

STRANTROL® SET POINT CONTROLLER



USFilter **INSTALLATION, OPERATION & MAINTENANCE MANUAL**

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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.


Your shipping package should contain these items:

1. The **STRANTROL** Set Point Controller and Warranty Registration Form.
2. HRR Sensor (P/N 7042002).
3. pH Sensor (P/N 7040004).
4. Flowcell Kit.


CAUTION: *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.

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


NEVER OVERRIDE SAMPLE FLOW SWITCH

	<p>WARNING</p> <p>NEVER OVERRIDE SAMPLE FLOW SWITCH</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 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.</p>
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TEST FLOW SWITCH FUNCTION

	<p>WARNING</p> <p>TEST FLOW SWITCH FUNCTION</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>WARNING</p> <p>NEVER CONNECT FEEDER DIRECTLY TO POWER SOURCE</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 Strantrol 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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Warning Notifications

ALWAYS USE ANTI-SIPHON DEVICES



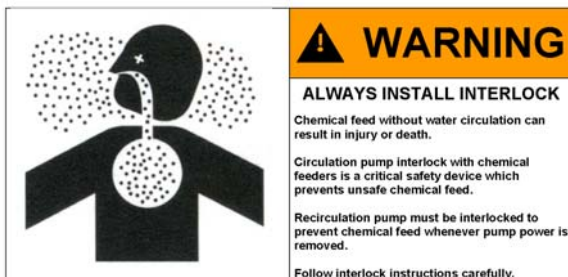
If a vacuum is created in the water circulation line and no anti-siphon device is installed on the chemical feeders, potentially hazardous concentrations of chemicals can be drawn into pool or spa. Always use injection check valves and anti-siphon valves in the chemical feed lines to prevent this situation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

	<p>⚠ WARNING</p> <p>Hazardous Voltage Enclosed</p> <p>Voltage or current hazard sufficient to cause shock, burn, or death. Disconnect and lockout power before servicing.</p>	<p>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.</p>
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WARNING REGARDING CONNECTING pH & CHLORINE OR BROMINE FEEDERS

 <p>DO NOT REMOVE THIS LABEL</p>	<p>⚠ WARNING</p> <p>ONLY CONNECT A pH FEEDER TO THIS OUTLET.</p> <p>Connecting a Chlorine/Bromine feeder to this outlet can cause chemical interactions that may cause personal injury or death. Insure feeders are connected properly to avoid hazardous chemical feed conditions. Never connect Chlorine/Bromine feeder to this connector. Strantrol pH Sensors are color coded as YELLOW.</p>	 <p>DO NOT REMOVE THIS LABEL</p>	<p>⚠ WARNING</p> <p>ONLY CONNECT A CHLORINE/BROMINE FEEDER TO THIS OUTLET.</p> <p>Connecting a pH feeder to this outlet can cause chemical interactions that may cause personal injury or death. Insure feeders are connected properly to avoid hazardous chemical feed conditions. Never connect pH feeder to this connector. Strantrol Chlorine/Bromine Sensors are color coded as BLUE.</p>
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Oxidizers (Chlorine or Bromine), acids (Muratic, Carbon Dioxide, CO₂) 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

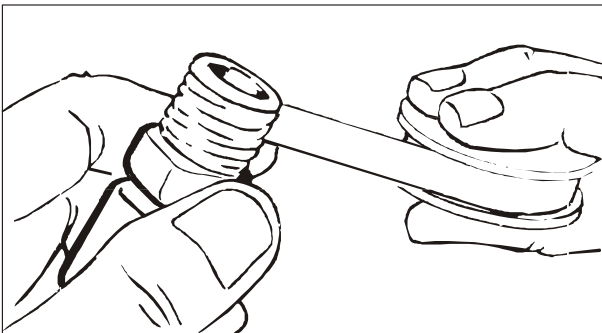
Make sure that the Set Point controller and the flowcell are mounted in a location that is free from chemical fumes and excessive heat, isolated from electrical interference, and near a power source protected by a ground fault interrupter.

Do not install Set Point controller out of doors.

Step 2: Wrapping the Fittings

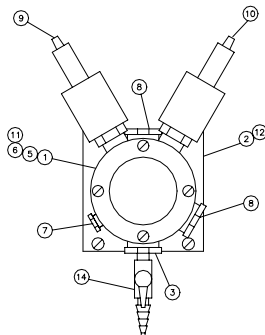
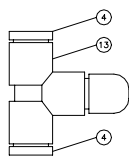
If you are assembling a flowcell, first open the bag of flowcell fittings and wrap each fitting three times around clockwise with Teflon® tape.

Step 3: Assembling the Sample Stream



The drawing below shows the flowcell parts that are provided with the Set Point controller. **Not provided** are ½-inch tubing and ½-inch ball valves. Once you have finished assembling the flowcell, close the valves and check for leaks.

KEY	DESCRIPTION	PART NO.	QTY
1	BODY, FLOWCELL ASSY w/INSERTS	1570008	1
2	BRACKET, FLOWCELL	1690511	1
3	BUSHING, PVC, 1/2" x 1/4", T&T	1930005	1
4	BUSHING, PVC, 3/4" x 1/2", S&T	1932010	2
5	COVER, FLOWCELL	2961023	1
6	O-RING, FLOWCELL	6091205	1
7	PLUG, PVC, 1/4"	6720002	1
8	PLUG, PVC, 1/2"	6720004	2
9	PROBE, pH	7042004	1
10	PROBE, ORP	7042002	1
11	SCREW, FLAT HD., #10-32 x 3/4" LG.	7772212	4
12	SCREW, PAN HD., #10-32 x 3/4" LG.	7772512	4
13	FLOWSWITCH	7821003	1
14	VALVE, 1/4" LABDOCK	9576012	1



Step 4: Plumbing the Sample Stream

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

Install the sample stream; ½-inch tubing is recommended for sample stream pickup and return. Make sure that you tap the supply off the effluent side of the filter(s), upstream of the chemical injection points and heater discharge. The sample should be filtered water, but more importantly, it must be from the return line to the pool, to stop the feed of chemical when the return line is not flowing. 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. It is recommended to install ½-inch ball valves (not provided) to allow isolation of the sample lines and adjust operating pressure / vacuum. Avoid discharge to drain or atmospheric pressure.

Before installing the sensors, give them a light cleaning with a toothbrush and detergent (see Part V). Wrap the sensor threads six times around clockwise with Teflon tape. Also, before installing the pH sensor (yellow), shake it down like a thermometer to get air out of the tip.

Save the sensor caps for future sensor storage.



WARNING

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Sample flow switch is a critical safety device which prevents uncontrolled chemical feed.

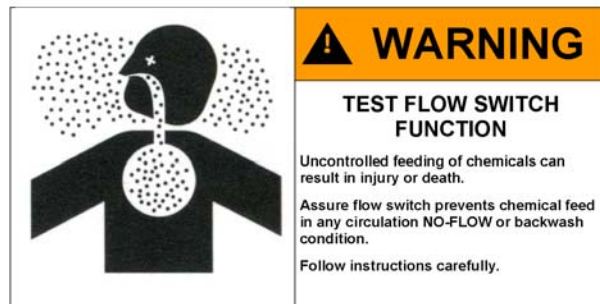
Follow instructions carefully.

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 flow switch in the sample stream. The flow switch is provided with two (2) slip X thread reducer bushings. Using the proper PVC primer and glue, assemble the flow switch with a reducer

bushing on each end. Pay particular attention to the flow direction indicated on the switch, and install only in “Bottom to Top”, or horizontal direction; never the “Top to Bottom” orientation.

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



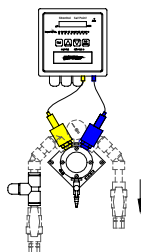
If flow switch does not stop and remain stopped during backwash no flow, or very low flow conditions, the controller cannot prevent the uncontrolled feed of chemicals, which could cause personal injury or death.

Step 5: Opening the Sample Stream Valve

Open the sample stream valve and check for leaks. Once you have a positive and steady pressure, open the wet test valve and make sure it generates a vigorous stream.

Step 6: 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 Set Point by twisting them a quarter of a turn. Allow the sensors to rinse in the sample water while you do the wiring (Part II). (Flowcell parts represented with dashed lines are not provided.)



Oxidizers (Chlorine or Bromine), acids (Muratic, Carbon Dioxide, CO₂) 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 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.

Step 7: Power Terminal

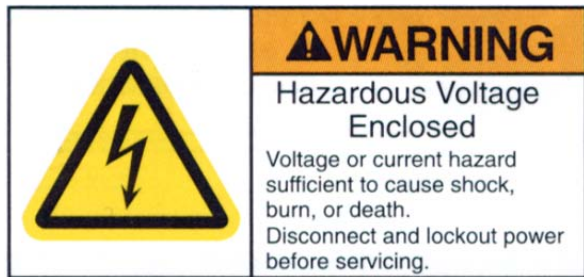
There are two options to connect power to the unit:

- 1) Plug directly into a power source using the male power cord (see next paragraph);

OR

- 2) Open the unit, discard the power cords and wire directly to the unit. Option 2 will require that you provide insulated spade connectors to attach the power to the spade lugs on the Set Point controller.

NOTE: There is no need to open the cover to connect power and a chemical feeder as this may be done through the power cords 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 Flow Switch.



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 8: Connecting Power to the Power Cords



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 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.

The Set Point controller is protected by a fuse against a load in excess of .25 amps for electronics, and 3 amps for each relay. It must be plugged into an earth-grounded AC power source. If you choose this option, you may plug directly into a 110 volt power source and go to Step 11.

NOTE: If you are using a 220 volt power source, you must go to Step 11 to change the line voltage switch before you plug in the unit. (Not normally needed in North America.)

Step 9: Opening the Cover

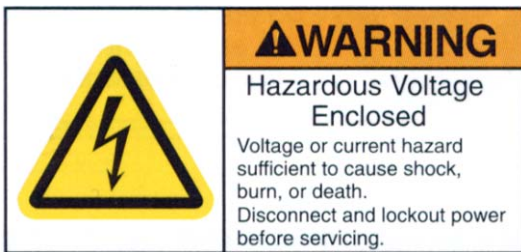
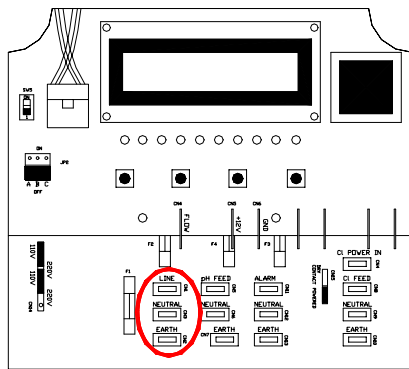
If you chose not to use the power cords to provide power to the unit, you must open the cover to connect power. Remove the cover by loosening the four screws at the corners with a screwdriver as shown. **NOTE:** The screws do not need to be totally removed, but only loosened. Once the screws are loosened, carefully lift the

top cover off of the unit. For now set aside the moisture absorbent packet found inside.

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

Step 10: 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 enclosure to enable you to easily run conduit. Use **insulated spade crimps provided**. Connect the black wire to spade lug labeled “LINE - CN1”, connect the green wire to the spade lug labeled “EARTH - CN2”, and connect the white wire to the spade lug labeled “NEUTRAL - CN3” inside the base of the unit. 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 4 (IP65) plug.



Line voltage (120/240VAC) can be present inside the Strantról 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 Strantról. 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.



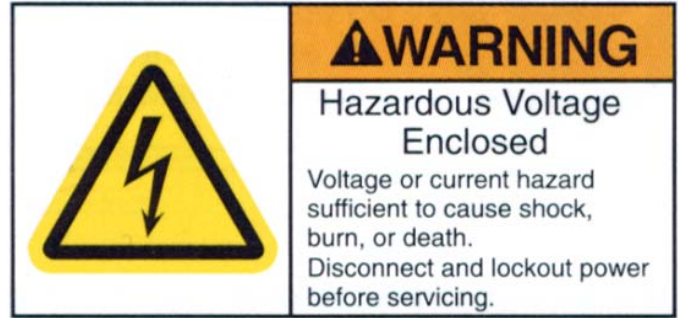
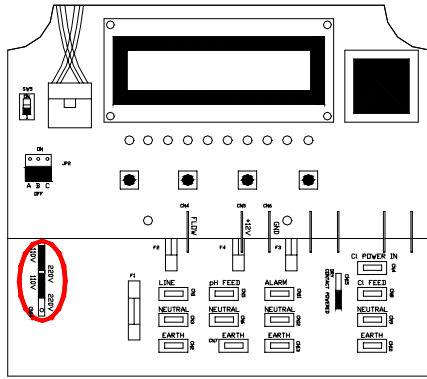
WARNING: MAKE SURE POWER IS DISCONNECTED WHILE YOU WIRE THE UNIT.

Step 11: Setting the Line Voltage Jumpers (Not normally necessary in North America)

Line Voltage Jumpers (LVJ) CN14 is set standard to 110 VAC but if you are using 220 VAC, then before you plug in the unit, set the LVJ in the base of the unit to 220 VAC. The LVJ is on bottom left of the bottom circuit board.

Remove the lower jumper and place it on the two most bottom pins. Remove the upper jumper and place it on the 2nd and 3rd pins from the top.





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 12: Wiring Relays

The first two relays are factory wired with power cords. The relays are wired with spade connections. The third relay is not factory wired. If you plan on wiring the third relay, it is recommended that you use insulated spade crimps provided. This will help to protect people and the controller from the 110 VAC output of the relay.

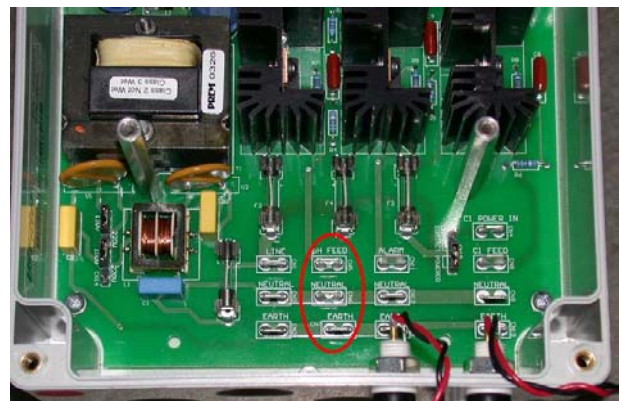
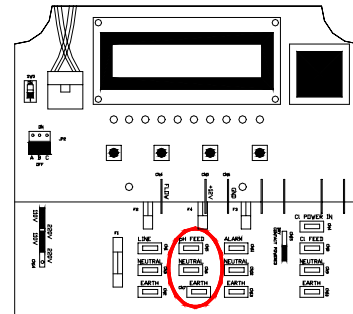
Step 13: Wiring Relay 1

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 power line running from the second hole from the left (the cord is color-coded yellow). You may then go on to Step 14.



Oxidizers (Chlorine or Bromine), acids (Muratic, Carbon Dioxide, CO₂) 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. 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.



The second way to wire the chemical feeder (Relay 1) is to remove the cover (as explained in Step 9) and then wire to spade lugs in the base of the unit as follows. The feeder has three wires to it. Use insulated spade crimps provided. Connect the black wire to spade lug labeled “pH FEED – CN5”, connect the green wire to spade lug labeled “EARTH – CN7”, and connect the white wire to the spade lug labeled “NEUTRAL – CN6”. (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 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.



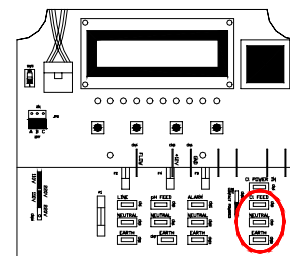
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present, are color coded. The **BLUE** sensor is associated with the feed of **Chlorine or Bromine** (sometimes called an oxidant or oxidizer). If these sensors or chemical feed pumps are not plugged into the proper connections, or are connected to 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 14: Wiring Relay 2 (powered)

Relay 2 controls chlorine. Refer to Step 14a for powered or dry contact settings. The feeder may be wired in two ways. The easiest is to plug the feeder into the female power line running from the hole on the right. You may then go on to Step 16.

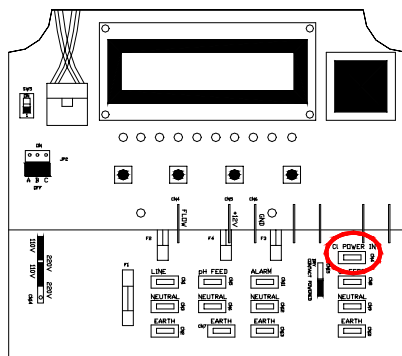
The second way to wire Relay 2 is to open the cover (as explained in Step 9) and then connect to spade lugs in the base of the unit as follows. Use insulated spade crimps provided. Connect the black (power) wire to the spade lug labeled “Cl Feed – CN8”, connect the green (earth ground) wire to the spade lug labeled “EARTH – CN10”, and connect the white (neutral) wire to the spade lug labeled “NEUTRAL – CN9” (Note: the black and white wires are colored brown and blue outside North America).





Step 14a: Wiring Relay 2 (dry contact)

Relay 2 will have an extra wire when the Power Jumper is in the dry contact position. Refer to Step 14b for powered or dry contact settings. The wiring schematic can be found in the Appendix (Dry Contact Wiring Schematic). Use insulated spade crimps provided. Connect the feeder power that is to be switched, to the Set Point controller spade lug labeled “CI POWER IN – CN4”.



⚠
WARNING

NEVER CONNECT FEEDER DIRECTLY TO POWER SOURCE

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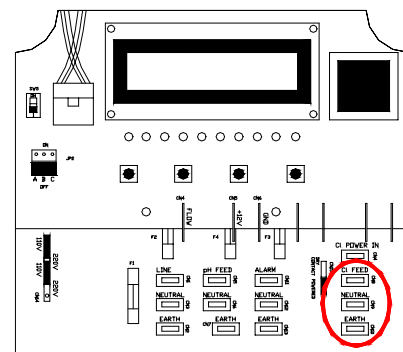
Chemical metering pumps must be connected to controller to enable safety controls.

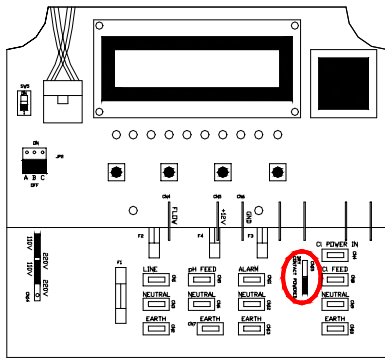
Follow instructions carefully.

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 14b: Placing the Power Jumper “CN15”

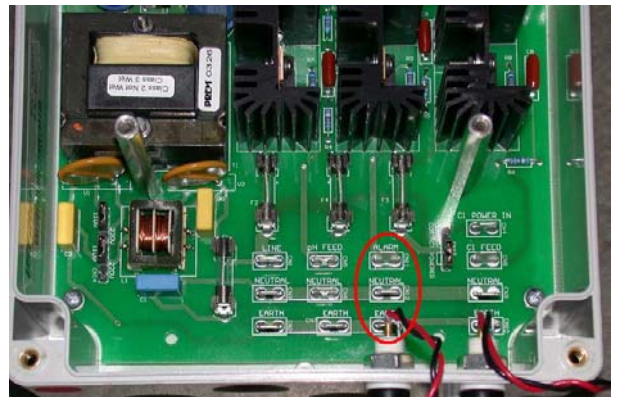
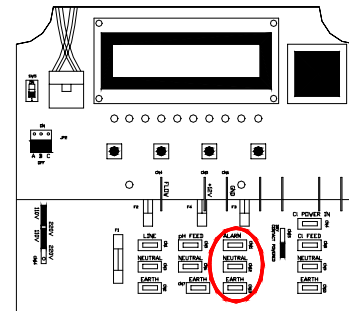
The power jumper enables you to have “CI Feed – CN8” at the base of the unit function as a powered or dry (unpowered) contact (some Calcium Hypochlorite feeders require that the power for the relay come from the feeder). Placing the jumper on the left two pins causes the contact to be powered, while placing the jumper on the right two pins causes the contact to be dry. To change the position of the jumper, pull it out and then replace it in the other position.





Step 15: Wiring Relay 3

Relay 3 is used for Alarms. Use insulated spade crimps provided. Connect the black (power) wire to the spade lug labeled “ALARM – CN11”, connect the green (earth ground) wire to the spade lug labeled “EARTH – CN13”, and connect the white (neutral) wire to the spade lug labeled “NEUTRAL – CN12” (Note: the black and white wires are colored brown and blue outside North America).



WARNING
NEVER CONNECT FEEDER DIRECTLY TO POWER SOURCE
 Uncontrolled feeding of chemicals can result in injury or death.
 Chemical metering pumps must be connected to controller to enable safety controls.
 Follow instructions carefully.

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 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.

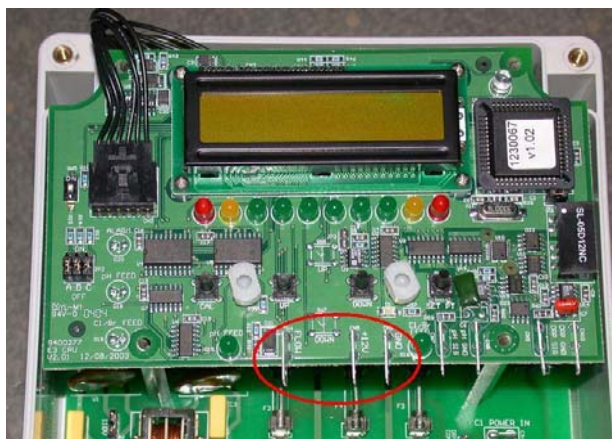
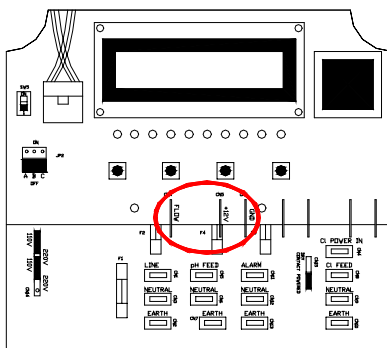
WARNING
NEVER OVERRIDE SAMPLE FLOW SWITCH
 Uncontrolled feeding of chemicals can result in injury or death.
 Sample flow switch is a critical safety device which prevents uncontrolled chemical feed.
 Follow instructions carefully.


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.

Step 16: Wiring a Flow Switch

A 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 8), running the wires from the flow switch through the cord grip provided and connecting them to the spade lugs located on the top circuit board. Use **insulated spade crimps provided**. Connect the black wire to the spade lug labeled “FLOW – CN4”, and the red wire to the spade lug labeled “+12V – CN5”.





⚠ WARNING

TEST FLOW SWITCH FUNCTION

Uncontrolled feeding of chemicals can result in injury or death.

Assure flow switch prevents chemical feed in any circulation NO-FLOW or backwash condition.

Follow instructions carefully.

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.

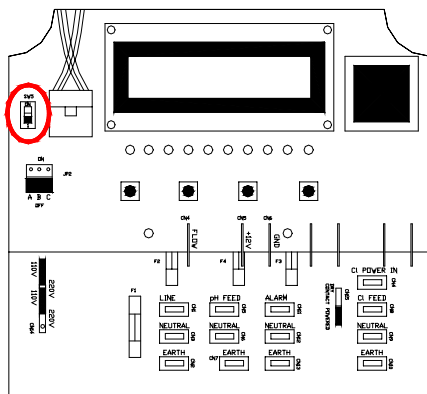
Testing of the flow switch installation is essential to assure the flow switch stops, remains stopped, and controller shows “NO-FLOW ALARM” within 20 seconds, whenever filter is in backwash or circulation flow stops. If the flow switch does not stop completely, plumbing corrections or the installation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

The STRANTROL Set Point Controller comes preprogrammed for pH feed down (acid, CO₂) to feed in Time-Based Proportional (TBP) mode. 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 and/or jumpers.

To change the dip switches, first unplug the Set Point controller power cord and remove the cover from the unit (see Step 9).

Step 17: Setting the DIP Switch

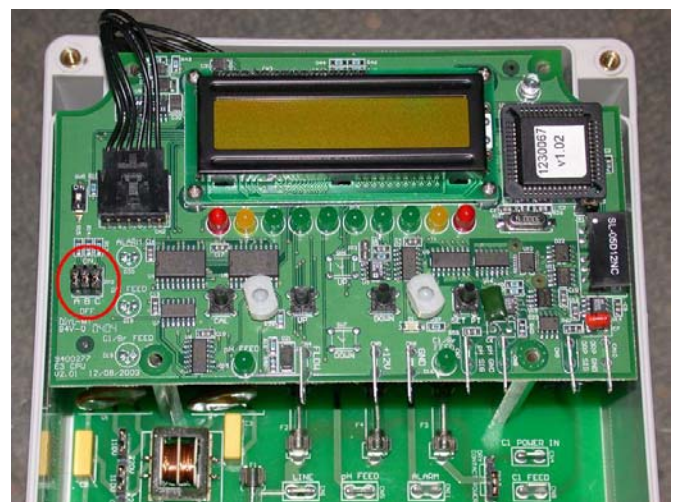
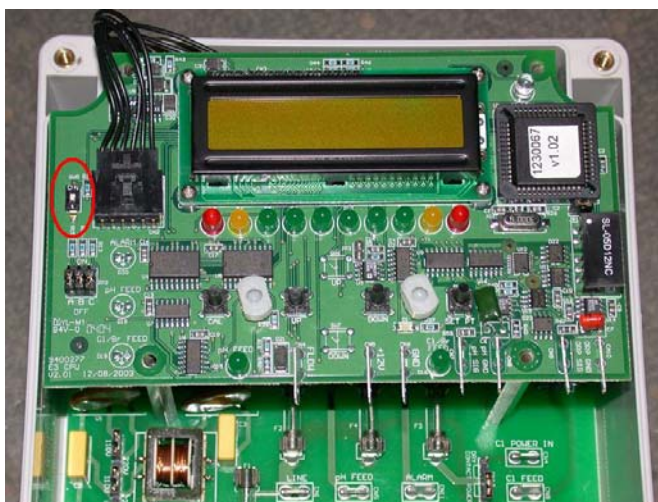
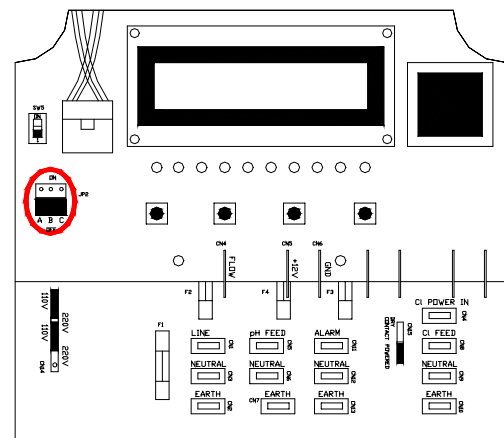
The drawing shows the Dip Switch (SW5) on the left side of the first circuit board. If the dip switch is in the “ON” position (up) then the Set Point controller is set to pH Feed-up mode. If the dip switch is in the “OFF” position (down) then the Set Point controller is set to pH Feed-down mode.



Step 18: Setting the Jumpers

The jumpers are on the left side of the first circuit board. The table below shows the jumper settings and what they change.

Jumper JP1	Jumper Set To ON	Jumper Set To OFF
1	pH On/Off Control	pH TBP Control
2	HRR On/Off Control	HRR TBP Control
3	Failsafe Timer = Off	Failsafe Timer = 4 Hrs.



Step 18a: Choosing Feed Up or Feed Down

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.

Step 18b: ON/OFF control

ON/OFF control should only be used when the feeder is under sized or for large bodies of water. ON/OFF control will activate the chemical feeder whenever the pH or HRR falls below or above (pH down) the Set Point and continue to feed until the pH or HRR meets Set Point, at which point the feeding will stop.

Step 18c: Timed-Based Proportional control

In Time-Based Proportional (TBP) control the Set Point controller will cycle the feeder ON for a fraction of 30-seconds depending on the amount of deviation from Set Point. The smaller the deviation, the less time the feeder is ON. TBP feature helps to hold a Set Point and to minimize over-shoot by making a standard feeder mimic the action of more sophisticated modulating feeders. TBP has two changeable variables to fit specific applications, span and time base.

The span sets the distance from the Set Point that TBP will be in control before the feeder is strictly ON. If overshoots are still experienced increase the span. If the Set Point is taking too long to attain set point, decrease the span.

The time base is the total of ON and OFF time. After the time base exceeds the controller will adjust the time ON and OFF to fit the current reading. This time base can be increased to gain longer ON and OFF times. Typically for pools the time base would be set to 60 seconds and for spas 30 seconds. The determining factor for the change of the time base is turnover time of the body of water.

Example: HRR Feed

HRR Span = 30 mV	Time Base = 30 seconds	
HRR Set Point = 750 mV		
HRR Display	ON (sec)	OFF (sec)
750 mV	0	30
740 mV	10	20
730 mV	20	10
720 mV and below	30	0

Step 18d: 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 Set Point in a reasonable period of time. The failsafe (overfeed) interval sets the maximum length of time the feeder can feed chemical. If the feeder has been trying to achieve Set Point without success for the selected time, the controller will cut power to the feeder, flash the feed light on the face panel and display a message to alert the operator.

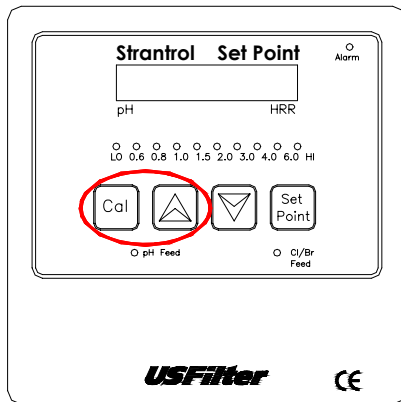
If unit goes into failsafe alarm, it can be reset by pressing and holding the Up and Down Arrow keys for 2 seconds.

Step 19: Replacing the Cover

Now it is time to put the cover back on the unit. Place the cover back on the unit and tighten the four screws at the corners to secure it in place.

Step 20: 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 21: 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.

pH High 7.8

Step 22: 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.

pH Low 7.2

Step 23: 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.

HRR High 900

Step 24: 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.

HRR Low 600

Alarm	Function
pH High	Disables Cl ₂ Feed – Cl/Br Lockout
pH Low	Disables Cl ₂ Feed – Cl/Br Lockout
No Flow	Disables All Feeders

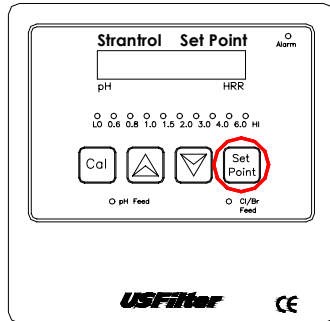
Step 25: Exiting the Menu

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

Exit menu

Step 26: Displaying Set Point

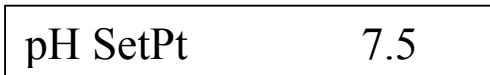
To display the Set Point, press the Set Point key briefly. The Set Point will be displayed for three seconds.



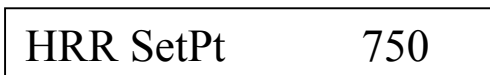
Step 27: Modifying the Set Point

To modify the Set Point, press the Set Point key for three seconds.

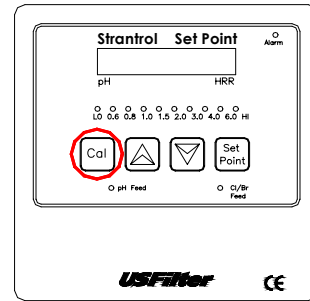
The display will change to pH SetPt followed by the current pH Set Point. If you would like to change this setting, use the Up or Down Arrows to input the value you would like. Then press the Set Point key again to enter the new value. If you wish to skip the pH SetPt change press the Set Point key.



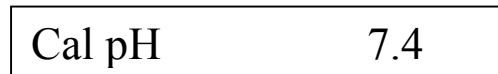
The screen then displays HRR SetPt followed by the current HRR Set Point. If you would like to change this setting, use the Up or Down Arrows to input the value you would like. Then press the Set Point key again to enter the new value. If you wish to skip the HRR Set Point change press the Set Point key.



Step 28: Single Point Calibration

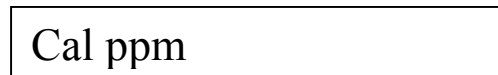


To enter the calibration menu, press and hold the Cal key for three seconds. After the display clears, release the Cal key. The display should now read Cal pH followed by the current pH calibration value.



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.

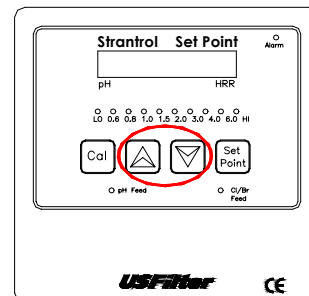
The display should then read Cal ppm and the ppm LEDs will be flashing.



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 29: Resetting the Failsafe Alarm

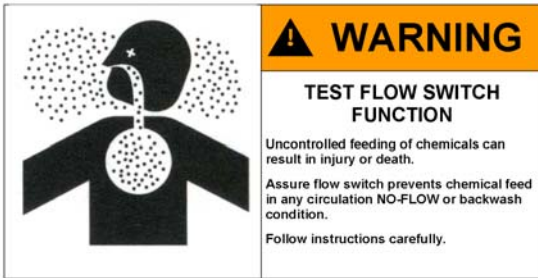
To reset a failsafe alarm press and hold the Up and Down Arrow keys for two seconds.



The Set Point controller requires no maintenance other than a periodic calibration check and sensor cleaning.

Step 30: Cleaning the Sensor

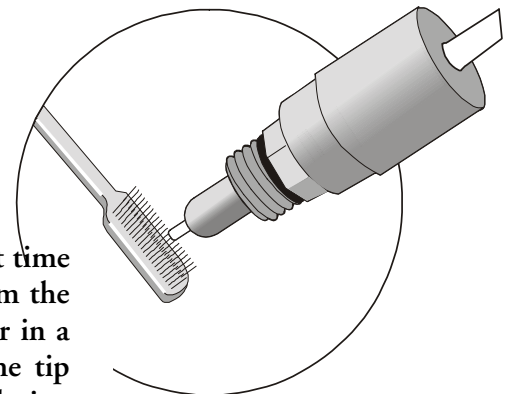
1. Isolate the Flowcell, and then remove the sensor.



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 soap and a toothbrush.
3. Check Teflon 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 Set Point controller. 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.

Electrical Information			
Supply Voltage	120VAC or 240VAC	Fuses	
Frequency	50 or 60 Hz	F1	0.25 Amperes Time Lag (Electronics)
Full Load Current	9.25 Amperes	F2	3 Amperes 250 VAC Time Lag pH Feeder
Enclosure	NEMA type 4 (IP 65)	F3	3 Amperes 250 VAC Time Lag Chlorine Feeder
Installation Environment	Indoor / Outdoor	F4	3 Amperes 250 VAC Time Lag Alarm Device
Temperature Range	32-122°F 0-50°C		
Humidity	0-100% Non-Condensing		

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

Quantity of Biocarbonate of Soda Needed to Raise Total Alkalinity

Desired Increase in ppm	Gallons in Spa					
	100	150	250	500	750	1000
10	1.25 ts	2.00 ts	4.00 ts	2.50 tb	0.25 cp	0.33 cp
20	1.00 tb	1.50 tb	2.50 tb	5.00 tb	0.50 cp	0.50 cp
30	1.50 tb	2.00 tb	3.50 tb	0.50 cp	0.67 cp	1.00 cp
40	2.00 tb	3.00 tb	0.33 cp	0.50 cp	1.00 cp	1.00 cp
50	2.50 tb	3.50 tb	6.00 tb	0.75 cp	1.00 cp	1.50 cp
60	3.00 tb	0.25 tb	0.50 cp	1.00 cp	1.33 cp	1.75 cp
70	3.50 tp	0.35 cp	0.50 cp	1.00 cp	1.50 cp	2.00 cp
80	0.25 cp	0.33 cp	0.50 cp	1.25 cp	1.75 cp	2.50 cp
90	0.33 cp	0.50 cp	0.67 cp	1.33 cp	2.05 cp	2.75 cp
100	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
10	1.25 ts	2.00 ts	1.00 tb	2.00 tb	3.00 tb	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	4.00 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 tp	0.25 cp	0.50 cp	1.00 cp	1.33 cp	1.75 cp
80	3.50 tp	0.33 cp	0.50 cp	1.00 cp	1.50 cp	2.00 cp
90	0.25 cp	0.33 cp	0.33 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 Chlorine Compound Needed to Increase 1 ppm

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

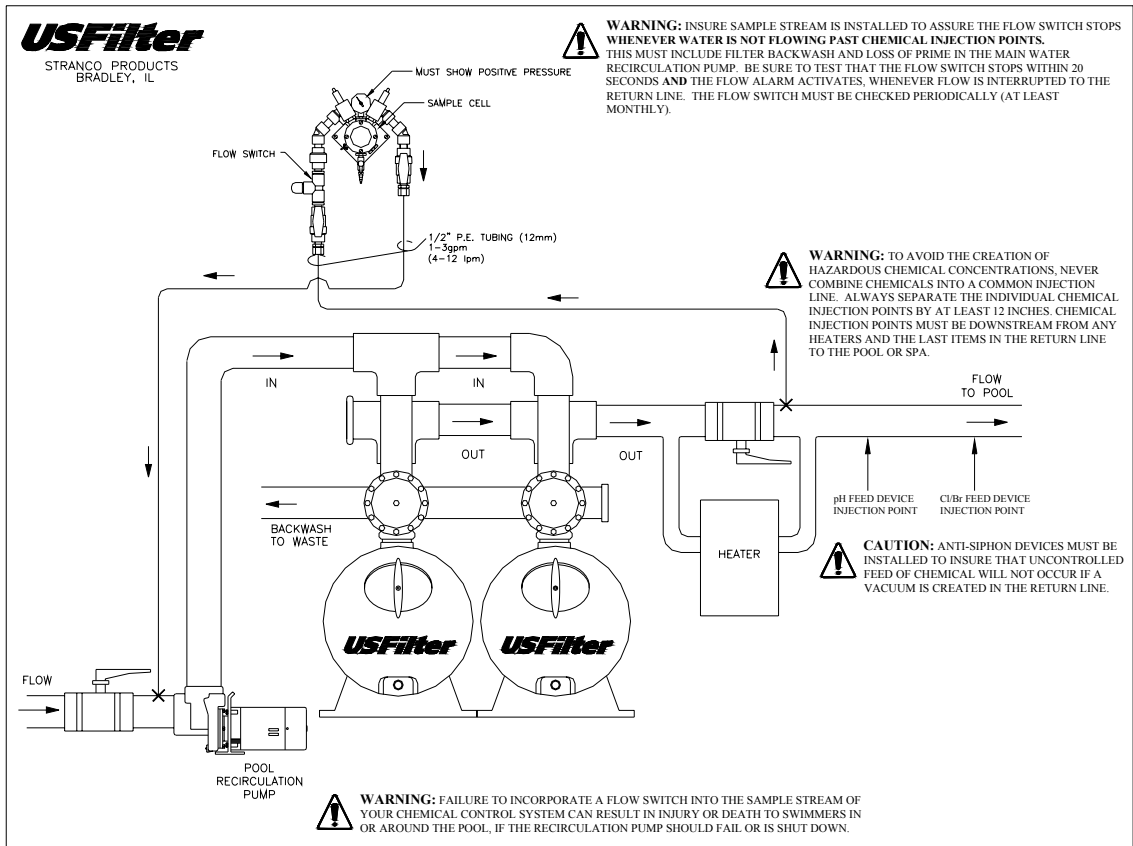
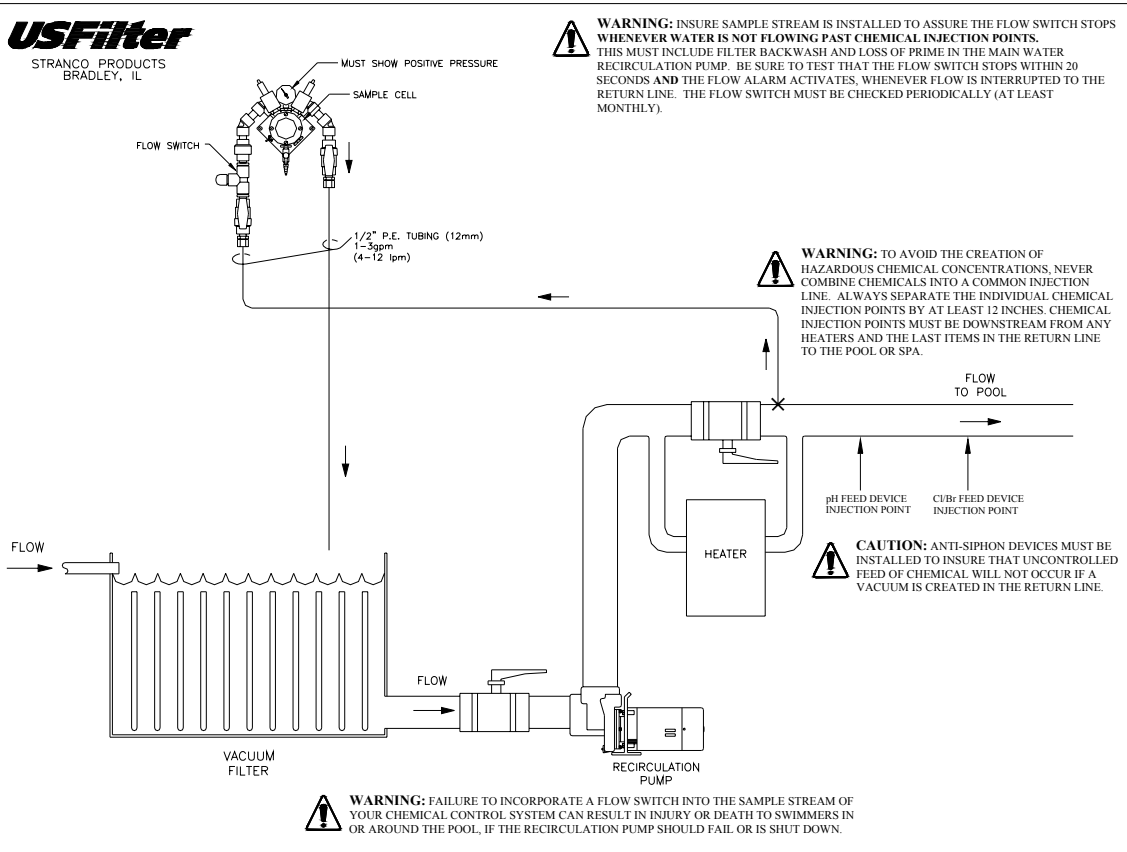
Desired Increase in ppm	Gallons in Pool									
	10,000	25,000	50,000	75,000	100,000	200,000	500,000	750,000	1,000,000	
10	1.50 lb	3.75 lb	7.50 lb	11.25 lb	15.00 lb	30.00 lb	75.00 lb	112.50 lb	150.00 lb	
20	3.00 lb	7.50 lb	15.00 lb	22.50 lb	30.00 lb	60.00 lb	150.00 lb	225.00 lb	300.00 lb	
30	4.50 lb	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 Calcium Chloride Needed to Increase Calcium Hardness

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 lb 4 oz	3 lb 2 oz	6 lb 4 oz	9 lb 6 oz	12 lb 8 oz	25 lb	62 lb 8 oz	93 lb 12 oz	125 lb	
20	2 lb 8 oz	6 lb 4 oz	12 lb 8 oz	18 lb 12 oz	25 lb	50 lb	125 lb	187 lb 4 oz	250 lb	
30	3 lb 2 oz	9 lb 6 oz	18 lb 12 oz	28 lb 2 oz	37 lb 8 oz	75 lb	187 lb 8 oz	281 lb 4 oz	375 lb	
40	5 lb	12 lb 8 oz	25 lb	37 lb 8 oz	50 lb	100 lb	250 lb	375 lb	500 lb	
50	6 lb 4 oz	15 lb 10 oz	31 lb 4 oz	46 lb 14 oz	62 lb 8 oz	125 lb	312 lb 8 oz	468 lb 12 oz	625 lb	
60	7 lb 8 oz	18 lb 12 oz	37 lb 8 oz	56 lb 4 oz	75 lb	150 lb	375 lb	562 lb 8 oz	750 lb	
70	8 lb 12 oz	21 lb 14 oz	43 lb 12 oz	65 lb 10 oz	87 lb 8 oz	175 lb	437 lb 8 oz	658 lb 4 oz	875 lb	
80	10 lb	25 lb	50 lb	75 lb	100 lb	200 lb	500 lb	750 lb	1,000 lb	
90	11 lb 4 oz	28 lb 4 oz	56 lb 4 oz	84 lb 6 oz	112 lb 8 oz	225 lb	562 lb 8 oz	843 lb 12 oz	1,125 lb	
100	12 lb 8 oz	31 lb 4 oz	62 lb 8 oz	93 lb 12 oz	125 lb	250 lb	625 lb	937 lb 8 oz	1,250 lb	
150	18 lb 12 oz	46 lb 4 oz	93 lb 12 oz	140 lb 10 oz	187 lb 8 oz	375 lb	937 lb 8 oz	1,406 lb 4 oz	1,875 lb	
200	25 lb	62 lb 8 oz	125 lb	187 lb 8 oz	250 lb	500 lb	1,250 lb	1,875 lb	2,500 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 gal	1.5 gal	2 gal	4 gal	10 gal	15 gal	20 gal	
10	1.6 cp	1 qt	2 qt	3 qt	1 gal	2 gal	5 gal	7.5 gal	10 gal	
12	1.33 cp	1.67 pt	1.517 qt	2.276 pt	3.33 qt	1.665 gal	4.163 gal	6.245 gal	8.326 gal	
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	0.834 lb	1.668 lb	4.170 lb	6.225 lb	8.340 lb	



STRANTROL® SET POINT

Installation, Operations & Maintenance Manual

SALES/SERVICE

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