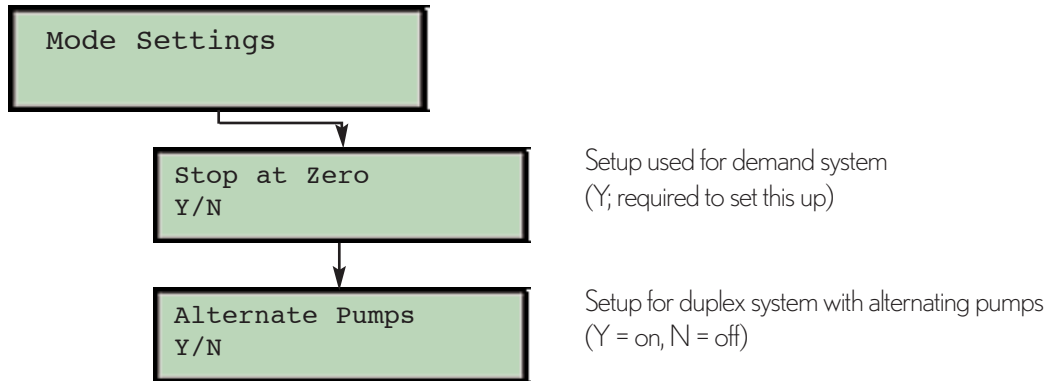
Veto Dose: The Veto function is simply a separate level that instructs the pump to run a different timing sequence and is intended to prevent pump tank overflows. The veto level is typically set above the high level alarm. When liquid reaches the veto level, the veto pump cycle times are initiated. The veto pump cycle times will remain in effect until the liquid level falls below the veto level. If the veto level is set above the alarm level, the alarm remains on. The alarm will not de-activate until it is manually silenced or the liquid level drops below the alarm level.

Note: If local regulation will not permit the use of an override function, then set the veto level to the same level as the high level alarm, and set the veto on and off times to establish the veto doses as a counter of the number of doses completed above the alarm level.

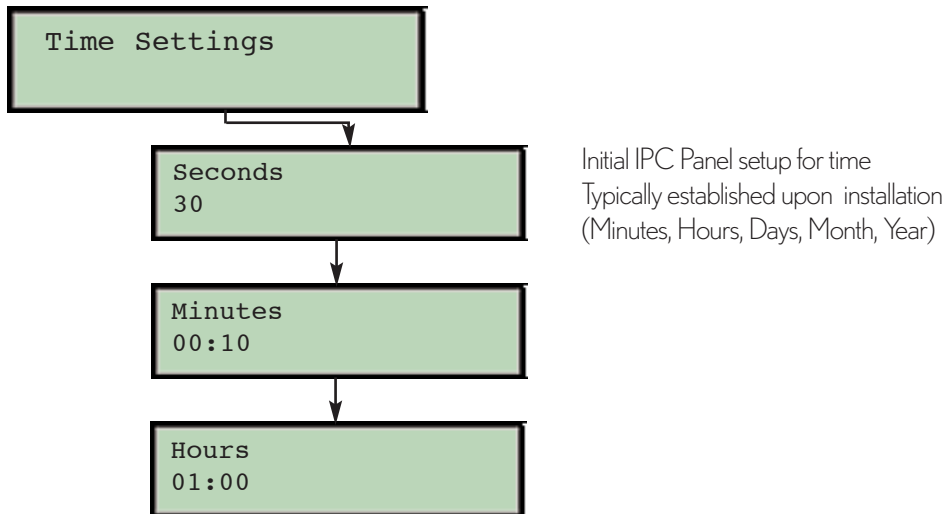
Section F) FACTORY SETTINGS:



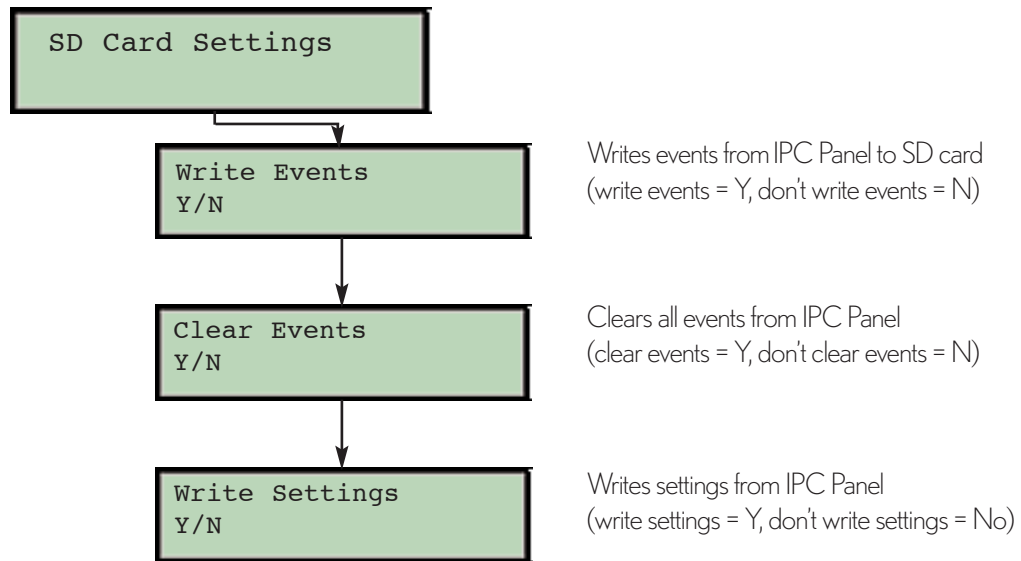
Section G) MODE SETTINGS: A set of sub-menus for more advanced settings. (This is especially important for use with sand filter data logging.)



Section H) TIME SETTINGS: A set of sub-menus to program local date and time for logged date and time-stamped events.



Section I) SD CARD SETTINGS: A set of sub-menus designed to perform events and settings retrieval, and to clear events when desired.



VI. Using the SD Card

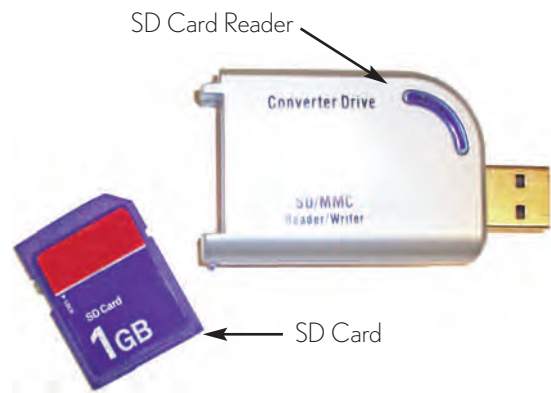
Note: It is recommended that a SD card with SD card adapter be used with the the MARC 2. The SD card must not exceed 1 GB of storage in order to operate properly.

1. Insert the SD card into the designated slot on the MARC.
2. Scroll through the MARC menus to the SD Card Settings menu, until the screen says "Write Events."
3. ENTER = "Y" to capture events to SD card, ENTER = "N" to skip.

Note: The MARC will show the events being transferred to the SD card.

4. Once the data transfer is complete, the SD card can be removed and placed in a card reader connected to a PC.
5. On the user's PC, locate the designated drive for the card reader.
6. Click on the file to identify the SD card events file (.evt) and settings file (.set).
7. The file can be opened using a spreadsheet or text editing program.

Note: Each event and settings file is saved by IPC Panel serial number, allowing the user to save the data from multiple IPC Panels on a single SD card.



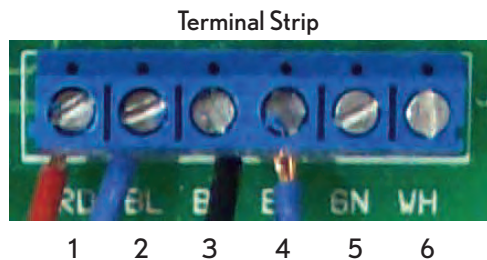
Sand Filter Panel Set-up

The IPC-DSF is designed for two pumps, two chambers and two transducer systems such as Sand Filters or Advanced Treatment Units. We named our system Sand Filter; however, it may be used with other advanced systems that require two pumps in different pump chambers with separate liquid levels.

In a traditional Sand Filter design, Pump A operates the pump in the Surge Tank that discharges to the sand filter, and Pump B operates the Pump Basin that discharges to the drainfield. Pump A is slaved to Pump B, so that if Pump B has an alarm, then Pump A will not run. This is important in order to protect the filter from an overload condition.

The Control Panel & Transducer set-up will follow the instructions for the Duplex panel found in Sections II & III of this manual and the Wiring Diagram found in the panel box. In addition, the IPC-DSF will require an additional step to properly connect the low voltage Pressure Transducer wires from both tanks.

The small 6-pin wire terminal strip may be wired using the following instructions (numbered 1-6, from left to right).



Terminal #:

1. Combine both (Sensor A & B) Red wires with a wire nut, and run a single wire to the terminal.
 2. Connect the Blue wire from Sensor A to the terminal.
 3. Combine both (Sensor A & B) Black wires with a wire nut, and run a single wire to the terminal.
 4. Connect the Blue wire from Sensor B to the terminal.
- Terminals 5 & 6 remain open.

Figure 8: Sand Filter Panel



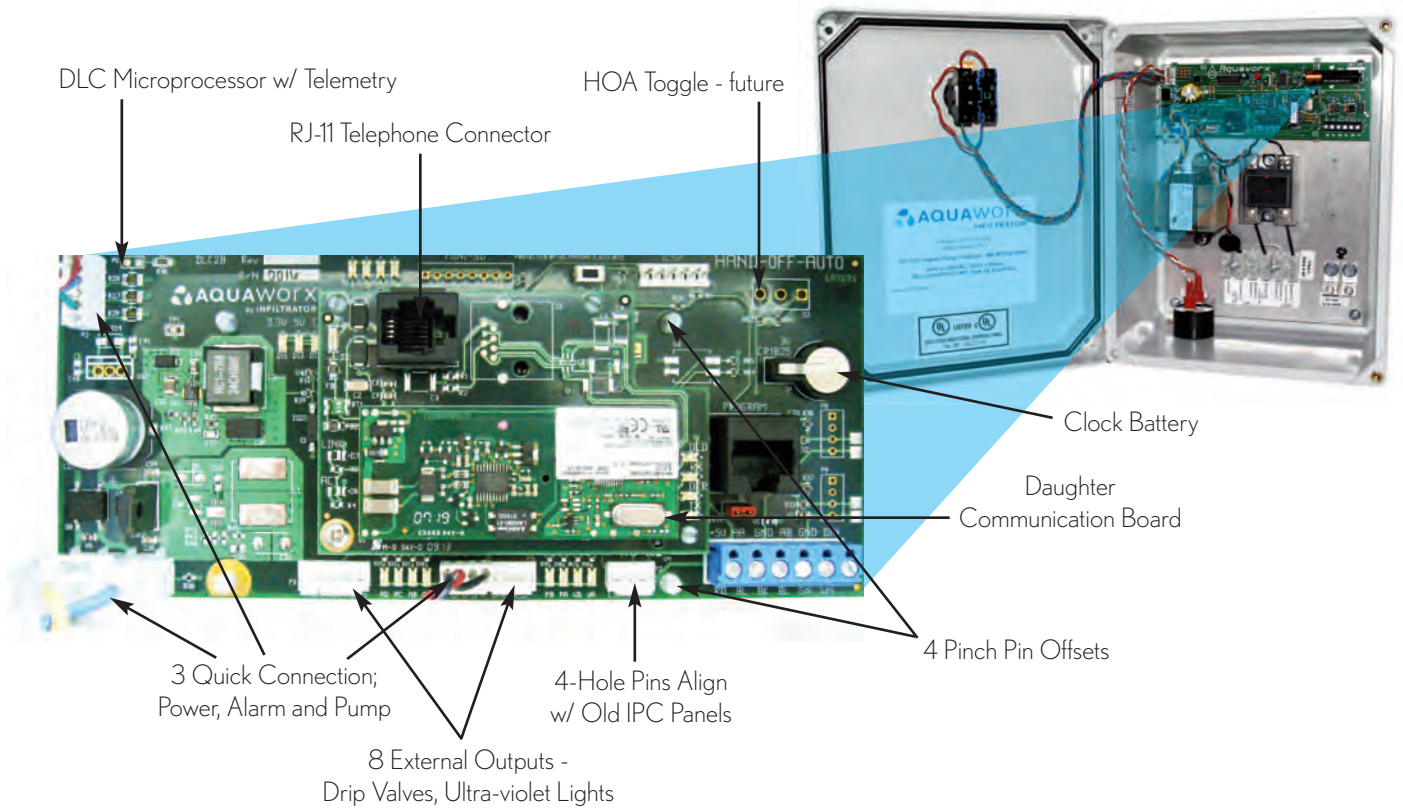
The Sand Filter features may be accessed and set-up using both the MARC2 or Palm III (WA state only) interfaces, and using the following steps:

1. Plug-in the MARC2 using the RJ45 cord. Screen should indicate Aquaworx, with version #.
2. Scroll to LOGIN and press ENTER, then scroll to the Duplex screen and SELECT setting - 2222. Press ENTER - Screen should read Duplex logged in.
3. Scroll to PUMP A SETTINGS and press ENTER. Enter the appropriate pump settings from Designer by following Section V of the manual. *Important Note: remember to calibrate both Pressure Transducers under the ZERO BIAS setting. The zero bias may be found on both the label and bell of the transducer (Example ZB-07).*
4. Complete the same step for PUMP B SETTINGS.
5. To enable the Sand Filter feature, Scroll to MODE SETTINGS and press ENTER.
6. Scroll to BOTH PUMPS/SFI screen and SELECT Y-yes.
7. To save your new settings to the processor, Scroll to AUTO, then press ENTER. Screen should default to Status screen.

Telemetry Panel Set-up

The Telemetry IPC Panel allows for telemetry access to the panel for remote monitoring and operation. It uses an advanced circuit board named the DLC-2. This board can replace the existing DLC-1 board and retrofit/upgrade an existing panel in the field. The DLC-2 board has two primary upgrades; 1) a secondary/daughter communications board, 2) increased terminals for additional inputs and outputs. **Figure 9** below shows a photograph of the DLC-2 features.

Figure 9: Aquaworx Telemetry DLC-2 Circuit Board



Aquaworx Telemetry Set up Instructions

1. Bring a working, direct telephone line to the IPC panel. *Note: All penetrations into the NEMA 4x control box should be air/water tight and meet local code.*
2. Hook a single line telephone to the line and check for a dial tone.
3. Using the phone, dial 360.371.4781. Listen for a FAX tone. This confirms that you have a good connection to our server.
4. Connect the phone line to the RJ-11 telephone connector on the Daughter Board (upper, middle). *Note: Do not connect to the RJ-45 connector for the MARC controller (lower, right).*
5. Initiate a Manual Call to the server by pressing and holding down the Alarm Button on the outside door of the panel for 10-12 seconds, then release button.
 - a. Single beep indicates a proper connection has been made.
 - b. While the panel is communicating, the two green LED lights above the phone connector will flicker.
 - c. Double beep indicates that the connection has ended and data has been sent.
6. Using a laptop computer with an internet connection (aircard or wireless), the Service Provider may verify that a connection has been made to the server. The server website is telemetry.aquaworxinc.com.
7. The Telemetry panel will communicate with the server using the panels, or circuit boards serial number (SN), example: 09-05-5190.

Using the Aquaworx Telemetry Website

1. Point your web browser (Mozilla Firefox preferred, some graphics are limited with MS Explorer) to:
telemetry.aquaworxinc.com
2. Click on **Log In** - upper right screen
 - a. Enter email address
 - b. Enter password - Password will be emailed to you.
3. From the Home Page, Click on **Panels** (Each of the Users panels will be displayed)
 - a. Click on **New Panel** to set up your new panel
 - i. Enter Panel ID from panel box or panel Serial Number (SN)
 - ii. Example: 01-12-2010
 - iii. Click **SAVE**
4. From the Panel Page, Click on your new **Panel** (left hand column)
5. Click on **Name Of Site**
6. Click on **Edit Site**
 - a. Enter your panel data:
 - i. Contact/Address/City/State/Zip/Phone#/Lat/Long/Time Zone/Notes
 - b. Click **01-12-2010** to save data and return to Panel
7. From the Settings Menu, Click **Panel Alerts**, this will display the alert history.
8. Click **New Alerts** and enter data:
 - a. EVT Code/Email/Subject/Body/
 - b. Enter your Panel from drop down menu
 - c. Click **Create Alert**
 - d. Click Back To: **01-12-2010**
9. From Settings Menu, Click **Pump A Settings**
 - a. Click **Edit Pump A** to set up your pump settings (Note: this may also be done in the field with the MARC2 handheld user interface).
 - b. Save settings by clicking on **01-12-2010**
10. From the Performance Menu, Click on **Reports or Events** to display critical data from your panel (Note: Report data is an advanced feature that requires site knowledge of Pump Tank Size (GPI) and Pump Performance (GPM))
 - a. Click Back to **01-12-2010** to return to Panel screen
11. Click on **O&M Provider**, then Edit O&M to enter data for the Operations and Maintenance Provider for the Panel. (Note: may also be Installer or Designer)

NOTE: Panel Configuration and Modem Settings are advanced settings; please call Aquaworx Technical Support before changing these settings.

Timed Dosing Setup Formulation

IPC Panel Setup Using the Following Aquaworx IPC Panels:
IPC-SO1, IPC-SM, IPC-DO1, IPC-DM, IPC-DSF and IPC-GD

Seven steps required for the IPC Panel setup		
1. Determine volume per inch in the pump tank	=	<u> </u> (A) gal/in
2. Verify pump's gal per minute volume (gpm)	=	<u> </u> (B) gal per minute
3. Dose "ON" time or Pump "ON" time	=	<u> </u> (C) minutes : seconds
4. Required dose volume (gpd)	=	<u> </u> (D) gal per dose
5. Number of doses per day or 24 hours (dpd)	=	<u> </u> (E) doses per day
6. Calculation for Pump "OFF" Time	=	<u> </u> (F) minutes : seconds
7. Establish Daily Flow Rate	=	<u> </u> gal per day (set by designer)

"A"

Calculate the Volume per inch for the Pump Tank (gal/in)

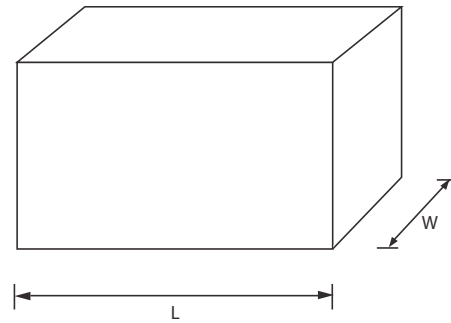
Square tank:

$$((L \times W) / 144) \times 7.48 \text{ (gal/cu ft)} / 12 = \text{gal/in}$$

Example #1:

$$\begin{aligned} \text{Assuming the tank is 96" long x 48" wide x 1000/gals} \\ &= ((96" \times 48") \times 7.48) / 12 \\ &= (4608 / 144) \times 7.48 / 12 \\ &= 32 \times 7.48 / 12 \\ &= 239.36 / 12 \end{aligned}$$

$$= 19.9 \text{ gal/in (rounded up to 20 gal/in)}$$



Cylindrical tank:

$$((3.14 \times (R^2) \text{ tank radius is half tank diameter}) \times 7.48) / 12 = \text{gal/in}$$

Example #2:

$$\begin{aligned} \text{Assuming the tank is 2' radius, 4' inside diameter (ID)} \\ &= ((3.14 \times 2^2 \text{ ft}) \times 7.48) / 12 \\ &= (12.57 \text{ ft}^3 \times 7.48 \text{ gal/ft}^3) / 12 \text{ in/ft} \\ &= 93.996 / 12 \text{ in/ft} \end{aligned}$$

$$= 7.8 \text{ gal/in (rounded up to 8 gal/in)}$$

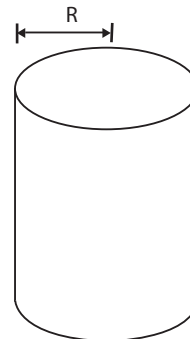


Table 1: Rectangular / Square Tanks

Width feet (inches)	Length feet (inches)	Gallons of liquid per inch
3' 4" (40 in)	6' 8" (80 in)	13.9
4' (48 in)	4' (48 in)	10.0
4' (48 in)	8' (96 in)	19.9
4' 5" (53 in)	8' 6" (102 in)	23.4
4' 10" (58 in)	8' 6" (102 in)	25.6
5' 2" (62 in)	8' (96 in)	25.8
5' (60 in)	9' (108 in)	28.1
5' (60 in)	10' (120 in)	31.2
5' 8" (68 in)	10' 8" (128 in)	37.7
4' (48 in)	11' (132 in)	41.1
6' 6" (78 in)	12' (144 in)	48.6

Table 2: Cylindrical Tanks

Tank diameter feet (inches)	Gallons of liquid per inch
2' (24 in)	2.0
2' 6" (30 in)	3.1
3' (36 in)	4.4
3' 6" (42 in)	6.0
4' (48 in)	7.8
5' (60 in)	12.2
6' (72 in)	17.6
7' (84 in)	24.0
8' (96 in)	31.3

“B”

Calculate the System Pump Volume in Gallons per Minute

****This is required to calculate Dose Volume****

$$\text{Gallons per minute (gpm)} = (\text{Draw Down} \times \text{gal/in})$$

1. Measure the pump discharge based on a 1 minute draw down of the tank.
2. Using the MARC, on MANUAL settings (Hands Off Auto) write down or record the liquid level.
3. Manually pump the tank for one minute. (Time will be recorded on the MARC as you manually pump down.)
4. Write down or record the difference in liquid level between the start and stop.
5. This will measure the liquid level draw down in inches for a one minute manual (HOA) pumping.

Example:

Draw Down = 2" (per the one minute draw down procedure listed above)

$$\text{Gallons per minute (gpm)} = (\text{Draw Down} \times \text{gal/in})$$

$$\text{Gallons per minute (gpm)} = (2" \times 20 \text{ gal/in})$$

$$\text{(gpm)} = 40$$

“C”

Minimum Dose Size Equation: Dose “ON” Time or PUMP “ON Time (D)

****This is required to calculate Dose Volume (C)****

$$\text{Dose “ON” Time (D)} = (A + 3B)$$

A = Time the pump is turned on until first squirt @ the first orifice.

(This will compensate for time when no water is being discharge to the system)

B = The time from when the first squirt shows @ the first orifice until the laterals are equally pressurized.

By multiplying by 3, we are ensuring that 67% of the water is being equally distributed.

Example:

Pump is turned on and the first squirt shows in 5 seconds

$$\text{A} = 5 \text{ (seconds)}$$

The time from the first squirt until the system is pressurized is 10 seconds

$$\text{B} = 10 \text{ (seconds)}$$

$$\text{Dose “ON” Time (D)} = (A + 3B)$$

$$\text{Dose “ON” Time (D)} = 5 + (3 \times 10)$$

$$\text{Dose “ON” Time (D)} = 5 + 30$$

$$\text{Dose “ON” Time (D)} = 35 \text{ seconds}$$

“D”

Calculation for Dose Volume

$$\text{Gallons per dose (gpd)} = (\text{Dose "ON" Time}/60 \times \text{gallons per minute (gpm)})$$

Example:

$$\text{Gallons per dose (gpd)} = (\text{Dose "ON" Time} \times \text{gallons per minute (gpm)})$$

$$\text{Gallons per dose (gpd)} = (35 \text{ (seconds)}/60 \text{ (seconds/minute)}) \times 40 \text{ (gpm)}$$
$$\text{(gpd)} = (.58 \times 40)$$

$$\text{(gpd)} = 23.3 \text{ gallons}$$

“E”

Calculation for Number of Doses per Day

$$\text{Number of doses per day} = \text{gallons per day (estimated daily flow rate)}/\text{gallons per dose}$$

Example:

Assume 360 gallons per day system (Typically set by designer)

$$\text{Doses per day (dpd)} = 360 \text{ gallons per day} / 23.3 \text{ gallons per dose}$$

$$\text{Doses per day (dpd)} = 360/23.3$$

$$\text{(dpd)} = 15.4 \text{ doses per day}$$

$$\text{(dpd)} = 15 \text{ doses per day}$$

“F”

Calculation for Pump “OFF” Time

$$\text{Take the number of hours in a day} = 24 \text{ hours and divide this by the number of doses per day}$$

Example:

$$\text{Pump: "OFF" Time} = 24 \text{ (hrs.)}/15 \text{ (dpd)}$$

$$\text{Pump "OFF" Time} = 1.6 \text{ hrs or } 1 \text{ hour}/36$$

Review six steps required for the IPC Panel setup

- | | |
|---|-------------------------------------|
| 7. Determine volume per inch in the pump tank | = 20 gal/in |
| 8. Verify pump's gal per minute volume (gpm) | = 40 gal per minute |
| 9. Required dose volume (gpd) | = 23.3 gal per dose |
| 10. Number of doses per day or 24 hr's (dpd) | = 15 does per day |
| 11. Calculation for Pump “OFF” Time | = 1 hr/36 min Off time |
| 12. Establish Daily Flow Rate | = 360 gal per day (set by designer) |

FREQUENTLY ASKED QUESTIONS

What does Z-BIAS mean?

Each transducer manufactured has a slightly different resistance called zero bias. Every transducer is calibrated at the factory prior to shipment. The calibration rating is labeled on the bell, and recorded on the outside of the transducer package. The Z-BIAS value needs to be programmed into the panel at start up.

What is Auto-clear?

Timed System:

The air trapped in the transducer bell needs to be replaced on occasion. During periods of low or no flow the level will start to drop in the tank. Once the level drops down to the start level the computer tracks the next dose or doses as auto-clear doses. Since the start level is typically set to one dose volume, the auto clear is typically set to one. (Example: A 40 gallon dose would translate to a 2" dose in most 1,000 gallon tanks) During one of the doses the level will drop below the start level. The next 2" dose will then end below the bottom of the bell and the system will be idle until the liquid level rises above the start level again. In the case of small doses multiple auto-clear doses may be needed. (Example: If the dose volume is 10 gallons, then 1/2" enough doses are required to draw the level to one inch below the bell, so in this case an auto clear of 4 would be used).

Demand System:

In a demand dose system the start level becomes the pump ON and the bottom of the bell becomes the OFF level. The auto clear is set in seconds - typically 10 seconds. (Example: Pump will turn on at the start level, pump down to the bottom of the bell then wait through the OFF time then run the additional time to clear the bell).

Can I cut or splice the transducer signal wire?

It is OK to cut the transducer wire to length from the tank to the panel. However, the cable should NOT be spliced. The high potential of corrosion when splicing the signal wire will affect the signal and could reduce the accuracy of the unit. The transducers come in 4 lengths eliminating the need for field splicing. The lengths are 40', 80', 120', and 240'.

What does VETO mean?

The VETO feature is a second timer setting (also known as an override in some markets). If the flow increases above the Veto level, the VETO timing replaces the normal time settings. If the level in the tank is at or above the VETO level, the panel will operate in the VETO schedule in addition to its normal time settings.

I have input the new settings but it still runs the default program.

If the timer schedule and/or the level functions are changed, the AUTO feature MUST be selected. This will upload the new changes to the board and is found on the MARC unit between Manual A and Pump A settings.

How should I supply power to the panel?

The control power must be 120V. The pump circuit for the panel can be wired either 120 volts or 240 volts depending on the pump requirements. It is important to provide two designated circuits to the panel, one circuit to the pump and one to the controls. The primary load draw is the pump and the most likely component to trip the supply circuit breaker. With two circuits, if the pump circuit tripped, power would be available to the controls and will notify the homeowner of the problem.

Why does my control panel read the EVENTS once a minute?

If the Log Status in the panel is set to Y (yes), then it will record every event once per minute. This will cause the 4000 event to fill-up quickly in the panel. The Log Status may be set to N (no). To change this using the MARC, go to Mode settings and press enter. In the first screen named Log Status, if you press enter the Log Status can be changed to N (no).

Why does my Transducer always read a 00.0" level?

In some cases the Transducer or circuit board may need to be replaced. Check all connections. Test any component before installing it. Checking a transducer with a bucket of water is an easy way to see if the new transducer solved the problem.

Why does the Transducer read a constant level, (ex: 1.5- 6.5") even though the pump is running?

The Transducer wiring to the circuit board is not in the proper sequence. Make sure the input wires are RED (RD), BLUE (BL), and BLACK (BK) from left to right on the wire terminal strip attached to the circuit board.

How do you setup for a Redundant off Float?

The best way to use a redundant off is to wire a load rated float switch in line with the power in the pump vault. Secondly, many pump companies supply a "piggy back float" option.

How do I wire a panel for 230/240 Volt installations?

The control side of the panel must only be wired for 120 volt installation. For the pump(s) power supply (Line side), using 3-wire, connect the Red wire to the Neutral or Pump L1 terminal block and the Black wire to the Pump L2 terminal block. The White neutral wire can be cut back. .

What should I use to plug the conduit to prevent sewer gases from entering the enclosure?

There is a variety of conduit sealing compounds available, but we recommend, Chico SpeedSeal Compound, as it will quickly harden to a dense, strong mass and is UL Listed and cUL Listed.

Can you run the same Transducer wire in the conduit for the pump supply?

The Transducer wire can be run thru the same conduit as the pump power supply without interference. However, the Transducer is a low voltage wire and in some jurisdictions it is not allowed to run both High/Low voltages in the same conduit. Check with both regional and State Regulations first.

Can I setup the IPC panel with a Remote Alarm?

Yes, a remote alarm can be purchased as an option with all Aquaworx IPC panels. The remote alarm will provide the same alarm sequence as the alarms on the main enclosure. The remote alarm can be located up to 2000' away from the main control box. Contact customer service to purchase.

What is the difference between DOSE, ADOSE & BDOSE in the Event log?

Dose = A recorded standard Dose from pump A.

ADose = A recorded Autoclear Dose.

BDose = A recorded Dose from pump B.

Can the panel be setup using two transducers?

Yes, using a IPC Sandfilter panel specifically for installations that require two separate pump systems each needing a separate transducer for each pump. (Product ID number: IPC-DSF)

When I set the panel up to run both pumps what will happen?

This setting is designed to run both pump A and pump B during a Veto level. This setting is used in conjunction with a Duplex panel to pump the tank down faster. This should only be used if the pumps are small and both pumps can run on one circuit or if it is a specialty panel setup for individual circuits for each pump.

Can I put a heater unit inside the control panel?

Yes, Aquaworx offers a heater unit that can be easily setup in an existing or new IPC panel. Contact customer service for more information.

What is the battery on the circuit board, and/or will I lose my events if the power goes out?

Its purpose is to keep the clock running, which will allow the data logging to record when the power goes out and for how long the power was off. The battery can last up to five years without a replacement but, it is recommend that it be change every year. If the battery is lost and the power goes out all data and all settings are retained and will function once power is restored, however, the date and time will re-set to 00.

What is a Varistor?

A varistor is a variable resistor used to protect excessive current in a circuit. Our varistor is connected between the incoming line and neutral. This 130V varistor serves as over voltage/surge protection for the controller.

How do I setup the panel to handle a Sandfilter application?

Using the MARC controller, under the Mode settings, the Run Both / SFI (Sand Filter Interface) menu will need to be set to Y (yes). This will not allow Pump A to initiate if pump B has a high level alarm.

The MARC unit is not recording events from my SD card?

If the MARC screen is going blank during the download, then it is probably receiving too much current from the SD card. This may be caused by too much data on the card, or too much memory on the card. We recommend a 1 Gigabit maximum SD card with dedicated use for the MARC.

How do I wire a Transducer to the panel for a Sandfilter application?

Follow the instructions provided with the panel. If the instructions are lost we can email you, or download from our website - www.aquaworx.com.



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