AquaSurf

© Neptune Systems
6288 San Ignacio Ave. Unit #B
San Jose, CA 95119
Phone (408) 578-3022 • Fax (408) 578-9383

1. Introduction

AquaSurf allows the AquaController to control up to 4 variable speed pumps. The on/off cycle time as well as the intensity can be flexibly controlled to create realistic wave simulations in the aquarium.

Features Include:

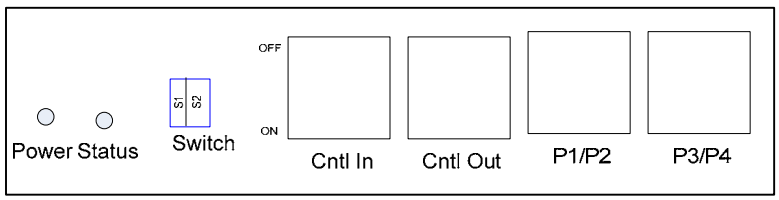
Independent control of 4 Tunze Stream pumps (7095 controller compatible).
Precise timing and intensity control of all pumps.
Mode of operation can be changed throughout the day.
Constructive interference wave generation without a wavebox.

2. Installation

AquaSurf should be screwed onto a wall or cabinet in a dry location so that water damage is not possible. It is recommended that you follow these guidelines:

1. Mount the AquaSurf above the water line of your tank.
2. Be sure to have drip loops on all cords plugging into the AquaSurf.
3. The RJ45 end of the pump control cable plugs into the P1/P2 or P3/P4 connector on the AquaSurf, and DIN5 connector plugs into the power adapter of the pump.
4. The telephone type cord connects from the AquaController Control port to the Cntl In port of the AquaSurf. Additional direct connect boxes plug into the Control Out of the AquaSurf, and the control in port of the next DCx.
5. The AquaController must have at least version 3.3 of the firmware (see selftest). If your controller has an earlier version of firmware, see the support section of our website www.neptunesys.com to download the latest firmware.

Refer to the figure below for the positions of the connectors on the digital control box:



Control Address selection (switch)

The first two dip switches on the left of the box allow for the setting of letter portion of the Control address of the AquaSurf. The table below illustrates the four possible settings. Note: only Control address letter codes E-H are available.

Switch 1	Switch 2	Control Address
Off	Off	E1-E4
Off	On	F1-F4
On	Off	G1-G4
On	On	H1-H4

Sample Setting:

If Switch 1 = On, Switch 2 = Off, AquaSurf will respond to control address F1-F4. The AquaController must be configured to use the same addresses as selected on the AquaSurf. Refer to the AquaController Owner's manual for more information on how to set up the AquaController.

Power

It is not necessary to connect an AC adapter to the power connector when the AquaSurf when it is used with Tunze Stream Pumps. The Stream pumps power the AquaSurf through the DIN5 to RJ45 cable. The power connector is present for possible non Tunze pump support.

Light Emitting Diode (LED)

The LED provides a visual indication of the operating status of the AquaSurf. When solid on, it means that power is on and the AquaSurf is ready to accept control commands. When blinking, the AquaSurf is receiving control commands.

Control Input (Cntl In)

The left RJ-11 connector (telephone plug) is the input connector for the Control signal. A telephone style cable (4 internal wires, supplied with the AQUASURF), should connect between this AQUASURF Control In port to the AquaController. The length of this cable should be less than 10 feet.

Control Output (Cntl Out)

The right RJ-11 connector (telephone plug) is the output connector for the Control signal. A telephone style cable (4 internal wires) should be used to connect this Control output port to another LS Control input port. Always connect Control inputs to Control outputs when daisy chaining

multiple Direct Connect boxes together. The last DCx in the chain should either have its Control output unconnected or connected to a Power-line interface (part #IM513).

P1/P2 And P3/P4 Connectors

These connectors generate the control voltage to the variable speed pumps. The P1/P2 connector controls pumps 1 and 2, and the P3/P4 connector controls pumps 3 and 4. The left cable of the wireless harness is pump #1 (or #3 on the P3/P4 connector), and the right cable is pump #2.

3. Programming Language

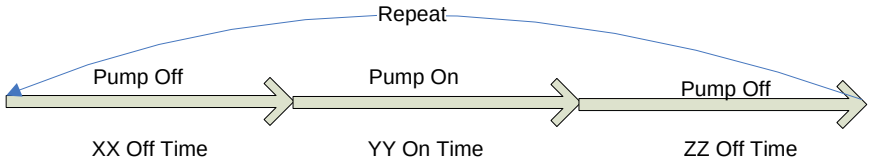
Several additional program statements are added to the AquaController's programming language to support the AquaSurf. A concept called 'profiles' is the major new enhancement which allows for characteristics of the pumps operation to be specified. In a given profile the pumps, off and on times, pumps minimum and maximum power levels, as well as synchronous/asynchronous operation can be specified. The ACJr supports up to 4, the AC3 up to 6, and the AC3Pro up to 7 profiles.

Pump OSC Statement

The syntax for the Pump OSC statement is:

Pmp OSC XX/YY/ZZ for PF1

Where XX is the initial off time, YY is the on time, and ZZ is the second off time. These times can either specify seconds or tenths of seconds (see the Pump MODE statement for details). The following diagram illustrates, how the osc statement works:



The following sample specifies that profile PF1 will start with the pump off for 3 seconds, then on for 5 seconds, and then an off for 4 seconds.

Pmp OSC 03/03/04 for PF1

Pump Int Statement

The syntax for the Pump Int statement is:

Pmp Int XXX/YYY for PF1

Where XXX is the minimum pump intensity, and YYY is the maximum pump intensity. The intensity values are in percent; 000 is off, and 100 is full on. For stream pumps, it is recommended to set the minimum intensity level above 30 percent.

The following sample specifies that profile PF1 will have the pump's minimum intensity at 30% and the maximum at 90%.

Pmp Int 30/90 for PF1

Pump Mode Statement

The syntax for the Pump mode of operation statement is:

Pmp Mode SD for PF1

Capital letters specify that the mode function is on, and lower case characters turn the mode function off. The Supported modes are:

S – Synchronize pumps on/off cycle with the previous (lower numbered pump). If synchronization is enabled for the profile, the pump will initially be held in the exit off state until the previous pump advances to the initial off state (i.e. both pumps will start in the initial off state at the same time). This mode is particularly useful when trying to generate waves through constructive interference. If synchronization is enabled for pump 2, then it will be synchronized to pump 1. Lower case 's' disables synchronization for the pump, and it start its initial cycle at an arbitrary time.

D – Divide times by 10. If enabled the times specified in Pmp OSC command are divided by 10 (time resolution is .1 seconds), and the time values are from 0.0 to 9.9 seconds. When off (lower case 'd') the time values are in seconds (from 0 to 99 seconds).

The following sample specifies that profile PF1 will have the synchronized with the preceding pump, and the time mode is in seconds.

Pmp Mode Sd for PF1

Pump Program Examples

Resonate (Wave) Mode

Since the AquaSurf allows for very precise timing of the on off cycles, it is possible to create large waves in the tank by constructive interference. Following is an example which generates 2+" waves in a 55 gallon (3 foot) tank with a single 6000 Stream.

```
If Time > 00:00 Then PMP PF1
Pmp Mode sD for PF1
```

Pmp Int 030/100 for PF1
Pmp OSC 00/06/05 for PF1

In the below table are the on/off times used to generate waves in our test tanks. The values used in your tank may be slightly different but these should be a good starting point.

Tank Width (feet)	Off Time	On Time
3’	0.6 Seconds	0.5 Seconds
4’	0.8 Seconds	0.8 Seconds
6’	1.2 Seconds	1.2 Seconds
8’	1.7 Seconds	1.8 Seconds

Alternate Pumps

If it is desired to have two pumps alternate back and forth with a period of 10 seconds on and then 10 seconds off use:

If Time > 00:00 Then TZ1 PF1
If Time > 00:00 Then TZ2 PF2
Pmp Mode sd for PF1
Pmp Int 030/100 for PF1
Pmp OSC 10/10/00 for PF1
Pmp Mode Sd for PF2
Pmp Int 030/100 for PF2
Pmp OSC 00/10/10 for PF2

NOTE: The above program could be modified to generate larger waves in the aquarium than a single pump in the first resonate program by simply adjusting the on/off times to the resonate values.

Growing Surg

If it is desired to have four pumps come on one at a time 5 seconds apart, and remain on so that a growing surge can be created use the following:

If Time > 00:00 Then TZ1 PF1
If Time > 00:00 Then TZ2 PF2
If Time > 00:00 Then TZ3 PF3
If Time > 00:00 Then TZ4 PF4

Pmp Mode sd for PF1
Pmp Int 000/100 for PF1
Pmp OSC 5/20/00 for PF1
Pmp Mode Sd for PF2
Pmp Int 000/100 for PF2
Pmp OSC 10/15/00 for PF2
Pmp Mode Sd for PF3
Pmp Int 000/100 for PF3
Pmp OSC 15/10/00 for PF3
Pmp Mode Sd for PF4
Pmp Int 000/100 for PF4
Pmp OSC 20/5/00 for PF4

Changing Mode of Operation

If it is desired to have two pumps during the day operate in a high intensity wave mode, and during the night run in a low intensity oscillation mode. The follow code assumes that the timer LT1 is on during the day and off at night.

If Timer LT1= ON Then TZ1 PF1
If Timer LT1 = OFF Then TZ1 PF3
If Timer LT1 = ON Then TZ2 PF2
If Timer LT1 = OFF Then TZ2 PF4
Pmp Mode sD for PF1
Pmp Int 030/100 for PF1
Pmp OSC 12/12/00 for PF1
Pmp Mode sD for PF2
Pmp Int 030/100 for PF2
Pmp OSC 00/12/12 for PF2
Pmp Mode SD for PF3
Pmp Int 30/50 for PF3
Pmp OSC 20/20/00 for PF3
Pmp Mode SD for PF4
Pmp Int 30/50 for PF4
Pmp OSC 00/20/20 for PF4

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For your protection, items being returned must be carefully packed to prevent damage in shipment and insured against possible damage or loss. Neptune Systems will not be responsible for damage resulting from careless or insufficient packaging. Before returning please obtain a return authorization (RMA) number from Neptune Systems at (408) 578-3022. Returned merchandise will not be accepted without a RMA number.

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