

# STRANTROL® SYSTEM3



## INSTALLATION, OPERATION & MAINTENANCE MANUAL

**USFilter**



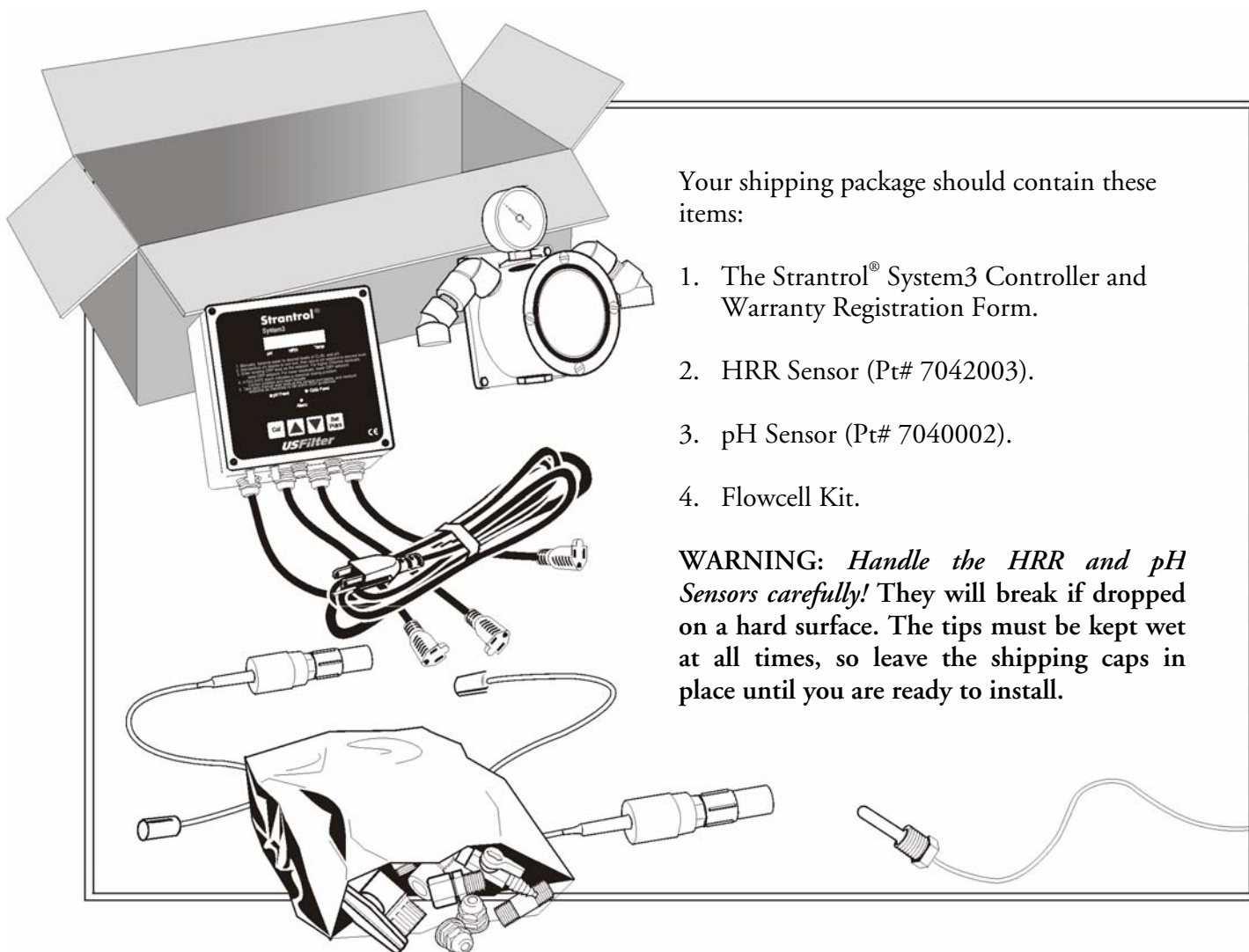
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## Unpacking



Your shipping package should contain these items:

1. The Strantrol® System3 Controller and Warranty Registration Form.
2. HRR Sensor (Pt# 7042003).
3. pH Sensor (Pt# 7040002).
4. Flowcell Kit.

**WARNING:** *Handle the HRR and pH Sensors carefully!* They will break if dropped on a hard surface. The tips must be kept wet at all times, so leave the shipping caps in place until you are ready to install.


## General Guidelines

How you choose to install and use your Strantrol Controller depends in part on your needs and specific applications. This manual offers a general guideline that is suitable for the majority of users. As an overview, we suggest that you first mount the components, i.e., the Controller, Flowcell, HRR sensor, and pH sensor. Then plumb the sample stream, open valves and test for leaks. Finally wire everything properly and program the controller.


## Warning Notifications

**NOTE: PLEASE PAY PARTICULAR ATTENTION TO THE WARNING NOTICES FOUND ON THE FOLLOWING PAGES AND THROUGHOUT THIS MANUAL.**

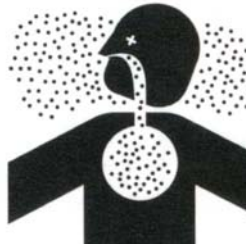
### NEVER OVERRIDE SAMPLE FLOW SWITCH

	<p><b>! WARNING</b></p> <p><b>NEVER OVERRIDE SAMPLE FLOW SWITCH</b></p> <p>Uncontrolled feeding of chemicals can result in injury or death.</p> <p>Sample flow switch is a critical safety device which prevents uncontrolled chemical feed.</p> <p>Follow instructions carefully.</p>	<p>Flow switches are provided with all Stranrol controllers and are an integral safety device to prevent the uncontrolled feed of chemicals, which could cause personal injury or death. The flow switch should <b>NEVER</b> be bypassed, even temporarily, as this critical safety device will not be available to protect the swimmers.</p>
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### TEST FLOW SWITCH FUNCTION

	<p><b>! WARNING</b></p> <p><b>TEST FLOW SWITCH FUNCTION</b></p> <p>Uncontrolled feeding of chemicals can result in injury or death.</p> <p>Assure flow switch prevents chemical feed in any circulation NO-FLOW or backwash condition.</p> <p>Follow instructions carefully.</p>	<p>If flow switch does not stop and remain stopped during backwash, no-flow, or very low flow conditions, the controller cannot prevent the uncontrolled feed of chemicals, which could cause personal injury or death.</p> <p>Testing of the flow switch installation is essential to assure the flow switch stops, remains stopped, and controller shows “NO-FLOW ALARM” within 20 seconds, whenever filter is in backwash or circulation flow stops. If the flow switch does not stop completely, plumbing corrections or the installation of additional safeguards will be necessary to avoid uncontrolled chemical feed.</p>
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### NEVER CONNECT FEEDER DIRECTLY TO POWER SOURCE

	<p><b>! WARNING</b></p> <p><b>NEVER CONNECT FEEDER DIRECTLY TO POWER SOURCE</b></p> <p>Uncontrolled feeding of chemicals can result in injury or death.</p> <p>Chemical metering pumps must be connected to controller to enable safety controls.</p> <p>Follow instructions carefully.</p>	<p>If the chemical feeders are connected to a wall outlet, the safety devices integral to your Stranrol controller, and to the safe feeding of chemicals, will be bypassed. It is very important that the chemical feeders are connected to the controller and never to a wall outlet. If the chemical feeders are connected to a wall outlet and feeding continuously, when the flow of water to the pool stops due to filter backwash, the circulation pump losing prime or other causes, potentially hazardous concentrations of chemicals can be fed into pool or spa.</p>
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## ALWAYS USE ANTI-SIPHON DEVICES



If a vacuum is created in the water circulation line and no anti-siphon device is installed on the chemical feeders, potentially hazardous concentrations of chemicals can be drawn into pool or spa. Always use injection check valves and anti-siphon valves in the chemical feed lines to prevent this situation from occurring.

## ELECTRICAL SURGES CAN DAMAGE YOUR CONTROLLER



Stranrol controllers, like all modern electronic devices can be damaged by severe electrical spikes and surges (think 'lightning'). Every effort has been made to harden your Stranrol controller against such surges, but no precautions are 100% effective. Additional surge protection can be installed at time of installation, but even that is not a guarantee that surge damage will not occur. If surge damage occurs, chemicals could be fed to your pool or spa, continuously with no safety controls. If you inspect your Stranrol after a possibly damaging power surge (thunderstorm or power outage) and suspect the controller is not operating properly, disconnect the chemical feeders at once, and contact your Stranrol dealer for service.

## WARNING REGARDING DISCONNECTING POWER CONNECTION



Disable lockout and tag circuit breaker providing power to the Stranrol controller, and test the circuit to be sure the power is off. Before you proceed, observe all local and national electrical codes.



## Warning Notifications

### WARNING REGARDING CIRCULATION PUMP INTERLOCK



If concentrated Chlorine and Acid are combined, chlorine gas is released. Chlorine gas causes severe irritation to lungs and can be toxic in certain situations.

If water is not flowing in the return line to the pool, and both these concentrated chemicals are allowed to combine in still water, a chlorine gas bubble will be created. When the flow eventually resumes to the pool, the chlorine bubble would then be flushed into the pool and released into the air around the pool, beginning at the water surface. To help prevent this situation, a chemical pump interlock must be installed. An interlock removes power from the chemical feed pumps whenever the power to the recirculation pump power is switched off.

### WARNING REGARDING CONNECTING pH & CHLORINE OR BROMINE FEEDERS

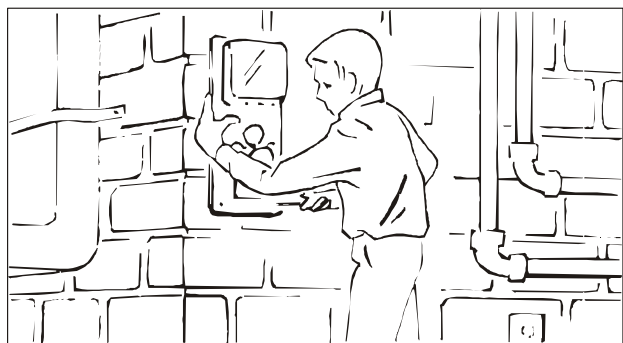


Oxidizers (Chlorine or Bromine), acids (Muratic, Carbon Dioxide, CO<sub>2</sub>) and caustics (Sodium Hydroxide, Caustic Soda, Soda Ash) are common chemicals used to automatically maintain safe and healthy pool and spa water chemistry. The automatic feeding of these chemicals is performed using sensors, which continuously monitor the water circulating through the filter(s). Each of the sensors is associated with a chemical it is monitoring and feeding. These sensors, their connectors, and the feeder power cords, if present, are color coded. The **YELLOW** sensor is associated with the **pH** control channel which feeds an Acid or a Base (sometimes called caustic or alkaline) chemical. The **BLUE** sensor is associated with the feed of **Chlorine or Bromine** (sometimes called an oxidant or oxidizer). If these sensors or chemical feed pumps are not plugged into the proper connections, or are connected to opposite devices, the uncontrolled feeding of one or both chemicals can occur. Uncontrolled or improper feeding of these two chemicals can cause serious injury or death to swimmers in the pool area from the formation of chlorine gas. Use extreme caution when connecting chemical feeders and sensors.



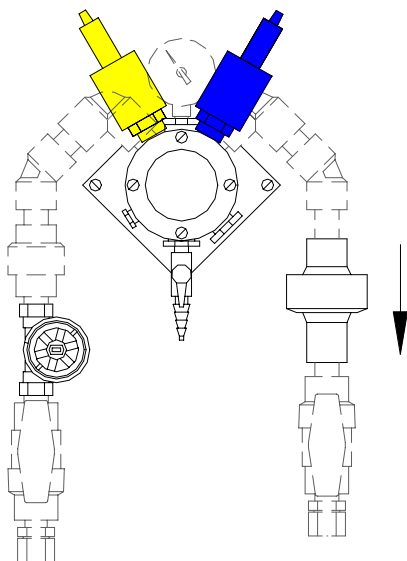
### Step 1: Mounting the Controller

If you ordered your System3 Controller with a flowcell, they can be mounted separately or come mounted together in a white PVC enclosure. The enclosure may be bolted to the wall by inserting four bolts through the holes in the four corners of the plate. Make sure that the System3 and the flowcell are mounted in a location that is free from chemical fumes and excessive heat, isolated from electrical interference, and near a power source protected by a ground fault interrupter. The System3 enclosure is weather resistant, but if mounting outdoors, locating the unit under a hood or overhang is recommended.



### Step 2: Assembling the Flowcell

Assemble and connect the flowcell as shown below. Fittings represented in dashed and grayed lines are not provided. Once you have finished assembling the flowcell, close the valves. Note that the Temperature Sensor is installed on the left side of the flowcell.

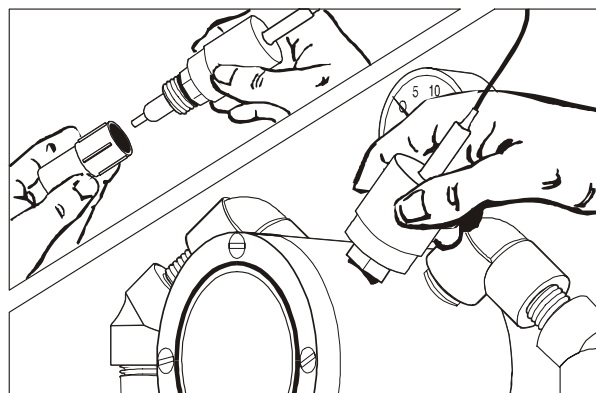


### Step 3: Plumbing the Sample Stream

You may want to refer to the application drawings in the Appendix before completing this step.

Install the sample stream; 1/2-inch tubing is recommended for sample stream pickup and return. Make sure that you tap the supply off the discharge side of the recirculation pump, upstream of the chemical injection points. The sample should be filtered water. Connect the sample stream pickup line to the flowcell and run the sample stream return line from the flowcell to the suction side of the main recirculation pump. Install 1/2-inch ball valves to allow isolation of the sample lines.

Before installing the sensors, give them a light cleaning with a toothbrush and laundry detergent (see Part V). Also, before installing the pH sensor, shake it vigorously a few times. Then screw the sensors into the flowcell (hand-tighten as shown). Save the sensor caps for future sensor storage.



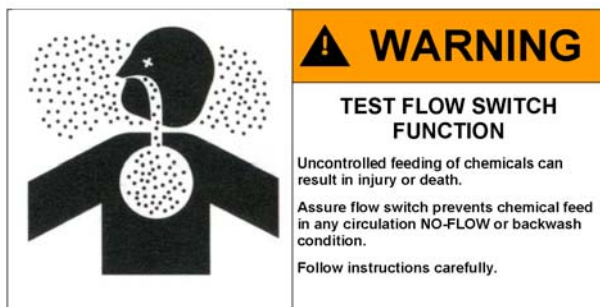
## Part I Mounting/Plumbing



Flow switches are provided with all Strantrol controllers and are an integral safety device to prevent the uncontrolled feed of chemicals, which could cause personal injury or death. The flow switch should **NEVER** be bypassed, even temporarily, as this critical safety device will not be available to protect the swimmers.

Install the Paddlewheel Flow Switch in the sample stream. Make sure that you only wrap the male fitting three times with Teflon<sup>®</sup> tape so as not to risk breaking the female fitting on the flow switch.

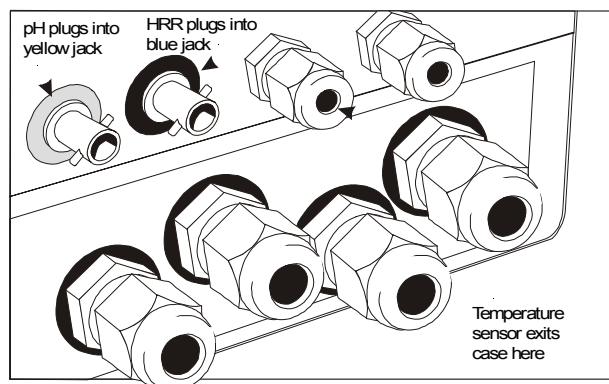
Note: As soon as you install the sensor, move immediately on to the next step to ensure that it stays wet.



If flow switch does not stop and remain stopped during backwash, no flow or very low flow conditions, the controller cannot prevent the uncontrolled feed of chemicals, which could cause personal injury or death.

### Step 4: Opening the Sample Stream Valve

Open the sample stream valve and check for leaks. Note the reading on the compound pressure gauge and make sure that it shows a positive and steady pressure. The sample stream should be about 2-20 psi at the flowcell. If this is not the case, then adjust the valves or relocate the point at which the sample stream is connected to the recirculating system. Negative pressure will destroy the sensors. Once you have a positive and steady pressure, open the wet test valve and make sure it generates a vigorous stream.

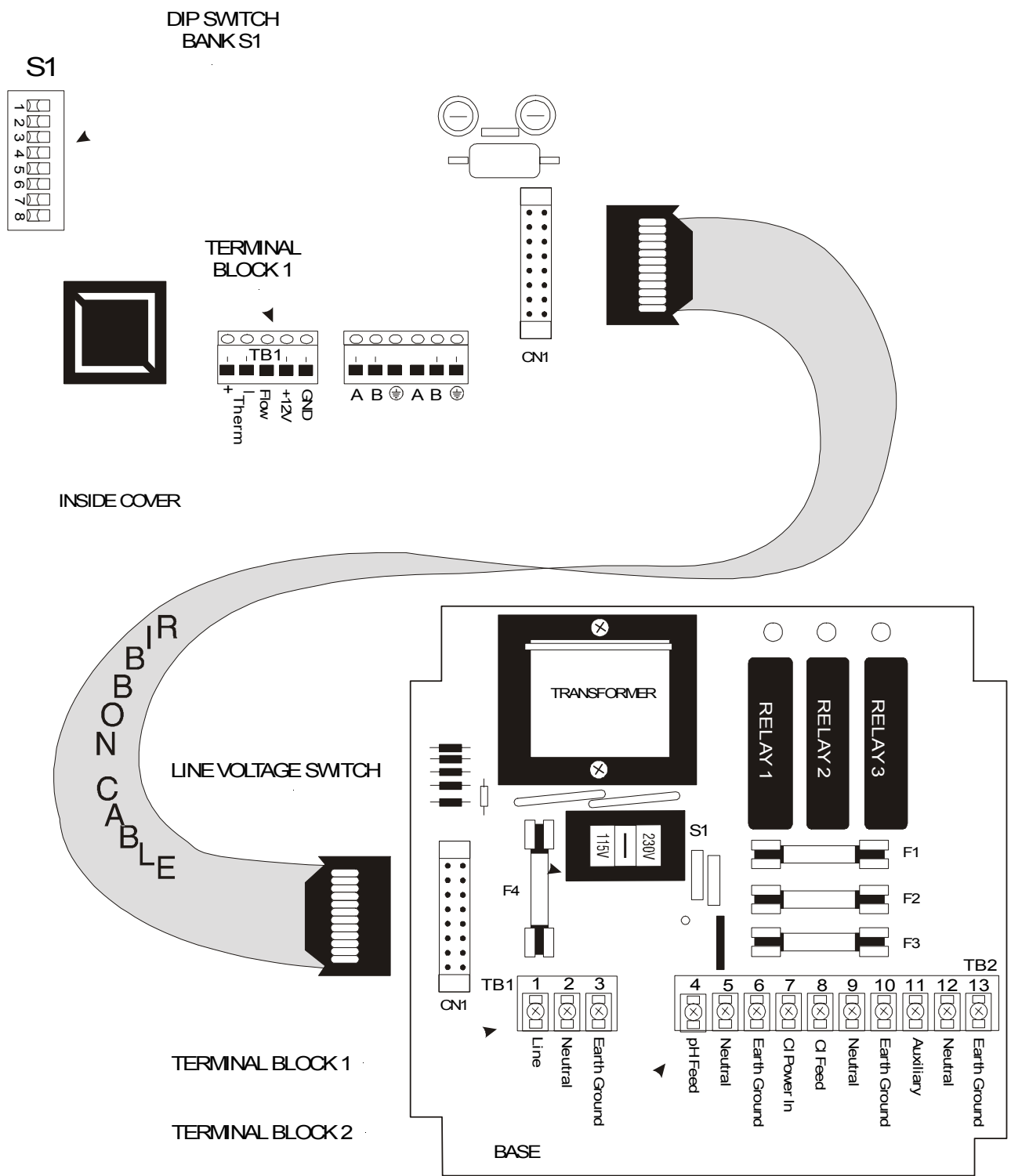


### Step 5: Plugging in the Sensors

Plug the pH sensor into the yellow-coded BNC jack and the HRR sensor into the blue-coded jack on the bottom of the System3 by twisting them a quarter of a turn. Allow the sensors to rinse in the sample water while you do the wiring (Part II).



Oxidizers (Chlorine or Bromine), acids (Muratic, Carbon Dioxide, CO<sub>2</sub>) and caustics (Sodium Hydroxide, Caustic Soda, Soda Ash) are common chemicals used to automatically maintain safe and healthy pool and spa water chemistry. The automatic feeding of these chemicals is performed using sensors, which continuously monitor the water circulating through the filter(s). Each of the sensors is associated with a chemical it is monitoring and feeding. These sensors, their connectors, and the feeder power cords, if present, are color coded. The **YELLOW** sensor is associated with the **pH** control channel which feeds an Acid or a Base (sometimes called caustic or alkaline) chemical. The sensor is associated with the feed of (sometimes called an oxidant or oxidizer). The **BLUE** sensor is associated with the feed of Chlorine or Bromine (sometimes called oxidant or oxidizer). If these sensors or chemical feed pumps are not plugged into to the proper connections, or are connected to opposite devices, the uncontrolled feeding of one or both chemicals can occur. Uncontrolled or improper feeding of these two chemicals can cause serious injury or death to swimmers in the pool area from the formation of chlorine gas. Use extreme caution when connecting chemical feeders and sensors.



System3 Circuit Board

## Part II Electrical

There are two options to connect power to the unit. 1) You may plug directly into a power source using the male pigtail cord (see next paragraph) and plug attached to the unit; 2) You may open the unit, discard the pigtails and wire directly to the unit.

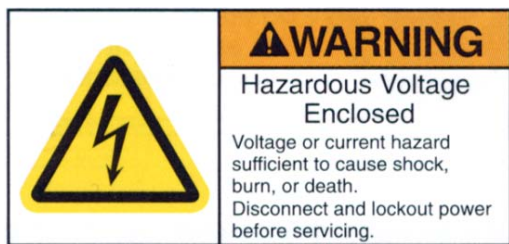
If you received the System3 as part of an integrated chemical feed package, then it may have been wired for you, but most systems are shipped with one preinstalled cord for AC input and three preinstalled cords for the output from relays one, two and three. These cords are called pigtails.

**NOTE:** There is no need to open the cover to connect power and a chemical feeder as this may be done through the pigtails provided (see next step). If you are using AC output and intend on using the controller to control one chemical feeder or act as a monitor and alarm, this is the easiest and fastest way to wire the unit. You must open the cover, however, to connect the Temperature Sensor and the Flow Switch.

### Step 6: Connecting Power to the Pigtails

The System3 is protected by a fuse against a load in excess of .25 amps for electronics, and 5 amps for each relay. It must be plugged into an earth-grounded AC power source. If you chose this option, you may plug directly into a 115 volt power source and go to Step 10.

**NOTE:** If you are using a 230 volt power source, you must go to Step 10 to change the line voltage switch before you plug in the unit.

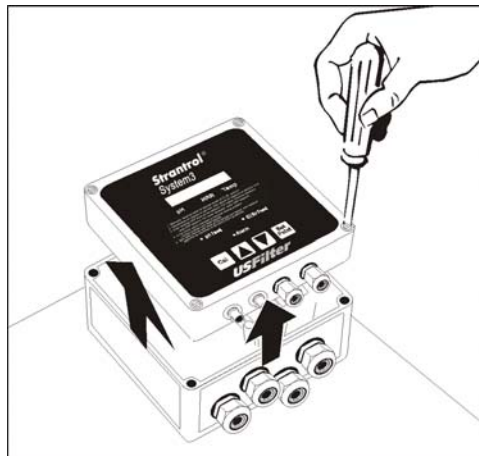


Line voltage (120/240VAC) can be present inside the Strantrol controller and caution should be used to prevent electrical shock, burns or electrocution. Be sure electric power is disconnected before opening the cover of any Strantrol. Follow all local safety policies, procedures and electrical codes, to prevent injury from electrical hazards, before opening the cover of this controller. If you are not trained

and comfortable performing work on electrical equipment, contact a licensed electrician to perform the work.

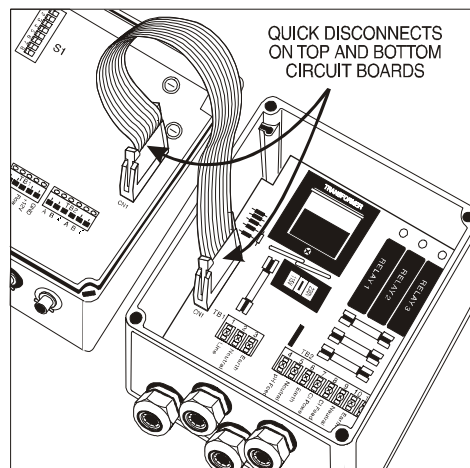
### Step 7: Opening the Cover

If you chose not to use the pigtails to provide power to the unit, you must open the cover to connect power. Remove the cover by loosening the four screws at the corners with a screwdriver as shown. **NOTE:** The screws do not need to be totally removed, but only loosened. Once the screws are loosened, carefully lift the top cover off of the unit. The cover will still be connected to the base by the ribbon cable. For now set aside the moisture absorbent packet found inside.

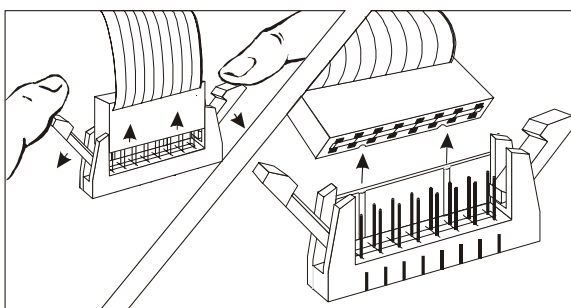


### Step 8: Disconnecting the Ribbon Cable

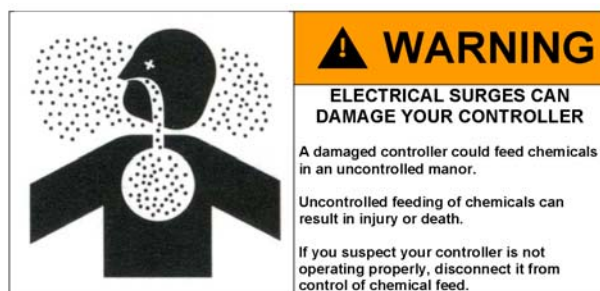
You may leave the ribbon cable attached while you wire the unit, but we recommend that you disconnect it by spreading the two holders at the end of the cable attached to the cover as shown, unplugging the cable and removing the cover.







**NOTE:** Be sure to store the cover in a safe, dry place while you wire the unit.



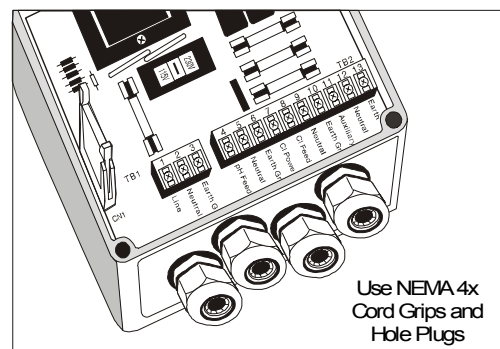
Stranrol controllers, like all modern electronic devices can be damaged by severe electrical spikes and surges (think 'lightning'). Every effort has been made to harden your Stranrol controller against such surges, but no precautions are 100% effective. Additional surge protection can be installed at time of installation, but even that is not a guarantee that surge damage will not occur. If surge damage occurs, chemicals could be prevented from being fed to your pool or spa, continuously with no safety controls. If you inspect your Stranrol after a possibly damaging power surge (thunderstorm or power outage) and suspect the controller is not operating properly, disconnect the chemical feeders at once, and contact your Stranrol dealer for service.

### Step 9: Wiring Directly to the Unit

If you choose to wire direct to the unit and discard the cords, you may use the two ½-inch holes in the casing to enable you to easily run wires to Terminal Block 1 inside the base of the unit. **NOTE:** There are Terminal Blocks labeled TB1 and TB2 in both the cover and base of the unit and they serve different functions.

Use the ½-inch cord grips provided and whatever holes are convenient, but when you are finished

wiring the unit, be sure to plug any unused holes with a ½-inch NEMA 4X plug.

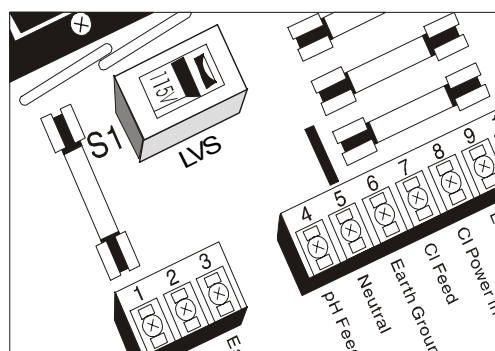


**WARNING:** MAKE SURE POWER IS DISCONNECTED WHILE YOU WIRE THE UNIT.

**NOTE:** If you are using a 230 volt power source, you must go to Step 10 to change the line voltage switch before you plug in the unit.

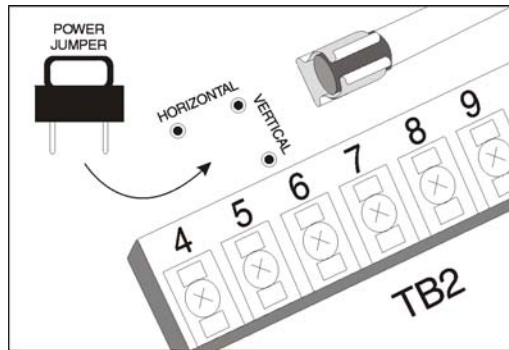
### Step 10: Setting the Line Voltage Switch

Before you plug in the unit, set the Line Voltage Switch in the base of the unit (LVS in the illustration) to either 115 or 230.



### Step 11: Placing the Power Jumper

The power jumper enables you to have Terminal 7 in Terminal Block 2 in the base of the unit function as a powered or dry contact (some Calcium Hypochlorite feeders require that the power for the relay come from the feeder). Placing the jumper in the horizontal position causes the contact to be powered, while placing the jumper vertically causes the contact to be dry. To change the position of the jumper, pull it out and then replace it in the other position.



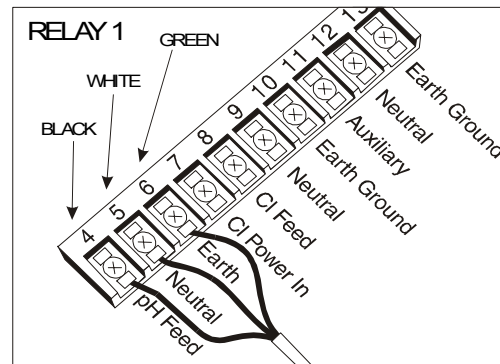
If the chemical feeders are connected to a wall outlet, the safety devices integral to your Strantrol controller, and to the safe feeding of chemicals, will be bypassed. It is very important that the chemical feeders be connected to the controller and never to a wall outlet. If the chemical feeders are connected to a wall outlet and feeding continuously, when the flow of water to the pool stops due to filter backwash, the circulation pump losing prime or other causes, potentially hazardous concentrations of chemicals can be fed into pool or spa.

### Step 12: Wiring Relay 1

Relay 1 controls pH. You may wire the chemical feeder for Relay 1 two ways. The easiest is to plug the feeder into the female pigtail line running from the second hole from the left (the cord is color-coded yellow). You may then go on to Step 13.



Oxidizers (Chlorine or Bromine), acids (Muriatic, Carbon Dioxide, and CO<sub>2</sub>) and caustics (Sodium Hydroxide, Caustic Soda, and Soda Ash) are common chemicals used to automatically maintain safe and healthy pools and spa water chemistry. The automatic feeding of these chemicals is performed using sensors, which continuously monitor the water circulation through the filter(s). Each of the sensors is associated with a chemical it is monitoring and feeding. These sensors, the connectors, and the feeder power cords, if present, are color coded. The **YELLOW** sensor is associated with the pH control channel, which feeds an Acid or a Base (sometimes called caustic or alkaline) chemical. If these sensors or chemical feed pumps are not plugged into the proper connections, or are connected to opposite devices, the uncontrolled feeding of one or both chemicals can occur. Uncontrolled or improper feeding of these two chemicals can cause serious injury or death to swimmers in the pool area from the formation of chlorine gas. Use extreme caution when connecting chemical feeders and sensors.



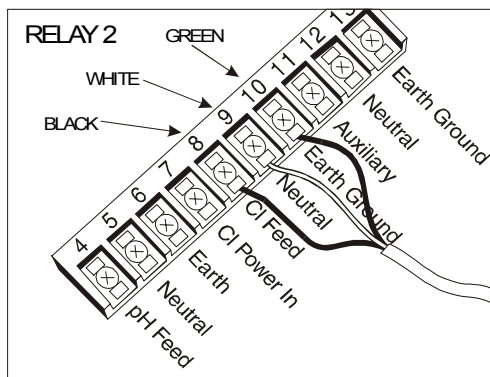
The second way to wire the chemical feeder (Relay 1) is to remove the cover (as explained in Step 7) and then wire to Terminal Block 2 in the base of the unit as follows. The feeder has three wires to it. Connect the black wire to TB2-4, connect the green wire to the ground at TB2-6, and connect the white wire to the neutral section at TB2-5 (Note: the black and white wires are colored brown and blue outside North America).



If the chemical feeders are connected to a wall outlet, the safety devices integral to your Stranrol controller, and to the safe feeding of chemicals, will be bypassed. It is very important that the chemical feeders be connected to the controller and never to a wall outlet. If the chemical feeders are connected to a wall outlet and feeding continuously, when the flow of water to the pool stops due to filter backwash, the circulation pump losing prime or other causes, potentially hazardous concentrations of chemicals can be fed into pool or spa.

### Step 13: Wiring Relay 2

Relay 2 controls HRR. The feeder may be wired in two ways. The easiest is to plug the feeder into the female pigtail line running from the hole on the right. You may then go on to Step 14.



Oxidizers (Chlorine or Bromine), acids (Muriatic, Carbon Dioxide, and  $\text{CO}_2$ ) and caustics (Sodium Hydroxide, Caustic Soda, and Soda Ash) are common chemicals used to automatically maintain safe and healthy pools and spa water chemistry. The automatic feeding of these chemicals is performed using sensors, which continuously monitor the water circulation through the filter(s). Each of the sensors is associated with a chemical it is monitoring and feeding. These sensors, the connectors, and the feeder power cords, if present, are color coded. The **BLUE** sensor is associated with the feed of Chlorine or Bromine (sometimes called oxidant or oxidizer). If these sensors or chemical feed pumps are not plugged into the proper connections, or are connected to opposite devices, the uncontrolled feeding of one or both chemicals can occur. Uncontrolled or improper feeding of these two chemicals can cause serious injury or death to swimmers in the pool area from the formation of chlorine gas. Use extreme caution when connecting chemical feeders and sensors.

The second way to wire Relay 2 is to open the cover (as explained in Step 7) and then wire to Terminal Block 2 in the base of the unit as follows. Connect the black (power) wire to the terminal block at TB2-8, connect the green (earth ground) wire to the terminal block at TB2-10, and connect the white (neutral) wire to the terminal block at TB2-9 (Note: the black and white wires are colored brown and blue outside North America).



If the chemical feeders are connected to a wall outlet, the safety devices integral to your Stranrol controller, and to the safe feeding of chemicals, will be bypassed. It is very important that the chemical feeders be connected to the controller and never to a wall outlet. If the chemical feeders are connected to a wall outlet and feeding continuously, when the flow of water to the pool stops due to filter backwash, the circulation pump losing prime or other

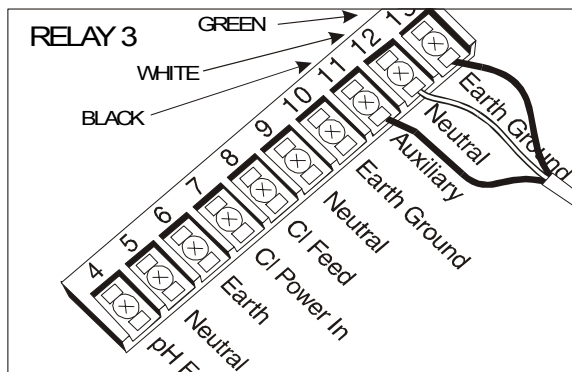


## Part II Electrical

causes, potentially hazardous concentrations of chemicals can be fed into pool or spa.

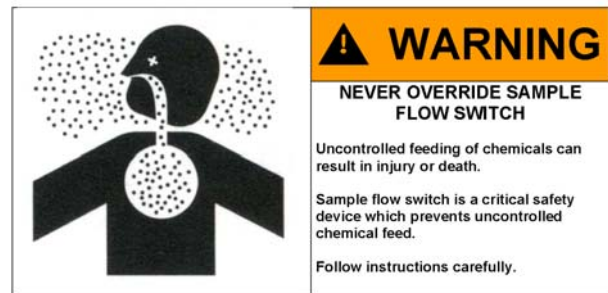
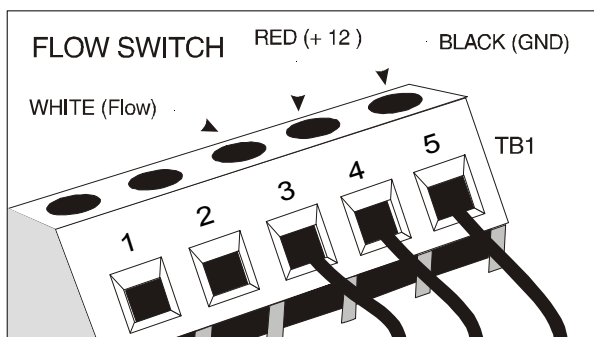
### Step 14: Wiring Relay 3

Relay 3 may be used for Dual pH control, Alarms or the optional Sensor Wash (refer to Step 19). Open the cover of the unit (as explained in Step 7) and then wire to Terminal Block 2 as follows. Connect the black (power) wire to the terminal block at TB2-11, connect the green (earth ground) wire to the terminal block at TB2-13, and connect the white (neutral) wire to the terminal block at TB2-12 (Note: the black and white wires are colored brown and blue outside North America).



### Step 15: Wiring a Flow Switch

A paddlewheel flow switch is incorporated into the flowcell to disable chemical feed in the event of loss of flow. Connect the flow switch by opening the cover of the unit (as explained in Step 7), running the wires from the flow switch through the cord grip provided and connecting them to Terminal Block 1 in the cover of the unit. Connect the black wire to the terminal labeled Ground, the white wire to the terminal labeled Flow, and the red wire to the terminal labeled + 12. Whenever the wheel spins, the green "flow" light on the flow switch will be on.

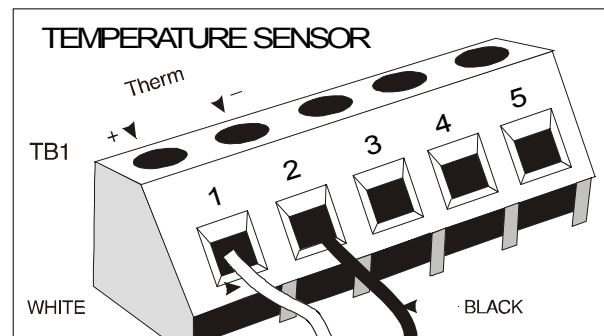


Flow switches are provided with all Stranrol controllers and are an integral safety device to prevent the uncontrolled feed of chemicals, which could cause personal injury or death. The flow switch should **NEVER** be bypassed, even temporarily, as this critical safety device will not be available to protect the swimmers.

### Step 16: Wiring the Temperature Sensor

To wire a temperature sensor, open the cover as shown in Step 7. Run the white wire from the sensor to the positive contact of the Therm section of Terminal Block 1 in the cover of the unit. Run the black wire to the negative contact of the Therm section of TB1.

If a temperature sensor is not being used, it may be necessary to remove the temperature reading from the display. This can be done in the Program Menu by setting the Temp High Alarm to the same value as the Temp Low Alarm.



The Strantrol System3 Controller comes preprogrammed for pH feed down (acid, CO<sub>2</sub>) to feed in Time-Based Proportional mode (not conventional On/Off with a 4-hour [240 minutes] overfeed alarm). These factory default settings are appropriate for most systems. If you would like to change one of these settings, you must change the internal dip switches.

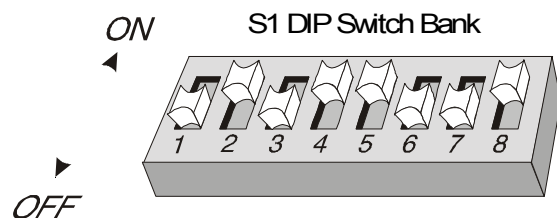
To change the dip switches, first unplug the System3 power cord and remove the cover from the unit (see Step 7).

### Step 17: Setting the Dip Switches

The illustration shows the Dip Switch bank (S1) in the cover of the unit. The following chart indicates the positions and functions of the switches.

Dip Switch Bank S1	Switch Set To OFF	Switch Set To ON
1	pH Feed Down	pH Feed Up
2	pH TBP control	pH On/Off control
3	HRR TBP control	HRR On/Off control
4	Failsafe Timer	Failsafe Timer
5	Failsafe Timer	Failsafe Timer
6	Relay #3 Sensor Wash	Relay #3 Alarm
7	Single pH control	Dual pH control (Relay 3)
8	Temperature @ C	Temperature @ F

**NOTE:** Relay #3 is required for dual pH control, so if you select that option you can not use the Sensor Wash or Alarm functions of Relay #3. Dual control automatically sets Relay #3 as pH Feed Down. Relay #1 will have to be set to pH Feed Up using dip switch #1. If Dual Control, the corresponding feeder will feed to setpoint and then stop feeding until the pH goes +/- .05 from the setpoint.



### Step 17a: Choosing Feed Up or Feed Down or Both

Relay 1 controls pH. It can be set to feed down (acid) for use with chemicals such as carbon dioxide or muriatic acid, or to feed up (base) for use with chemicals such as caustic soda or soda ash (if you are using Dual pH, then Relay #1 is set as Feed Up and Relay #3 is set as Feed Down). Relay 2 controls HRR.

### Step 17b: Choosing ON/OFF or Time Based Proportional

In general, if you are using a motor-driven chemical feeder, then you should choose the On/Off option. If you are using a solenoid-driven or pulsed-diaphragm chemical feeder, you should choose the TBP option. If you choose the ON option and are feeding up, then the controller will activate the chemical feeder whenever the pH or HRR falls below the setpoint and continue to feed until the pH or HRR meets or rises above the setpoint, at which point it will stop.

One advantage of the System3 (and all Strantrol Controllers) is that the unit can be used with a timer to control the feeder and still not lose power to the sensor. Most controllers work with a timer by cutting all power, which then means that the sensor goes through an erratic period (up to two minutes) every time power is restored. With Strantrol units, the sensor continues to function even when the timer cuts power to the feeder so there is never a loss in accuracy.

In Time-Based Proportional mode the System3 will cycle the feeder ON for a fraction of a minute depending on the amount of deviation from setpoint. The smaller the deviation, the less time the feeder is ON each minute. If the feeder is a diaphragm pump (such as Pulsatron, most LMI models or most Prominent Models) or is regulated by a solenoid valve, use the Time-Based Proportional mode. This feature helps to hold a setpoint and to minimize over-shoot by making a standard feeder mimic the action of more sophisticated modulating feeders.

If you choose the TBP option, the controller will activate the chemical feeder whenever the pH or HRR falls below the setpoint and will feed for a percentage of one minute proportional to the offset from setpoint. The balance of each minute

## Part III Setting Dip Switches

the feeder will be paused. The feeder will continue this feed and pause cycle until the System3 achieves the setpoint.

### Step 18: Setting the Failsafe Timer Settings

The most common failures of automated chemical feed systems are depletion of the chemical supply and/or chemical feeder failure. Both problems result in the controller being unable to reach setpoint in a reasonable period of time. The failsafe interval sets the maximum length of time the feeder can run. If the feeder has been trying to achieve setpoint without success for the selected time, the controller will cut power to the feeder, flash the feed light on the facepanel and display a message to alert the operator. If in TBP Pause mode, the controller will reset.

If unit goes into failsafe alarm, it can be reset by pressing and holding the Up and Down Arrow keys for 2 seconds.

To select the failsafe time interval or disable the overfeed alarm, move switches 4 and 5 to the positions shown in the following chart.

### Step 19: Enabling Alarms

Setting Dip Switch 6 to the ON Position enables Relay 3 to be used as an alarm relay. The pH High and Low Alarm points are set in the programming section of this manual under steps 25 and 26 respectively, while the HRR Low and High Alarm points are set in steps 27 and 28.

Dip Switch 4	Dip Switch 5	Time (Hours)
Off	Off	1
Off	On	2
On	Off	4
On	On	Off

### Step 20: Enabling the Sensor Wash

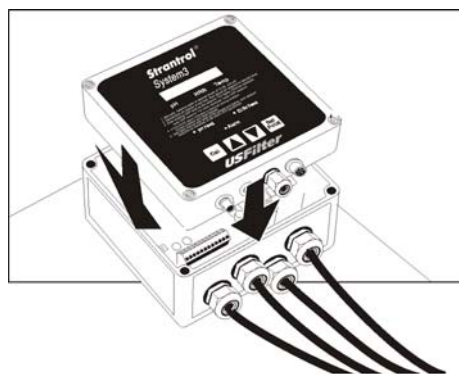
Setting Dip Switch 6 to the OFF Position enables Relay 3 to control the Sensor Wash. The Sensor Wash will begin 12 hours from power-up for approximately 2 minutes and come on again every 24 hours after that. NOTE: If power is lost the unit will begin a new cycle once power is restored.

### Step 21: Enabling Temperature Display

Enter the main menu (see Part IV), scroll to the Temperature High alarm setting. The high alarm value is currently set at the same value as the temperature low alarm setting. This disables the temperature display. Changing the temperature high alarm value to a higher setting will enable the temperature display. The suggested high alarm value is 109°F.

Setting Dip Switch 8 to the ON position displays temperature in Fahrenheit and to the OFF position displays temperature in Celsius.

### Step 22: Reconnecting the Ribbon Cable and Replacing the Cover



Now it is time to put the cover back on the unit. But before you do, give your wiring one last check and make sure that you reconnect the ribbon cable (as shown), if you disconnected it earlier. Line up the small holes in the cable end with the pins attached to the cover and gently press the cable into place. Make sure the two holders attached to the cover close back over the cable end to hold it firmly in place. Then place the cover back on the unit and tighten the four screws at the corners to secure it in place.

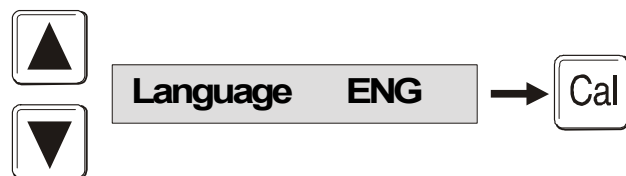
### Step 23: Entering the Program Menu

To enter the program menu, press and hold both the Cal and Up key for 3 seconds. When the LCD screen clears, release the keys and "Program" should appear on the display. Press the Up key to enter the menu and press the Down key to exit. Use the Up or Down Arrows to scroll to the setting you wish to change. Press the Cal key to select the setting, then use the Up or Down Arrows to modify the value. Press the Cal key again to enter the new value and return to the menu. To exit the program menu, scroll to the "Exit menu" option and depress the Cal key. NOTE: After two minutes of no programming activity, the Time-Out feature will automatically exit the programming menu.



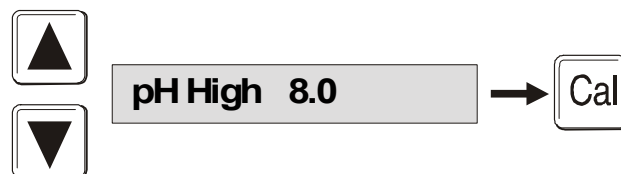
### Step 24: Selecting Language

The System3 can be programmed to display in three different languages. Once you have entered the program menu, the screen will display Language ENG, signifying that the display is currently set to English. Pressing the Cal key will display the question mark (?) before the language. Pressing the Down Arrow will change the language displayed from ?ENG to ?SPN for Spanish. Pressing the Cal key at this point would select Spanish. Pressing the Up Arrow again will display ?FRN for French. Pressing the Cal key at this point would select French. Pressing the Down Arrow will scroll back through the ?SPN and ?ENG displays. Press the Cal key to select the language you would like to use for the display.



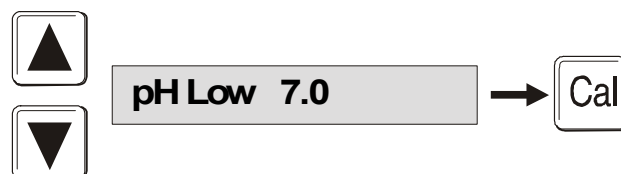
### Step 25: Setting the pH High Alarm Point

Pressing the Down Arrow displays pH High followed by the current pH high alarm point. If you would like to change this setting, press the Cal key and then use the Up or Down Arrows to input the value you would like. Then press the Cal key again to enter the new value.



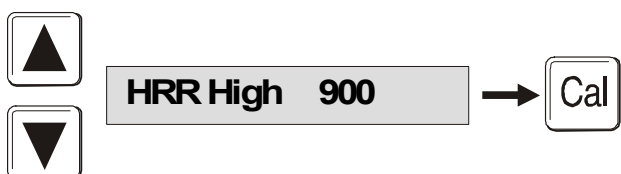
### Step 26: Setting the pH Low Alarm Point

Pressing the Down Arrow displays pH Low followed by the current pH low alarm point. If you would like to change this setting, press the Cal key and then use the Up or Down Arrows to input the value you would like. Then press the Cal key again to enter the new value.



### Step 27: Setting the HRR High Alarm Point

Pressing the Down Arrow displays HRR High followed by the current HRR high alarm point. If you would like to change this setting, press the Cal key and then use the Up or Down Arrows to input the value you would like. Then press the Cal key again to enter the new value.

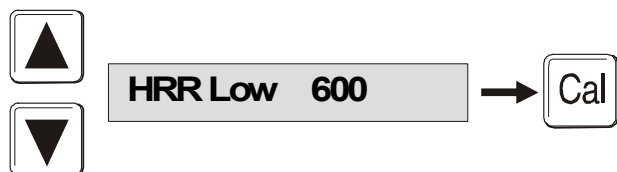


## Part IV Programming

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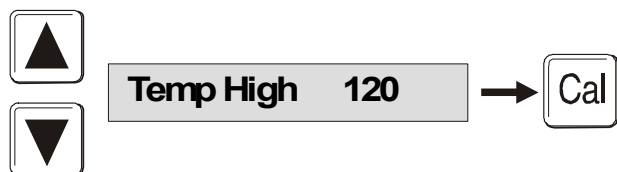
### Step 28: Setting the HRR Low Alarm Point

Pressing the Down Arrow displays HRR Low followed by the current HRR high alarm point. If you would like to change this setting, press the Cal key and then use the Up or Down Arrows to input the value you would like. Then press the Cal key again to enter the new value.



### Step 29: Setting the Temperature High Alarm Point

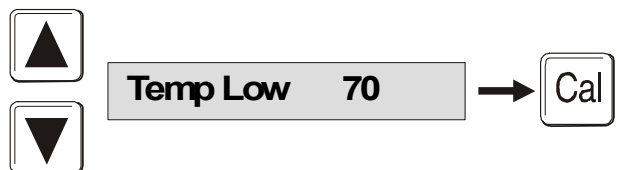
Pressing the Down Arrow displays Temp High followed by the current temperature high alarm point. If you would like to change this setting, press the Cal key and then use the Up or Down Arrows to input the value you would like. Then press the Cal key again to enter the new value.



**NOTE:** If the temperature display is not needed set the Temp High Alarm to the same value as the Temp Low Alarm.

### Step 30: Setting the Temperature Low Alarm Point

Pressing the Down Arrow displays Temp Low followed by the current temperature low alarm point. If you would like to change this setting, press the Cal key and then use the Up or Down Arrows to input the value you would like. Then press the Cal key again to enter the new value.



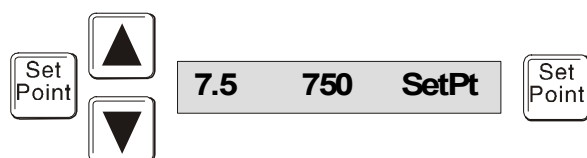
### Step 31: Exiting the Menu

Pressing the Down Arrow displays Exit menu. Pressing the Cal key exits the programming menu.

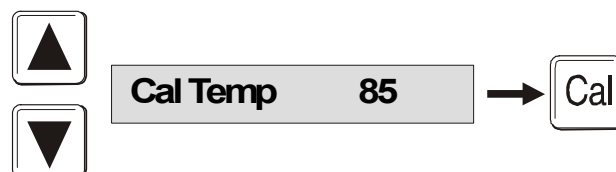


## Step 32: Displaying Setpoint

To display the setpoints, press the Setpoint key briefly. The setpoints will be displayed for three seconds.

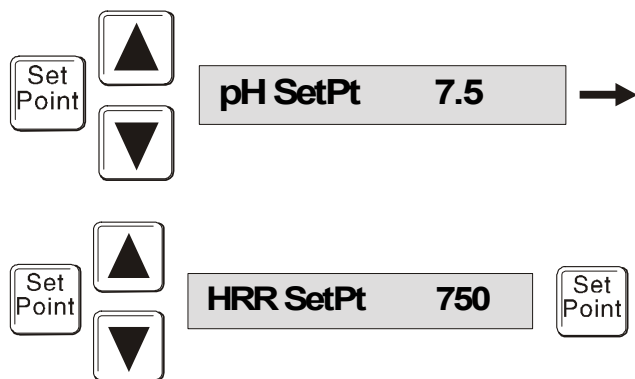


The display should now show Cal Temp followed by the current Temp calibration value. Once again, use the arrow keys to adjust this value to the real value then press the Cal key to enter it.

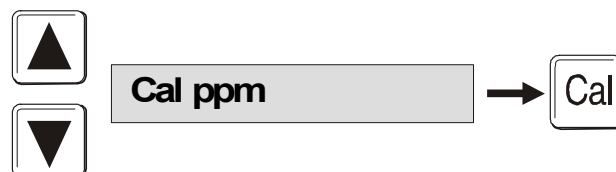


## Step 33: Modifying the Setpoint

To modify the setpoints, press the Setpoint key for three seconds. The display will change to pH SetPt followed by the current pH Setpoint. If you would like to change this setting, use the Up or Down Arrows to input the value you would like. Then press the Setpoint key again to enter the new value. The screen then displays HRR SetPt followed by the current HRR Setpoint. If you would like to change this setting, use the Up or Down Arrows to input the value you would like. Then press the Setpoint key again to enter the new value.



The display should then read Cal ppm and the ppm LEDs will be flashing. Once again, use your test kit to determine the actual ppm and then use the arrow keys to adjust this value shown on the LED bar graph to the correct reading and then press the Cal key to enter it.

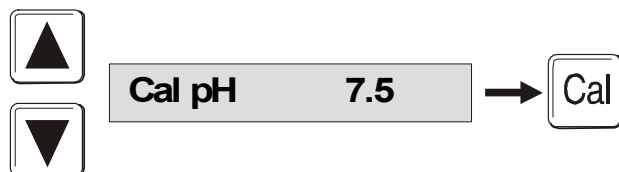


## Step 35: Resetting the Failsafe Alarm

To reset a failsafe alarm (see Step 18), press and hold the Up and Down Arrow keys for two seconds.

## Step 34: Single Point Calibration

To enter the calibration menu, press and hold the Cal key for three seconds. After the display clears, release the Cal key. The display should now read Cal pH followed by the current pH calibration value. Use your test kit to determine the actual pH and then use the arrow keys to adjust the displayed value to the real value and then press the Cal key to enter it.



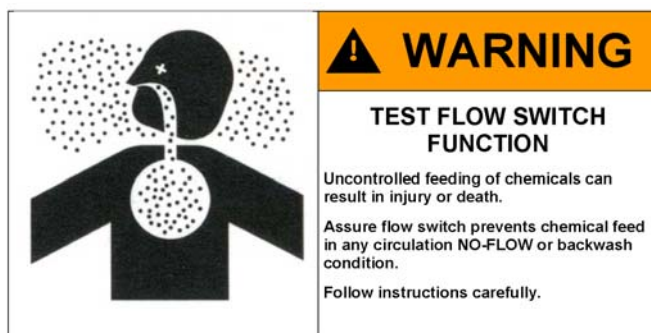




The System3 requires no maintenance other than a periodic calibration check and sensor cleaning. (Do not adjust the internal potentiometers.)

### Step 36: Cleaning the Sensor

1. Isolate the Flowcell, and then remove the sensor.

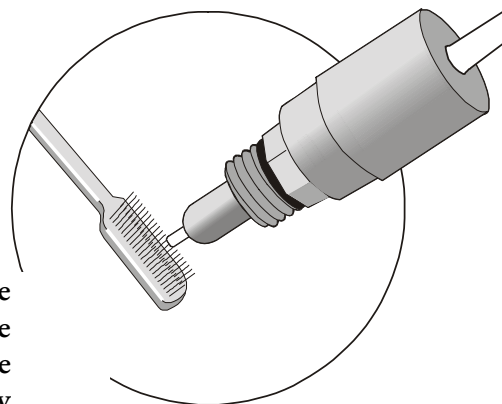


If flow switch does not stop and remain stopped during backwash, no-flow, or very low flow conditions, the controller cannot prevent the uncontrolled feed of chemicals, which could cause personal injury or death.

Testing of the flow switch installation is essential to assure the flow switch stops, remains stopped, and controller shows 'NO-FLOW ALARM' within 20 seconds, whenever filter is in backwash or circulation flow stops. If the flow switch does not stop completely, plumbing corrections or the installation of additional safeguards will be necessary to avoid uncontrolled chemical feed.

2. Clean the tip with liquid laundry detergent and a toothbrush.
3. Check Teflon<sup>®</sup> sealing tape on threads and reinstall sensor.
4. Open valves and let sensor rinse 10 to 15 minutes in sample stream water before making any adjustments.

**Note:** If the sample stream is shut down for more than a short time (particularly in freezing temperatures), remove the sensor from the flowcell and unplug the System3. Store the sensor in a heated, secure area, with the sensor cap in place or with the tip immersed in any small container of water to prevent it from drying out.





## Part VII Feed Charts and Typical Installations

Use the charts on the following pages to determine the correct amount of chemical to add to spa or pool water to achieve desired conditions. Choose which chart to use by the chemical indicated and the number of gallons to be treated.

Quantity of Muriatic Acid Needed to Lower Total Alkalinity

Desired Decrease in ppm	Gallons in Spa					
	100	150	250	500	750	1000
10	1.25 ts	2.00 ts	1.00 tb	2.00 tb	3.00 tp	0.25 cp
20	2.50 ts	4.00 ts	2.00 tb	0.25 cp	0.33 cp	0.50 cp
30	1.25 tb	2.00 tb	3.00 tb	0.33 cp	0.67 cp	0.75 cp
40	5.00 ts	2.50 tb	0.25 cp	0.50 cp	0.75 cp	1.00 cp
50	2.00 tb	3.00 tb	5.00 tb	0.67 cp	1.00 cp	1.33 cp
60	2.50 tb	0.25 cp	0.33 cp	0.75 cp	1.00 cp	1.50 cp
70	3.00 tb	0.25 cp	0.50 cp	1.00 cp	1.33 cp	1.75 cp
80	3.50 tb	0.33 cp	0.50 cp	1.00 cp	1.50 cp	2.00 cp
90	0.25 cp	0.33 cp	0.67 cp	1.00 cp	1.67 cp	2.33 cp
100	0.25 cp	0.50 cp	0.67 cp	1.33 cp	2.00 cp	2.50 cp

Quantity of Sodium Bisulfate Needed to Lower Total Alkalinity

Desired Decrease in ppm	Gallons in Spa					
	100	150	250	500	750	1000
10	1.50 ts	2.50 ts	1.00 tb	2.50 tb	0.25 cp	0.33 cp
20	1.00 tb	1.50 tb	2.50 tb	0.33 cp	0.50 cp	0.67 cp
30	1.50 tb	2.50 tb	0.25 cp	0.50 cp	0.75 cp	1.00 cp
40	2.00 tb	3.00 tb	0.33 cp	0.67 cp	1.00 cp	1.25 cp
50	2.50 tb	0.25 cp	0.50 cp	0.75 cp	1.25 cp	1.50 cp
60	3.00 tb	4.50 tb	0.50 cp	1.00 cp	1.50 cp	2.00 cp
70	0.25 cp	0.33 cp	0.50 cp	1.00 cp	1.67 cp	2.25 cp
80	0.25 cp	0.33 cp	0.67 cp	1.25 cp	2.00 cp	2.50 cp
90	0.33 cp	0.50 cp	0.75 cp	1.50 cp	2.25 cp	3.00 cp
100	0.33 cp	0.50 cp	0.75 cp	1.67 cp	2.50 cp	3.25 cp

## Part VII Feed Charts and Typical Installations

### Quantity of Biocarbonate of Soda Needed to Raise Total Alkalinity

Desired Increase in ppm	Gallons in Spa					
	100	150	250	500	750	1000
<b>10</b>	1.25 ts	2.00 ts	4.00 ts	2.50 tb	0.25 cp	0.33 cp
<b>20</b>	1.00 tb	1.50 tb	2.50 tb	5.00 tb	0.50 cp	0.50 cp
<b>30</b>	1.50 tb	2.00 tb	3.50 tb	0.50 cp	0.67 cp	1.00 cp
<b>40</b>	2.00 tb	3.00 tb	0.33 cp	0.50 cp	1.00 cp	1.00 cp
<b>50</b>	2.50 tb	3.50 tb	6.00 tb	0.75 cp	1.00 cp	1.50 cp
<b>60</b>	3.00 tb	0.25 tb	0.50 cp	1.00 cp	1.33 cp	1.75 cp
<b>70</b>	3.50 tp	0.35 cp	0.50 cp	1.00 cp	1.50 cp	2.00 cp
<b>80</b>	0.25 cp	0.33 cp	0.50 cp	1.25 cp	1.75 cp	2.50 cp
<b>90</b>	0.33 cp	0.50 cp	0.67 cp	1.33 cp	2.05 cp	2.75 cp
<b>100</b>	0.33 cp	0.50 cp	0.75 cp	1.50 cp	2.25 cp	3.00 cp

### Quantity of Calcium Chloride Needed to Increase Calcium Hardness

Desired Increase in ppm	Gallons in Spa					
	100	150	250	500	750	1000
<b>10</b>	1.25 ts	2.00 ts	1.00 tb	2.00 tb	3.00 tb	0.25 cp
<b>20</b>	2.50 ts	4.00 ts	2.00 tb	0.25 cp	0.33 cp	0.50 cp
<b>30</b>	1.25 tb	2.00 tb	3.00 tb	0.33 cp	0.67 cp	0.75 cp
<b>40</b>	4.00 ts	2.50 tb	0.25 cp	0.50 cp	0.75 cp	1.00 cp
<b>50</b>	2.00 tb	3.00 tb	5.00 tb	0.67 cp	1.00 cp	1.33 cp
<b>60</b>	2.50 tb	0.25 cp	0.33 cp	0.75 cp	1.00 cp	1.50 cp
<b>70</b>	3.00 tp	0.25 cp	0.50 cp	1.00 cp	1.33 cp	1.75 cp
<b>80</b>	3.50 tp	0.33 cp	0.50 cp	1.00 cp	1.50 cp	2.00 cp
<b>90</b>	0.25 cp	0.33 cp	0.33 cp	1.00 cp	1.67 cp	2.33 cp
<b>100</b>	0.25 cp	0.50 cp	0.67 cp	1.33 cp	2.00 cp	2.50 cp

## Part VII Feed Charts and Typical Installations

### Quantity of Chlorine Compound Needed to Increase 1 ppm

Percent Chlorine in Product	Gallons in Spa					
	100	150	250	500	750	1000
<b>5</b>	0.50 tb	2.00 ts	1.25 tb	2.50 tb	0.25 cp	0.33 cp
<b>10</b>	0.25 tb	1.00 ts	2.00 ts	1.25 tb	2.00 tb	2.50 tb
<b>12</b>	0.25 tb	1.00 ts	0.50 tb	1.00 tb	1.50 tb	2.00 tb
<b>30</b>	0.25 tb	0.33 ts	0.75 ts	1.25 ts	2.00 ts	2.50 ts
<b>40</b>	0.167 ts	0.25 ts	0.500 ts	1.00 ts	1.50 ts	2.00 ts
<b>50</b>	0.167 ts	0.25 ts	0.375 ts	0.75 ts	1.25 ts	1.50 ts
<b>60</b>	0.167 tb	0.200 ts	0.375 ts	0.50 ts	1.00 ts	1.25 ts
<b>65</b>	0.100 ts	0.167 ts	0.250 ts	0.50 ts	0.75 ts	1.00 ts

## Quantity of Muriatic Acid Needed to Lower Total Alkalinity

Desired Decrease in ppm	Gallons in Pool								
	10,000	25,000	50,000	75,000	100,000	200,000	500,000	750,000	1,000,000
10	1.30 pt	1.62 qt	3.25 qt	1.22 gl	1.62 gl	3.25 gl	8.13 gl	12.20 gl	16.25 gl
20	1.30 pt	3.25 qt	1.62 gl	2.43 gl	3.25 gl	7.50 gl	16.20 gl	24.30 gl	32.50 gl
30	1.95 qt	1.22 gl	2.44 gl	3.86 gl	4.98 gl	9.76 gl	24.40 gl	36.60 gl	48.80 gl
40	2.80 qt	1.63 gl	3.25 gl	4.87 gl	6.50 gl	13.00 gl	32.50 gl	48.70 gl	65.00 gl
50	3.25 qt	2.03 gl	4.07 gl	6.10 gl	8.14 gl	16.28 gl	40.70 gl	61.00 gl	81.40 gl
60	3.90 qt	2.44 gl	4.88 gl	7.32 gl	9.76 gl	19.52 gl	48.80 gl	73.20 gl	97.80 gl
70	1.14 gl	2.84 gl	5.69 gl	8.54 gl	11.38 gl	22.76 gl	56.90 gl	85.45 gl	113.80 gl
80	1.30 gl	3.25 gl	6.50 gl	9.75 gl	13.00 gl	26.00 gl	65.00 gl	97.50 gl	138.00 gl
90	1.48 gl	3.66 gl	7.31 gl	10.96 gl	14.82 gl	29.24 gl	73.10 gl	109.60 gl	146.20 gl
100	1.63 gl	4.06 gl	8.12 gl	12.18 gl	16.24 gl	32.48 gl	81.20 gl	121.80 gl	162.40 gl
120	1.96 gl	4.88 gl	9.76 gl	14.64 gl	19.52 gl	39.00 gl	97.80 gl	148.40 gl	196.20 gl
150	2.44 gl	6.09 gl	12.18 gl	18.27 gl	24.40 gl	48.80 gl	121.80 gl	182.70 gl	244.00 gl
200	3.25 gl	8.12 gl	16.24 gl	24.36 gl	32.50 gl	65.00 gl	162.40 gl	243.80 gl	325.00 gl

### Quantity of Bicarbonate of Soda Needed to Raise Total Alkalinity

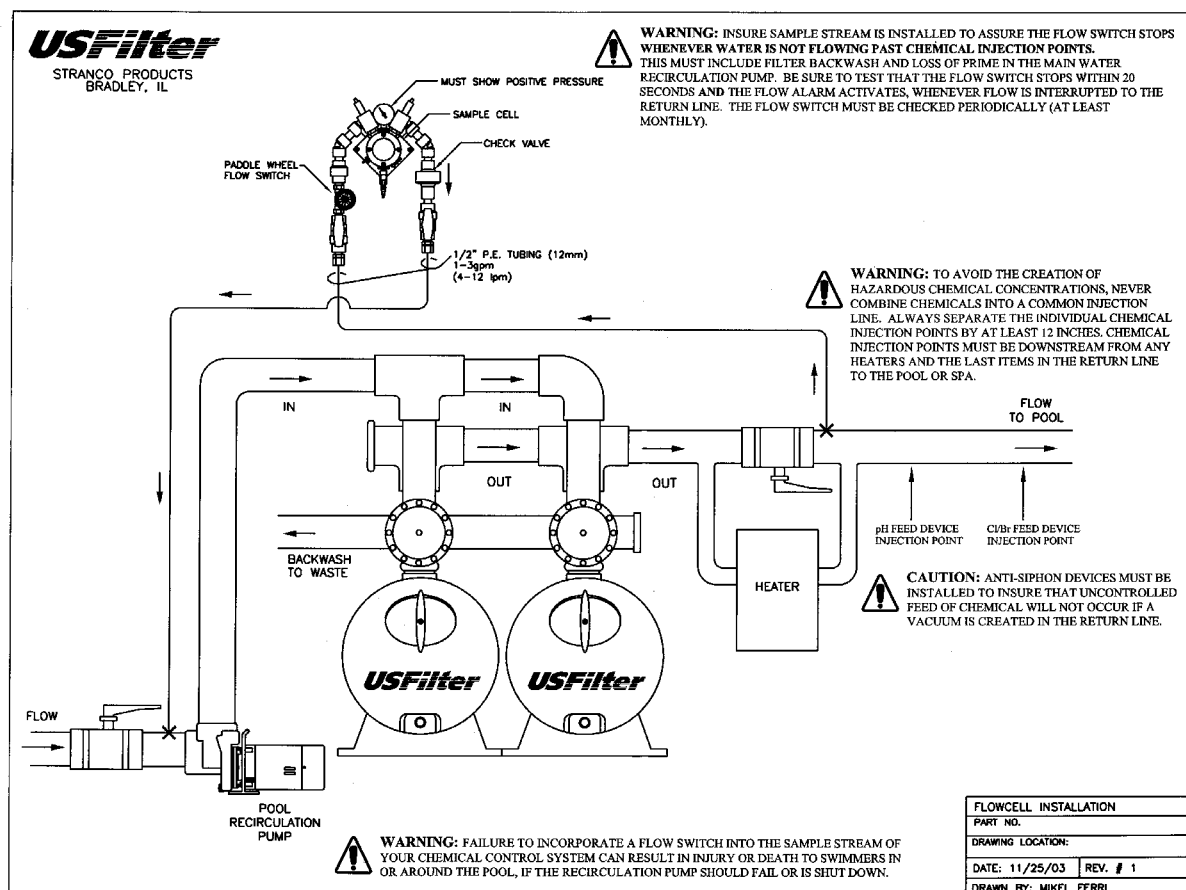
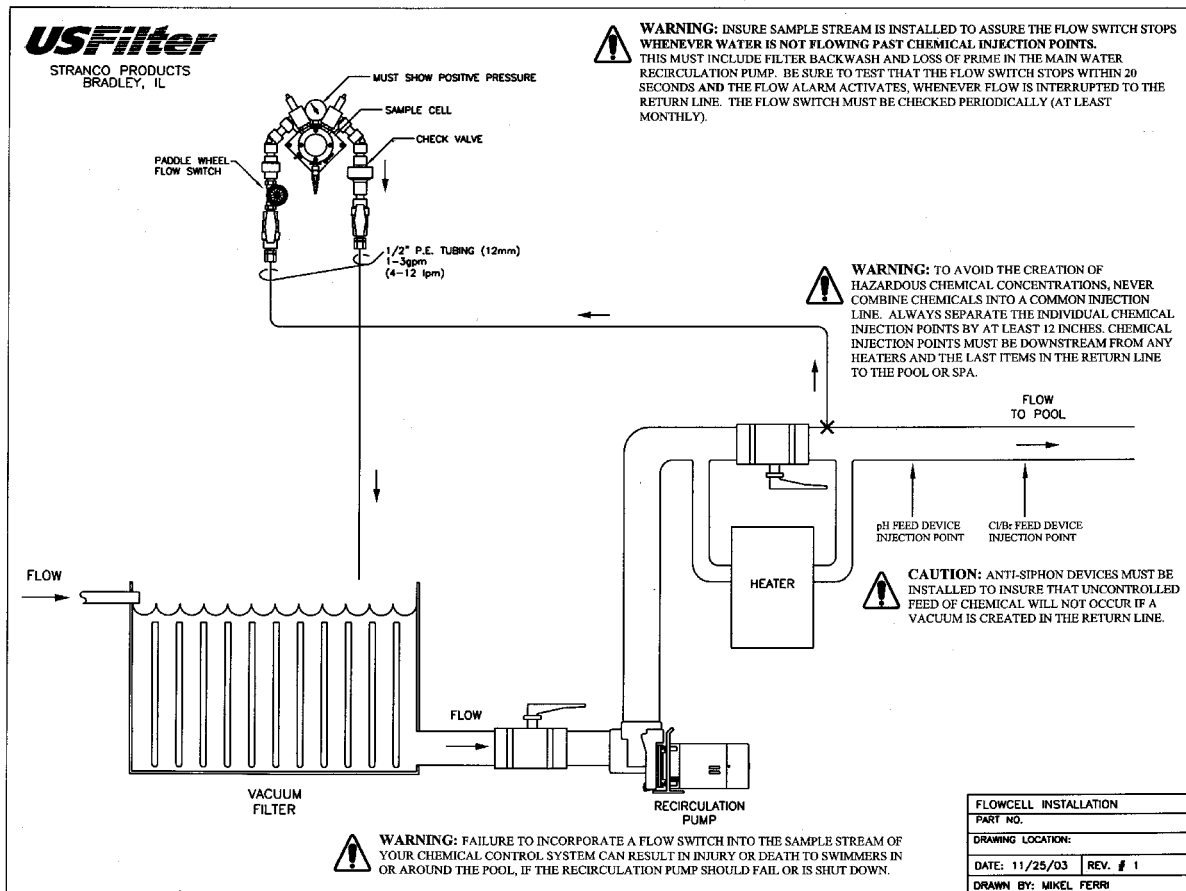
Desired Increase in ppm	Gallons in Pool								
	10,000	25,000	50,000	75,000	100,000	200,000	500,000	750,000	1,000,000
10	1.50 lb	3.75 lb	7.50 lb	11.25 lb	15.00 lb	30.00 lb	75.00 lb	112.50 lb	150.00 lb
20	3.00 lb	7.50 lb	15.00 lb	22.50 lb	30.00 lb	60.00 lb	150.00 lb	225.00 lb	300.00 lb
30	4.50 lb	11.25 lb	22.50 lb	33.75 lb	45.00 lb	90.00 lb	225.00 lb	337.50 lb	450.00 lb
40	6.00 lb	15.00 lb	30.00 lb	45.00 lb	60.00 lb	120.00 lb	300.00 lb	450.00 lb	600.00 lb
50	7.50 lb	18.75 lb	37.50 lb	56.25 lb	75.00 lb	150.00 lb	375.00 lb	562.50 lb	750.00 lb
60	9.00 lb	22.50 lb	45.00 lb	67.50 lb	90.00 lb	180.00 lb	450.00 lb	675.00 lb	900.00 lb
70	10.50 lb	26.25 lb	52.50 lb	78.75 lb	105.00 lb	210.00 lb	525.00 lb	787.50 lb	1050.00 lb
80	12.00 lb	30.00 lb	60.00 lb	90.00 lb	120.00 lb	240.00 lb	600.00 lb	900.00 lb	1200.00 lb
90	13.50 lb	33.75 lb	67.50 lb	101.25 lb	135.00 lb	270.00 lb	675.00 lb	1012.50 lb	1350.00 lb
100	15.00 lb	37.50 lb	75.00 lb	112.50 lb	150.00 lb	300.00 lb	750.00 lb	1125.00 lb	1500.00 lb

### Quantity of Chlorine Compound Needed to Increase 1 ppm

Percent Available Chlorine		Gallons in Pool								
		10,000	25,000	50,000	75,000	100,000	200,000	500,000	750,000	1,000,000
5	3.2 cp	2 qt	1 gl	1.5 gl	2 gl	4 gl	10 gl	15 gl	20 gl	
10	1.6 cp	1 qt	2 qt	3 qt	1 gl	2 gl	5 gl	7.5 gl	10 gl	
12	1.33 cp	1.67 pt	1.517 qt	2.276 pt	3.33 qt	1.665 gl	4.163 gl	6.245 gl	8.326 gl	
30	0.278 lb	0.665 lb	1.390 lb	2.085 lb	2.780 lb	5.580 lb	13.900 lb	20.850 lb	27.800 lb	
40	0.209 lb	0.521 lb	1.043 lb	1.565 lb	2.086 lb	4.172 lb	10.430 lb	15.645 lb	20.860 lb	
50	0.167 lb	0.417 lb	0.834 lb	1.251 lb	1.668 lb	3.336 lb	8.340 lb	12.511 lb	16.680 lb	
60	0.139 lb	0.348 lb	0.695 lb	1.043 lb	1.390 lb	2.780 lb	6.950 lb	10.425 lb	13.900 lb	
65	0.128 lb	0.321 lb	0.642 lb	0.963 lb	1.284 lb	2.568 lb	6.420 lb	9.630 lb	12.840 lb	
70	0.119 lb	0.298 lb	0.596 lb	0.894 lb	1.192 lb	2.384 lb	5.960 lb	8.940 lb	11.920 lb	
75	0.111 lb	0.278 lb	0.556 lb	0.834 lb	1.112 lb	2.224 lb	5.560 lb	8.340 lb	11.120 lb	
80	0.104 lb	0.261 lb	0.521 lb	0.782 lb	1.042 lb	2.064 lb	5.210 lb	7.815 lb	10.420 lb	
85	0.096 lb	0.417 lb	0.491 lb	0.737 lb	0.982 lb	1.964 lb	4.910 lb	7.365 lb	9.829 lb	
90	0.093 lb	0.232 lb	0.463 lb	0.695 lb	0.926 lb	1.852 lb	4.630 lb	6.945 lb	9.260 lb	
100	0.083 lb	0.209 lb	0.417 lb	0.626 lb	0.634 lb	1.668 lb	4.170 lb	6.225 lb	8.340 lb	



## Part VII Feed Charts and Typical Installations





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# **STRANTROL® SYSTEM3**

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## **Installation, Operations & Maintenance Manual**

### **SALES/SERVICE**

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