Solar 1000 manual

Software Version
6.2

Table of Contents

General

Before you Start

This manual is designed to familiarize you with the unit's functionality. It is best to read the entire manual before beginning the installation. Keep in mind that all the features described in this manual may not apply to your model.

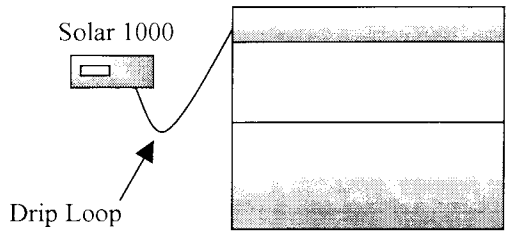
The Menu Navigation Chart that has been provided shows how to move through the menu selections from the front panel.

Safety Precautions

We have designed this controller to ensure that it is as safe as we can make it. Safe operation is also dependent on you, the operator. We recommend that you follow these simple safety rules.

1. **Electricity and Water do not mix!** Place your Solar 1000 in a location that avoids spray, splash or immersion. It is also recommended that the unit be kept out of areas with high humidity.

2. All wiring connected to the Solar 1000 should include a drip loop.



3. Avoid touching the unit or wiring when hands or the floor on which you are standing is wet.

Determining your Solar 1000 Model Number

When powering up your unit, the model and software version will be initially displayed on the screen and then once every minute thereafter. Other screens with important information will also be sequentially displayed. Compare the model designator with the descriptions below to determine the supported functionality.

Solar 1000 L1 (Lighting)	Solar 1000 L2 (Lighting)
Qty 1 – IceCap™ port Qty 1 - Moonlight port	Qty 2 – IceCap™ ports Qty 1 – Moonlight port Qty 1 - X10 port
Solar 1000 LW (Lighting and Wavemaker)	**Solar 1000 LWM (Lighting, Wavemaker, Measurement)**
Qty 2 – IceCap™ ports Qty 1 - Moonlight port Qty 1 - X10 port	Qty 2 – IceCap™ ports Qty 1 - Moonlight port Qty 1 - X10 port Qty 1 - Temperature port Qty 1 - pH port Qty 1 - ORP port

Determining the Software Version

Watch for the status screen that shows your model and software version. The "V6.2" designator indicates the software version. The "6" indicates the major revision level and the "2" indicates a minor revision level. Major revisions indicate the current level of supported software features and functionality. New major revisions are typically released once per year. Minor revision levels represent corrections to the functionality of the existing major revision level. Minor revisions are released as required.

Port Descriptions

- IceCap™ port – each port is designed to directly drive one (1) IceCap™ 660 or 430 ballast. The units performance has been verified with most combinations of Normal (NO), High (HO), or Very High Output (VHO) fluorescent lamps. The 430 ballast is restricted to driving no more than two 4' lamps when used with a dimmer.

- Moonlight port – this port drives standard household incandescent bulb(s) up to a combined total of 150 watts. Adapter kits are available for hoods not currently wired for incandescent bulbs. This port is used either for moonlight simulation only or moonlight with dawn/dusk simulation.

- X10 port – this port is connected to an X10 transmitter for controlling remote X10 devices. The port supports any X10 compatible device.

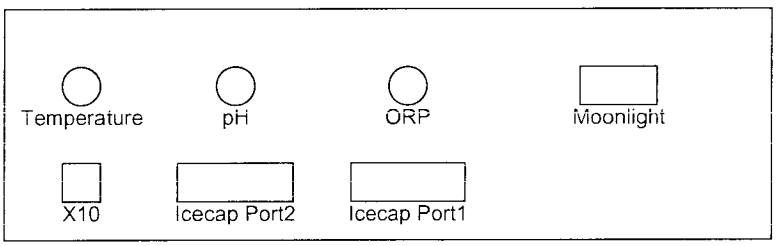
- Temperature port – this port is connected to a compatible temperature probe.

- pH port – this port is connected to a compatible pH probe.

- ORP port – this port is connected to a compatible ORP probe.

Solar 1000 Backpanel

This back panel drawing shows the available ports on the Solar 1000 LWM. Other models will not have all the ports shown.



Checking the Systems Status

Move to the System Status screens if not there already. A sequence of system operation and status screens will be displayed, changing every 3 seconds. The following screens will be displayed according to your model.

Model – this screen displays the Solar model designator and software version number (all models)

System Ck – this screen displays the results of a self-diagnostic routine (all models)

"Pass" will be normally displayed upon successful completion of the systems self-diagnostics. The diagnostic routines run continuously in the background. If a "Err#" appears, the Solar 1000 has diagnosed an error condition. Refer to the Error Condition section for corrective actions.

Time – user programmed time (all models)

Date – user programmed date (all models)

Today - weather forecast for the day i.e. sunny, am clouds, pm clouds, overcast (all models)

The next few screens describe the times that are currently being used to sequence the dimming on IceCap™ ports 1 and 2. Note that these times are not programmed. They are calculated from the times set under the "Seasonal Changes" section and the current date.

Dawn – time when the lamps will begin to brighten (all models)

Sunrise – time when the lamps will have brightened to the daytime level (all models)

Noon Bgn – time when the lamps will have brightened to the noontime level (all models)

Noon End – time when the lamps will end holding at the noontime level (all models)

Sunset – time when the lamps will have dimmed to the daytime level (all models)

Dusk – time when the lamps will be fully dimmed off (all models)

The next screens describe the moonlight port operation.

Moonrise – time when the moonlight port will become active (all models)

Moonset – time when the moonlight port will become inactive (all models)

MnPhase – indicates the current phase of the moon (all models)

The next screens show simulated LED's indicating on/off states

- Off State
- On State

TimerLED – indicates the state of the associated X10 remote(s) typically used for light timers (L2, LW, LWM). The LED's show the status of timers 1-4, in that order.

WaveLED – indicates the state of the associated X10 remote(s) used for wavemakers (LW, LWM). The LED's show the status of wavemakers 1a, 1b, 2a, 2b, 3a, 3b, 4a, 4b, in that order.

The last screens show the current measurements on the associated probes.

Temp – current temperature and X10 remote status (LWM)

PH – current pH and X10 remote status (LWM)

ORP – current Oxidation Reduction Potential and X10 remote status (LWM)

Setting The Time And Date

The Time screen provides the user with the opportunity to set the Solar 1000 to the local time. The Solar 1000 uses this setting to determine day and night. This can be set to the actual time or offset to some other locale.

Q. What if I come home late at night and wish to have the lights on when I get home?

A. The time does not have to be set to the actual local time. Setting the clock several hours earlier will push the Solar 1000 "day" into the evening for nighttime viewing. The best way to accomplish this is to program the unit as you would for a "normal" day, then set the clock back by how many hours that you would want to push the day forward into the evening.

The Date screen is used to set up the Solar 1000 for seasonal changes and lunar cycles. Setting it to the current date will synchronize the lunar cycle with the actual moon phases.

Manual Dimming

This section corresponds to all screens shown under Manual Dimmers.

The Solar 1000 allows you to manually control the IceCap™ ports 1 and 2 independently. Each port can be dimmed from 0-100%. Manual dimming is only allowed for 2 consecutive hours before the unit will automatically force the lights back to the normal operation state.

Note that even though the lamps are fully dimmed, the ballast still has hazardous voltages applied. Power must be removed from the ballast before starting any maintenance procedures.

Lighting

Creating Seasonal Changes

This section corresponds to all screens shown under Seasonal Changes.

When simulating the photoperiod anywhere but at the equator, the length of day changes with the seasons. Even at the equator, the period of time when the sun is directly overhead varies, changing the duration of peak light intensity throughout the year.

The Solar 1000 allows you to recreate the seasonal changes anywhere on earth just by programming the longest and shortest days of the year. The Solar 1000 will automatically change the settings between the two programmed days. The adjusted times are what appear under the system status screens.

The summertime setting is the first day to program and corresponds to June 21st, the Summer Solstice. The wintertime setting is the second day to program and corresponds to Dec 21st, the Winter Solstice.

These charts show the factory default settings.

Summer Solstice – June 21st	
Dawn	6:00am
Sunrise	6:30am
Noon Bgn	9:00am
Noon End	5:00pm
Sunset	7:30pm
Dusk	8:00pm

Winter Solstice – Dec. 21st	
Dawn	7:00am
Sunrise	7:30am
Noon Bgn	11:00am
Noon End	3:00pm
Sunset	6:30pm
Dusk	7:00pm

Note that Dawn will begin at 6:00am on June 21st and will increase itself each day until it reaches 7:00am on Dec 21st. The reverse holds true (decreases to 6:00am) going from Dec 21st to June 21st.

The same process applies for each of the six programmable events.

Setting up Moonlight

This section corresponds to screens shown under Moon Options.

The Moonlight Port supports up to 150 watts of incandescent which would be too bright for moonlight for most aquariums. In order to allow the use of various wattage bulbs, the Solar 1000 allows you to throttle the lamp under its rated wattage. As an example, setting the intensity percentage to 20% on a 60 watt bulb will give you an effective 12 watt bulb at the full moon and less than that at other times in the lunar cycle.

The Moonphases, Moonrise and Moonset times are all preprogrammed into the Solar 1000. Setting the proper date is the only requirement for having an astronomically correct Lunar Cycle.

New Feature: enabling the port1 follow option allows the moon port to act as a sunrise/sunset simulator during the day and the moonlight in the night. It will switch it's function over automatically at Dawn and Dusk. The moon lamps will go to full brightness (100%) during the day but only to the set level at night.

Setting up the Light Levels

This section corresponds to screens shown under Seasonal Changes and Daytime Levels.

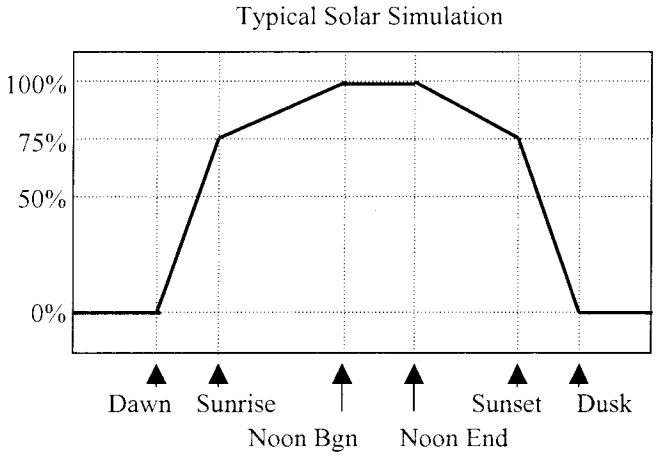
Normal daylight intensity increases gradually throughout the day, peaks during the noontime hours and then declines towards nightfall. The Solar 1000 allows you to duplicate this natural occurrence.

Setting up the Light Levels (cont.)

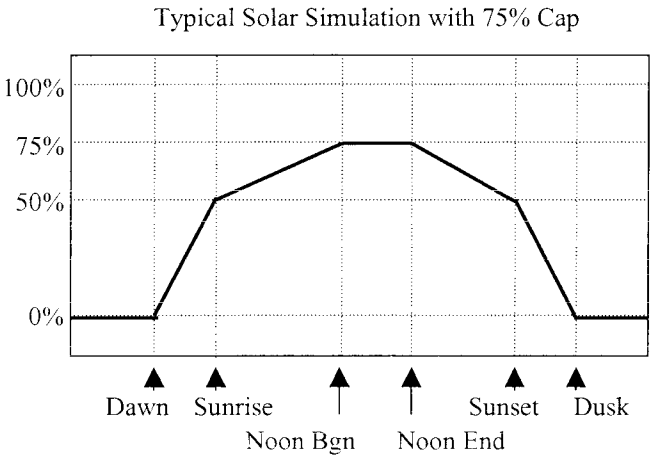
There are six times and two levels that are used during the day for Solar Simulations. The times are Dawn, Sunrise, Noon Bgn, Noon End, Sunset and Dusk. The levels are Daytime and Noontime and are programmable from 0-100% in 5% increments. Note that the Solar Simulation will follow the seasonal changes described above.

The following examples demonstrate how the Solar 1000 uses these times and levels to drive the lamps on the IceCap™ Ports 1 and 2.

Example 1: Daytime Level = 75%, Noontime Level = 100%



Example 2: Daytime Level = 50%, Noontime Level = 75%



Setting up Weather Patterns

This section corresponds to all screens shown under Storm Center.

The Storm Center allows the Solar 1000 to create weather through cloud and wave simulation. There are six levels of weather activity that determine the frequency of stormy days per month. The following table gives you the approximate monthly percentage of stormy days based on the activity setting.

Activity Level	Cloudy Days/Mth.
0	0%
1	12%
2	25%
3	38%
4	50%
5	65%

The "Intensity" setting determines the darkness of the clouds. There are ten settings from the darkest (9) to the lightest (0). This should be set according to preference. This setting has no affect on wave action.

The "Seasonal" setting creates weather patterns that change with the time of year. Peak storm activity occurs around September and is determined by the activity setting. The frequency of stormy days will then drop away to all sunny days in the winter months. Without seasonal changes weather is consistent year round.

The forecast screen that is displayed in the status mode will always show one of the following.

Sunny..... no clouds all day, normal wave action
am clouds..... cloud activity in am, increased wave action in the am hours
pm clouds..... cloud activity in pm, increased wave action in the pm hours
overcast ..... cloud activity all day, overcast skies all day, increased wave action all day.

The weather based wave action and cloud activity can each be set independently.

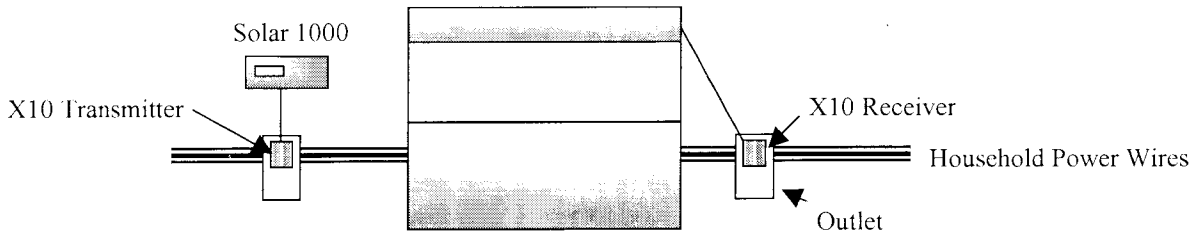
X10 Operation

What is X10?

This section corresponds to all screens shown under X10 Timers.

X10 is the standard for home automation. The home automation industry requires an ability to turn on and off various appliances within the home. This normally would have required an extensive rewiring of the home. X10 uses the existing power wires and outlets to make it possible for any home to be easily upgraded for home automation.

A basic X10 system consists of a transmitter and one or more receivers. The X10 transmitter is connected to the Solar 1000 and then plugged into any wall outlet. The receiver is then connected to the device being controlled (in this case a fan in the hood) and is also plugged into an outlet. When the Solar 1000 wishes to control the fan, it sends a signal to the receiver through the household power wires. The receiver then turns on or off the fan per the request of the Solar 1000.



Setting up the Light Timers

The Solar 1000 (L2, LW, LWM) has the capability to operate four Light timers. Each timer (Timers 1-4) can be independently set for one on and one off time per 24-hour period. The timer on and off times are linked to one of the six daily light events. An offset can be added to stagger the timers off from the standard event times.

Setting the House Code

The house codes purpose is to let the receivers know if the transmitted on/off command is for them. For example, a receiver with a house code of "B" will not act on a transmitted message with a house code of "A" even if the device number (1-16) is correct. The House Code screen lets the user select one of the house code pairs "A/B, C/D, E/F". This flexibility allows for multiple home automation devices to be operating without interference as long as they use different house codes.

Wavemaker

Wave Action

This section corresponds to all screens shown under Wavemakers.

The Solar 1000 wavemaker simulates realistic wave action. It does not take more than a few minutes at a beach to notice that wave action increases and decreases over a short period on time. Ask any surfer and they will tell you that they wait for the set of large waves that invariable come in sets of three. Keeping this in mind, the Solar wavemaker emulates this very phenomena by having the wave action vary in intensity to duplicate the "wave sets". The Solar 1000 wavemaker experiences a period of low wave action then builds to the set of three large waves, and then subsides back to the original level.

Setting up the Wavemakers

This section illustrates several typical setups for wavemaker operation.

The first mode is "Alternating Pumps". This mode alternately switches power between two pumps. The table shown below indicates the proper settings for a user who wants a 10-minute cycle.

The second mode is Alternating Pumps with Idle". This mode is the same as "Alternating Pumps" but provides a time between power transfer when both pumps are off. This is desirable if a pump has established a whirlpool effect and you want this current to die down before starting a pump directed in the opposite direction.

The third mode is "Single Pump". This mode switches a single pump on and off in a 10 minute cycle.

The forth mode is "Main Pump". This mode is used when you wish to have the Feed Mode affect the main circulation pump. The pump will not cycle on / off and is not affected by modes other than Feed Mode.

Wavemaker Mode	A time	Off time	B time
Alternating Pumps	5 minutes	0	5 minutes
Alternating Pumps w/Idle	5 minutes	15 seconds	5 minutes
Single Pump	5 minutes	5 minutes	0
Main Pump	5 minutes	0	0

Night Mode

Night mode allows you to set the aquarium into a quieter nighttime wave action by doubling all the active wavemakers times. In the table above, the Alternating Pumps mode would cycle every 10 minutes in the day and every 20 minutes at night. Enabling night mode activates this function. Otherwise wave action continues at the programmed values around the clock.

Lunar Mode

Lunar mode simulates the strengthening of the tides found around the full moon. The tides strengthen due to the pull of the sun and the moon on the opposite sides of the earth. When this function is enabled wave action will increase towards the full moon and subside towards the new moon.

Storm Cycle

The Storm Cycle feature is related to the Storm Center settings found under Lighting Simulations. Wave action increases on "stormy days" with the increase proportional to the weather found in the forecast. Enable this function to have wave action change with the weather, otherwise the wave action is independent of weather.

Feed Mode

Feed Mode allows you to shut down the wavemakers and possibly the main pump if there is a concern that the food will be swept away and sucked into a filter. When this function is activated all pumps connected to the wavemaker will be shut off for the period of time specified in the Feed Time screen.

To start a Feed Mode cycle, set the Feed Time to the desired time, and move to the Feed Control screen and press the "up" key. This starts the Feed Mode timer. At any point during the Feed Mode cycle, pressing the "down" key (while at the Feed Control screen) will stop the process and normal wavemaker operation will resume.

New Feature: A second method of starting Feed Mode is to press both the left and right front panel buttons simultaneously. This allows starting Feed Mode from any screen.

Temperature

This section corresponds to all screens shown under Temperature Settings.

The temperature measurement and control functionality allows you to maintain precise temperature control in your aquarium. Both chillers and/or heaters can be controlled with the use of X10 modules. For best performance, the temperature probe should be placed in an area that has excellent water circulation so that it represents the true aquarium temperature.

Setpoint and Range

The setpoint determines the target temperature to be maintained. The range provides a window of acceptable temperature variation that does not stress the animals or equipment.

The temperature setpoint is calculated from the "SummerTemp" and "WinterTemp" values. For a consistent year round temperature, the values should be equal. To create seasonal variations, make the two settings different. The Solar 1000 will automatic adjust the setpoint from the "SummerTemp" to the "WinterTemp" throughout the year.

Summer and Winter temperature setpoints can range from 60°F to 90°F. The range is selectable from ±0.2°F to ±1.0°F.

Creating Seasonal Changes

As an example of setting up seasonal changes, assume the "SummerTemp" = 82°F and the "WinterTemp" = 76°F. The following chart indicates the average temperatures that would be maintained during each month of the year. Keep in mind that the actual temperature will change in 0.2°F increments throughout the month.

Jan	77°F	
Feb	76°F	< Winter Temp Setting
Mar	77°F	
Apr	78°F	
May	79°F	
Jun	80°F	
Jul	81°F	
Aug	82°F	< Summer Temp Setting
Sep	81°F	
Out	80°F	
Nov	79°F	
Dec	78°F	

Calibrating the Probe

Periodic calibration of the temperature probe is required for optimum performance. Calibrate the probe every six months or at any time when temperature is suspect.

To calibrate, set up a glass of water with a temperature between 70°F to 80°F. Place a good reference thermometer and the Solar 1000 temperature probe into the glass and wait for the temperature readings to stabilize on both instruments (The Solar 1000's temperature is read at the "Temp" screen). Once it has stabilized, go to the Solar 1000's temperature "setpoint" screen and set the temperature equal to that of the reference thermometer. Next, go to the "calibrate?" screen and set it to [Y]. Finally, return to the "Temp" screen and the calibration is complete.

pH

This section corresponds to all screens shown under pH Settings.

The pH measurement and control functionality allows you to maintain a precise pH in your aquarium. Both CO2 and/or Dosers can be controlled with the use of X10 modules. For best performance, the pH probe should be placed in an area that has excellent water circulation so that it represents the true aquarium pH. If electrical interference influences the reading, place a ground probe near the pH probe.

Setpoint and Range

The setpoint determines the target pH to be maintained. The range provides a window of acceptable pH variation that does not stress the animals or equipment.

The pH setpoint can range from 4.00 to 10.00. The range is selectable from ±0.05 to ±0.25pH points.

Calibrating the Probe

Periodic calibration of the pH probe is required for optimum performance. Calibrate the probe every month or at any time when pH accuracy is suspect.

Calibration is accomplished with the use of pH10 and pH7 calibration fluids. Start by calibrating at pH7. Insert the probe into the fluid and wait for the reading to stabilize (The pH is read at the "PH" screen). Go to the "7.0 Calibration" screen, then to "calibrate?" and set it to [Y]. Return to the "PH" screen for the next step.

Next, calibrate at pH10. Insert the probe into the fluid and wait for the reading to stabilize. Go to the "10.0 Calibration" screen, then to "calibrate?" and set it to [Y]. Return to the "PH" screen and the calibration is complete.

ORP

This section corresponds to all screens shown under ORP Settings.

The ORP measurement functionality allows you to monitor the ORP of your aquarium.. For best performance, the ORP probe should be placed in an area that has excellent water circulation so that it represents the true aquarium ORP. If electrical interference influences the reading, place a ground probe near the ORP probe.

Setpoint and Range

The setpoint determines the target ORP to be maintained. The range provides a window of acceptable ORP variation that does not stress the animals or equipment.

The ORP setpoint can range from 200mv to 500mv. The range is selectable from ±10 to ±100mv.

Calibrating the Probe

Periodic calibration of the ORP probe is required for optimum performance. Calibrate the probe every month or at any time when ORP accuracy is suspect.

Calibration is accomplished with pH7 and pH4 calibration fluids mixed with Quinhydrone. The procedure for mixing is included in the calibration kit.

Start by calibrating with the pH4 fluid. Insert the probe into the fluid and wait for the reading to stabilize (The ORP is read at the "ORP" screen). Go to the "ORP4 Calibration" screen, then the "calibrate?" screen and set it to [Y]. Return to the "ORP" screen for the next step.

Next, calibrate with the pH7. Insert the probe into the fluid and wait for the reading to stabilize. Go to the "ORP7 Calibration" screen, then the "calibrate?" screen and set it to [Y]. Return to the "ORP" screen and the calibration is complete.

Doser Timers

The Solar 1000 has the capability to control the dosing of calcium, alkalinity, iodine, etc. There are two doser controls with alternating "a" and "b" sides giving you control of up to four independent dosers. Each doser can be set to dose 1, 2 or 4 times daily. The following table indicates the schedule of each doser control under each scenario.

	1 Dose per Day		2 Doses per Day		4 Doses per Day	
12am	"a" Dose		"a" Dose		"a" Dose	
3am						"b" Dose
6am				"b" Dose	"a" Dose	
9am						"b" Dose
12pm		"b" Dose	"a" Dose		"a" Dose	
3pm						"b" Dose
6pm				"b" Dose	"a" Dose	
9pm						"b" Dose

Each doser can be turned on from 5 seconds to up to an hour starting at the times indicated in the table. Doser1 and Doser2 can have independent frequency of dosing and duration times.

CO2 Control

Calcium reactors have become very popular for tanks with large calcium consumption. The use of CO2 as the agent to lower pH and dissolve the calcium has brought the potential of dramatically lowering the aquarium pH if not monitored. The solar 1000 has the ability to control the solenoid of a CO2 delivery system to prevent a potentially disastrous drop in aquarium pH.

To use this feature, set up the pH Target and pH Range to values that you would like the aquarium to stay within. When the monitored pH drops below the set pH Target minus its set acceptable pH Range the Solar 1000 will shut off the CO2 solenoid until the pH recovers. A separate pH control could also be used to boost pH back to an acceptable range.

Check the specifications page for the X10 code for CO2 control.

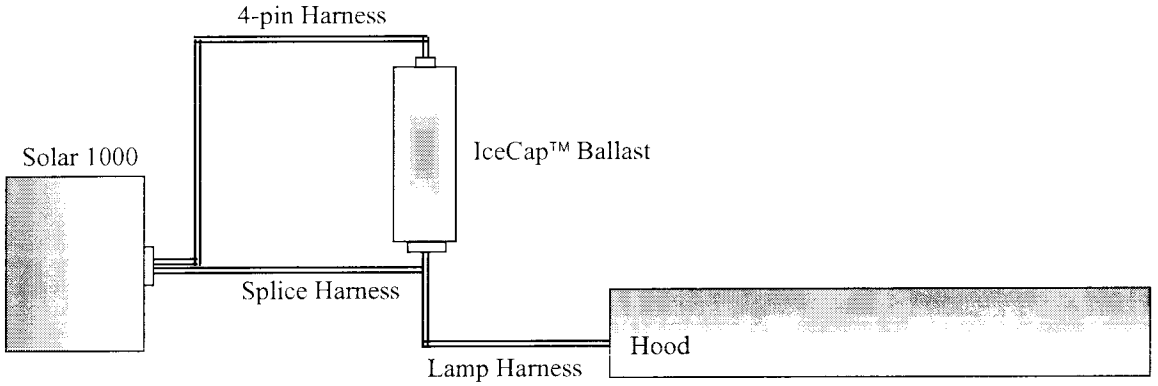
Installation

Setting up your System

Step 1: If you are installing a new lighting system, run the IceCap™ ballast(s) at full load for a minimum of one hundred hours without the Solar 1000 attached. This time period allows new lamps to break-in for best dimming as well as allowing any system problems between the ballast and lamps to appear.

Step 2: Once the system is broken-in, power down the lighting system and connect the supplied harness(es) between the Solar 1000 and the IceCap™ ballast(s). Crimp on the three splicing wires with the provided connectors according to the following directions. (see next page for splicing details)

1. Splice the RED wire from the Splice Harness to either RED wire on the Lamp Harness
2. Splice the ORANGE wire from the Splice Harness to either ORANGE wire on the Lamp Harness (660 only). Cap off the ORANGE wire on for 440 installations.
3. Splice the WHITE wire on the Splice Harness to the WHITE wire on the Lamp Harness (power neutral)
4. Connect the 4-pin harness to the ballast I/O port



Step 3: Power up the Solar 1000 and perform all programming. All programming is stored in non-volatile memory and will not be lost when the Solar 1000 is powered down in the future.

Step 4: Go to the Manual Dimming screens and set port1 (all models) and port2 (L2, LW, LWM) to 100%

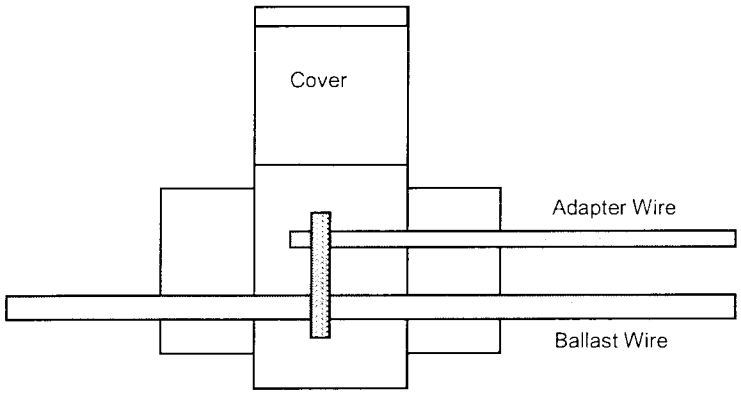
Step 5: Power up the ballast(s). Wait one minute and then set the Solar 1000 to the System Status screens. The Solar 1000 will start execution of the program.

Adding a Second Ballast

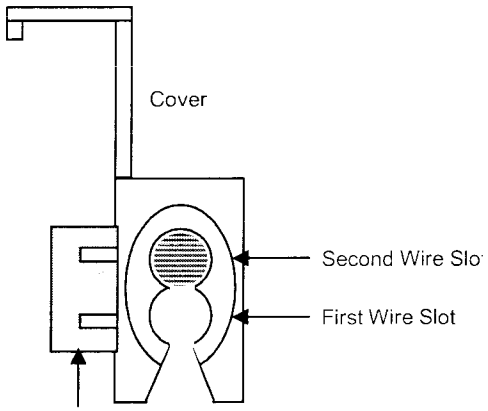
A second ballast can be controlled on some models (L2, LW, LWM). Attach the second ballast as describe above but now connect to Port2. Note that Port 2's factory default is to follow the Port 1 settings. You can offset the Port 2 controls by up to 1 hour in the Port 2 Offset screen. Using this feature starts the dim-up later and starts the dim-down earlier than Port1.

Splicing Instructions

1. Slide the wire from the ballast through the open side of the splice. Position it such that it aligns with the first wire slot.
2. Push the wire from the dimmer into the splices second wire slot until it stops.
3. Crimp down on the metal connector with pliers until it is flush with the splice
5. Fold over and snap the cover over the top over the splice



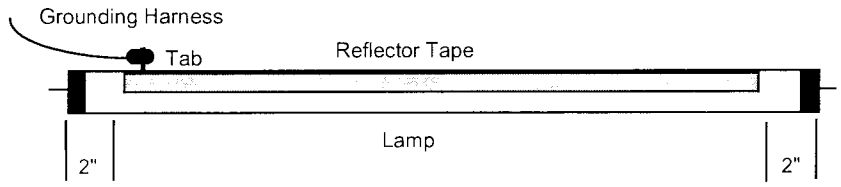
Red Splice



Metal Connector

Ground Plane Installation

A way to create smoother dimmer operation is to use a ground plane. A ground plane is typically a metal plate that parallels the fluorescent tubes along their total length. Most lighting setups do not include a ground plane or it is too far from the lamps to be of any use (greater than 1/8"). This can cause faulty tube starting as well as less than optimum dimming performance. Ground planes can be fashioned by simply using aluminum foil and wire attached to Earth ground or a kit can be purchased with all the necessary materials.



Error Conditions

When error conditions occur in the Solar 1000 it will attempt to correct the fault and then indicate the problem in the status screens. When an error appears, look up the error number and follow the procedure for corrective action.

Err1 = time error
Error Condition: time being displayed is incorrect
Corrective Action: Solar 1000 will reset time to 12:00pm on this condition. User should reset time. If the condition persists, return the unit for repair.

Err2 – date error
Error Condition: date being displayed is incorrect
Corrective Action: Solar 1000 will reset date to 1/1/99 on this condition. However if only one portion of the date is incorrect, only that portion will be reset. User should reset date. If the condition persists, return the unit for repair.

Err3 – real time clock circuit problem
Error Condition: real time clock is malfunctioning
Corrective Action: Solar 1000 should be sent to the factory for repair

Err4 – LCD circuit problem
Error Condition: LCD display is malfunctioning
Corrective Action: Solar 1000 should be sent to the factory for repair

Err5 – real time clock corrupted memory
Error Condition: one or more memory locations have become corrupted
Corrective Action: Solar 1000 should be reset by holding down the "up" button on the front panel while cycling power to the unit. This will reset the unit to all factory default. If the condition persists, return the unit for repair.

Err6 – LCD corrupted memory
Error Condition: one or more memory locations have become corrupted
Corrective Action: Solar 1000 should be reset by holding down the "up" button on the front panel while cycling power to the unit. This will reset the unit to all factory default. If the condition persists, return the unit for repair.

Err7 – microprocessor corrupted memory
Error Condition: one or more memory locations have become corrupted
Corrective Action: Solar 1000 should be reset by holding down the "up" button on the front panel while cycling power to the unit. This will reset the unit to all factory default. If the condition persists, return the unit for repair.

Err8 – summer solstice programming is out of order
Error Condition: dawn, sunrise, noon bgn, noon end, sunset and dusk is programmed out of sequence
Corrective Action: set times so that the order described above is preserved

Err9 – winter solstice programming is out of order
Error Condition: dawn, sunrise, noon bgn, noon end, sunset and dusk is programmed out of sequence
Corrective Action: set times so that the order described above is preserved

Specifications

Power Requirements
Voltage Requirement: 120vac, 60hz
Power Consumption: 3 watts

Physical Dimensions
Case Material: PC Bone Plastic Case
Width: 8.08"
Height: 2.50"
Depth: 6.25"

Interface
LCD: 1 line by 16 characters, alphanumeric
Keypad: Integrated membrane switches
Memory: User setting storage = greater than 10 years

IceCap™ Ports
Port Load: One (1) 430 or 660 ballast per port

Moonlight Port
Port Load: 150 watts maximum, incandescent only
Warning: do not use fluorescent lamps on this outlet!

X10 Port
Port Load: One (1) X10 transmit module

X10 Remotes
Load: Unlimited number of remotes supported
Type: All switched versions

X10 Remote Codes (assuming House Code "A/B")

Function	Code	Function	Code	Function	Code
Timer1	A1	Wave3a	A9	ORP High	B1
Timer2	A2	Wave3b	A10	ORP Low	B2
Timer3	A3	Wave4a	A11	Doser1a	B3
Timer4	A4	Wave4b	A12	Doser1b	B4
Wave1a	A5	Temp High	A13	Doser2a	B5
Wave1b	A6	Temp Low	A14	Doser2b	B6
Wave2a	A7	pH High	A15	CO2	B7
Wave2b	A8	pH Low	A16		

Temperature Port
Range: 50°F to 100°F
Resolution: 0.2F

pH Port
Range 3pH to 12pH
Resolution: 0.05pH

ORP Port
Range: 0 to 550mv
Resolution: 1mv

Warranty

Blueline warrants the original purchaser of each new product against defects in materials and workmanship for one (1) year commencing upon date of original purchase if the original purchaser tenders the sales receipt for the product at the time warranty claim is made. This warranty may not be modified by anyone other than Blueline.

To make a claim under this warranty, return the product to:

Blueline
c/o Champion Lighting
291 N. Main Street
Ambler, PA 19002

The product will be repaired or replaced with no charge for labor or materials.

Blueline shall not be held responsible for any damages caused by defective components or materials, or for the loss incurred because of the interruption of service, or any other special, consequential, or incidental damages or expenses arising from the manufacture, sale, use, or misuse of this product.

This warranty is in lieu of all other express warranties. Any warranty implied by law, whether a warranty for merchantability or fitness for particular purposes, shall be effective only for the one-year warranty period specified above. Some states do not allow the exclusion of limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary, from state to state.