

Naturally Balanced Chlorine / Bromine Generation

AUTOPILOT®
PURIFYING S Y S T E M S

**RESIDENTIAL
INSTALLATION / OPERATION
MANUAL**

MODELS LS1000 / LS1500 / LS2000

Now Equipped With CVC Technology



Factory Direct Customer Assistance...

HOTLINE: 1.800.922.6246 or 1.954.772.2255

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IMPORTANT

Read This Manual Before Installing & Operating

Table Of Contents



Models: LS1000, LS1500, & LS2000

Important Safety Instructions	1
Specifications	2

Section 1 Water Pretest & Preparation

1 a	System Sizing	3, 4
1 b	Pool Water Preparation & Charts	5 - 7

Section 2 Manifold Plumbing Requirements

2 a	Material Requirements For Installation	8
2 b	Manifold Installation & Pool Diagrams	9, 10
2 c	Benefits Of Manifold	11

Section 3 Command Center Mounting & Wiring

3 a	Hi-Low Voltage Wiring	12, 13
3 b	General Information	13 - 19

Section 4 Start Up & Operation

4 a	Command Center Functions	20 - 23
4 b	Start Up Sequence	24

Section 5 Trouble Shooting & Parts Replacements

5 a	Trouble Shooting LS1000, LS1500 & LS2000	25 - 27
5 b	Parts Replacement Guide	28

IMPORTANT SAFETY INSTRUCTIONS

When installing and using this electrical equipment, basic safety precautions must always be followed, including the following:

1. **READ AND FOLLOW ALL INSTRUCTIONS.**
2. **WARNING** - to reduce the risk of injury, do not permit children to install or operate this product.
3. Follow all aspects of the local and National Electric Code(s) when installing this product.
4. During installation, mount the AUTOPILOT Command Center to ensure the least amount of direct exposure to rain, direct sunlight or any corrosive environment.
5. Install at least 5 feet from the inside wall of the pool or spa.
6. A ground-fault circuit-interrupter must be provided if this device is used to control underwater lighting fixtures. The conductors on the load side of the ground-fault circuit-interrupter shall not occupy conduit boxes or enclosures containing other conductors unless the additional conductors are also protected by a ground-fault circuit-interrupter.
7. A terminal bar marked GROUND is provided within the right side of the Command Center. To reduce the risk of electrical shock, connect this terminal bar to the grounding terminal of your electrical service or supply panel with a continuous green or green & yellow striped insulated copper wire, equivalent in size to the circuit conductor supplying this equipment, but no smaller than No. 12 AWG (3.3mm²).
8. A security screw is provided on the outside door latch to restrict access to the Command Center after installation. Remove screw from latch prior to installation, insert and tighten screw when installation is complete.
9. **SAVE THESE INSTRUCTIONS.**

CAUTION

Failure to follow these instructions can result in fire, explosion, electric shock or electrocution.
Read through and follow these instructions carefully before beginning the installation
or start up of the AUTOPILOT system.

Specifications

NOTE: HIGH VOLTAGE is to the RIGHT of the divider panel inside the Command Center, and
LOW VOLTAGE is to the LEFT of the divider panel inside the Command Center.

ALL MODELS INPUT:

110-120 VAC, 50/60 Hz, 2.4 Amps
220-240 VAC, 50/60 Hz, 1.2 Amps

Voltage must be specified when ordered

Outputs

RC-7 Cell .75 lbs. (0.34 kg) @ 3.5 Amps
per 24 hours @ Maximum setting (11)

RC-15 Cell 1.10 lbs. (0.49 kg) @ 5 Amps
per 24 hours @ Maximum setting (11)

External 24 VAC 24 VAC @ 3 Amps

LS1500 Relay 2 output: (Vertical Relay) 25 Amps maximum for filter pump

LS2000 High voltage relay contacts: 25 Amps maximum @ 277 VAC
ACT 1 - ACT 3: 1 Amp @ 24-VAC Maximum
Heater relay contact: 1 Amp @ 24 VDC / 0.5 AMP @ 125 VAC Maximum

Flow Rate Minimum: 15 gpm / 3.4 cubic meters per hour
Maximum: 100 gpm / 22.7 M³/hr (Use external bypass if flow rate exceeds 100 gpm (22.7 M³/hr))

Automatic Self Cleaning Feature

Reverse Polarity Function (Standard in all models)

The Reverse Polarity Function is designed to automatically clean the cell blades, maximizing the cell's ability to manufacture chlorine or bromine. If some water chemistry levels are too extreme, specifically very high calcium hardness, a build up can occur on the blades too fast for this feature to handle at the factory setting. This feature can be adjusted to a more frequent reversal setting, to accommodate all types of water make-up and main filter run time. **Note:** The more frequent the cell has to reverse, the more wear it receives, which will shorten the life of your cell. Your unit is pre-set from the factory at a 4 hr. reversal rate.

CAUTION: The "Day" position does not provide a reverse polarity function. In some rare instances, depending on the water chemistry, the cell will scale and acid washing will be necessary to ensure continued sanitizer production.

AUTOPILOT[®]
PURIFYING SYSTEMS



System Sizing

Use these formulas to figure your correct gallonage:

Rectangular Pool: Length x Width x Average Depth x 7.5 = Total Gallons

Oval / Round Pool: Diameter x Diameter x Average Depth x 5.9 = Total Gallons

AutoPilot's System Production Capacity

1. Sanitizer Demand / Pool Requirements

The rate at which sanitizer is consumed in any swimming pool depends on the relationship of eight major variables. Since these variables can vary widely from pool to pool and season to season, precise prediction of the sanitizer demand for any one pool is difficult. At the end of this section, rules of thumb are provided for AutoPilot System Sizing. Given all the variables, should you find the unit unable to keep up with the sanitizer demand in your pool (assuming it is being operated correctly), we suggest increasing the output through a larger or multiple units.

THE VARIABLES ARE:

1. Volume and surface area of the pool / spa being sanitized.
2. Average water temperature maintained: As the temperature of the water increases, the sanitizer demand will also increase. As the temperature of the water decreases, the sanitizer demand will also decrease. When this happens, the output dial *should* be decreased to compensate for this lower demand (which will also protect your equipment from excessive levels of sanitizers).
3. Cyanuric acid level maintained: This chemical, when added to pool water, significantly inhibits sanitizer depletion from exposure to sunlight. Cyanuric acid also inhibits corrosion if your pool is equipped with any metal components. Minimum levels or better must be maintained to ensure that the sanitizer being produced is protected from UV breakdown.
4. Bather load: As the bather load increases, the sanitizer demand will also increase.
5. Amount of direct sunlight / UV exposure: Pools exposed to larger amounts of direct sunlight are more vulnerable to increased sanitizer loss and algae growth. Indoor or screened pools have less sanitizer demand.
6. Exposure to vegetation and airborne debris: Dense landscaping near the pool, along with increased nitrate levels (urine, bird droppings, fertilizer, well water, etc.) greatly contribute to increased sanitizer demand.
7. Chemical dilution: Virtually *all* pool chemicals experience dilution through rainfall, adding of fresh make-up water due to evaporation, splash-out, filter backwashing, leaks, etc. When freshwater is added, sanitizer demand increases for a brief period.
8. Main filter pump runtime and your pool's circulation patterns: Sanitizer can be produced only while the main filter pump is operating. Waterfalls/Fountains and other water features operated by the filter pump can directly effect sanitizer demand. The main filter pump runtime and/or output dial may need to be increased to satisfy this higher demand. **NOTE: Enabling the Boost Cycle feature on your AutoPilot provides a means to prepare for or to recover from increased bather loads, like pool parties, without making permanent adjustments to your output dial.**




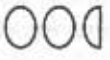
2. Sanitizer Production / System Sizing

While sanitizer *demand* varies beyond precise prediction, and you may desire a higher or lower sanitizer residual in your pool, the following "rules of thumb" will assist you in properly selecting the correct AutoPilot model. When unsure, we recommend selecting the larger model versus the smaller model if you desire 100% of your sanitizing requirements be satisfied with your AutoPilot System.

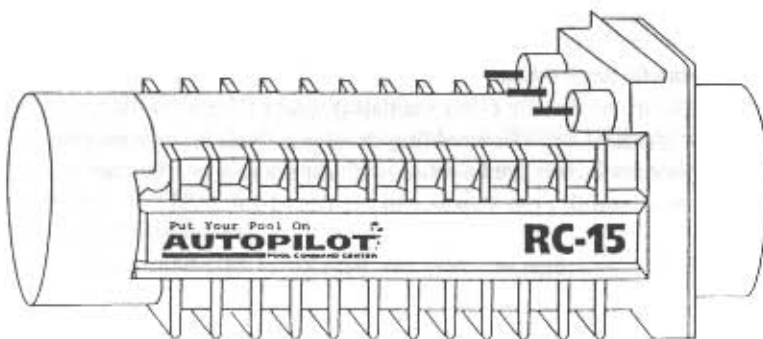
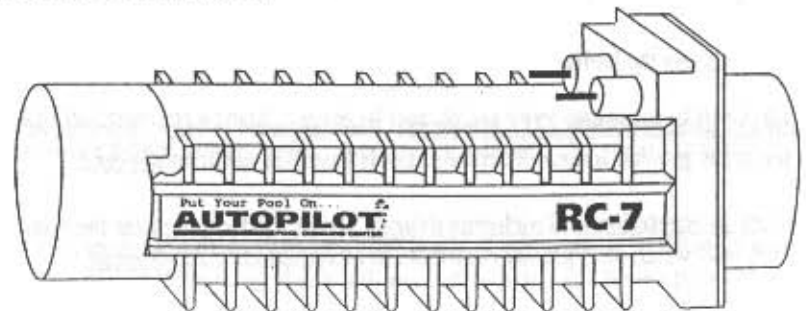
1. A Command Center with a RC-7 cell, operated at maximum output (3.5 amps), at 2500 ppm salt residual will produce .75 lbs. (0.34 kg) of 100% pure Sodium Hypochlorite (at a natural pH of 7.7) in 24 hours of continuous operation.
2. A Command Center with a RC-15 cell, operated at maximum output (5.0 amps), at 2500 ppm salt residual will produce 1.10 lbs. (0.49 kg) of 100% pure Sodium Hypochlorite (at a natural pH of 7.7) in 24 hours of continuous operation.

NOTE: Residual salt levels must be maintained between 2500 ppm and 3000 ppm. To maximum efficiency and to avoid the water tasting salty, Do not exceed 3,500 ppm.

AUTOPILOT EQUIVALENT PRODUCTION COMPARISONS IN 24 HOUR PERIOD

Autopilot Cell Model	Equivalent ounces Liquid Chlorine	Portion of 8 oz. Tri-Chlor Tablet	Equivalent Tablets Per Day	Weekly Production 7 Days 24 Hrs Per Day
7 Blade	108 oz.	169%		12 Tablets
15 Blade	158 oz.	250%		17.5 Tablets

"AUTOPILOT Eliminates the Chlorine Hassle"



STEP 1 - Proper Water Balance Requirements

Proper AUTOPILOT System operations is dependent on proper pool water conditions. Manually balance the pool water chemistry to meet all suggested ranges of water balance factors below before start-up of AutoPilot. From the point forward your AutoPilot System will assist you in keeping your water chemistry factors in balance *naturally*.

BEFORE START UP MAKE SURE THE POOL WATER MEETS THE FOLLOWING REQUIREMENTS: ALL WATER BALANCE FACTORS SHOULD BALANCE WITH LANGELIERS SATURATION INDEX. WE RECOMMEND THE TAYLOR K-2005 TEST KIT, OR A VISIT TO YOUR LOCAL POOL PROFESSIONAL.

AUTOPILOT System Required Ranges (And periods for testing water for these water balance factors.)

STEP 2 - Bi-Weekly Checks

- 1) Free Chlorine 1.0-3.0 ppm or Bromine 2.0-4.0 ppm
- 2) pH 7.2-7.8 ppm

STEP 3 - Monthly Checks

- 3) Calcium Hardness 150-300 ppm
- 4) Total Alkalinity 80-150 ppm
- 5) Cyanuric Acid (stabilizer) 60-80 ppm (Outdoor Pools)
10-20 ppm (Bromine/Indoor Pools)
- 6) Salt Residual 2500-3000 ppm
- 7) Langeliers index (water balance) + or - 0.3 pH of saturation
- 8) Visual Cell Inspection

CAUTION: Excessive Bromine or Chlorine residuals (greater than 4.0 ppm) will cause erosion and/or corrosion of any metal components in contact with pool water. Staining and premature failure of heaters, filters, and other metal components will be the result. Do not exceed recommended sanitizer ranges. **NOTE:** Standard pool water test kits do not read chlorine levels above approximately 5.0 ppm residual. Test reagents, at high levels, return to a clear liquid. **AVOID HIGH SANITIZER LEVELS!**

STEP 4 - Salt Requirements

It is important that a suggested salt level between 2500 ppm to 3000 ppm be maintained at all times. Allowing less than 2000 ppm salt can activate a flashing red salt light and result in the cell deactivation. No chlorine will be produced. The amount of salt required depends on the size of the pool.

1. Use of granulated, evaporated, 98% pure sodium chloride (NaCl) salt is recommended. Water conditioning pellets can be used but take longer to dissolve. Use the chart on the next page to determine the amount of salt to add, in pounds or kilos, for a new pool start up. Also test your make up water for its level of salt and compare it with the charts on the next page. Before adding salt to a pool for the first time, turn your AutoPilot off, open your main drain, then pour salt around the perimeter of the pool. **NEVER** add salt directly through the skimmer. Allow salt to dissolve and circulate for 24 hours before starting up unit. Further, excessive salt, above 6,000 ppm, may cause corrosion to metal pool equipment. Please dilute if necessary.

NOTE: **DO NOT** allow large amounts of undissolved salt to remain on fresh cementitious pool/spa interior surfaces. Brush vigorously to accelerate salt dissolving especially in cold water conditions, or in pools with inoperative or no main drains.

Stains From Salt

Some salt contain an anti-caking additive, Yellow Prussiate of Soda (YPS) that contains a small amount of Iron. When large quantities of this salt is left on the pool floor to slowly dissolve, this iron content will leave a brown or orange colored stain. Avoid using salt with YPS, or if used, brush the salt periodically to assist in the dissolving of the salt.

NOTE: Homeowners with water softening equipment, which utilize salt, may already have substantial levels of salt in their drinking water. So before adding this water to your pool, test the level of salt, then determine the amount of salt still needed to bring the level up to the suggested 2500 ppm level.

Manual Cleaning Of Cells

In normal conditions the AutoPilot should not require Manual Cleaning. If manual cleaning is required, check water chemistry for possible imbalances or call factory for consultation.

Remove loop from the manifold by loosening unions to release. Fill loop with solution of 1 part muriatic acid added to 4 parts of water. After 10 - 15 minutes of foaming drain loop and rinse out with fresh water. If cell blades still have scale on them, repeat the process, not to exceed 15 minute intervals. **NOTE:** **DO NOT** try to remove any scale from cell blades with any tools. This may scratch or damage the coating on the blades.

I will VOID WARRANTY.

CAUTION: Always add acid to WATER, not water to acid.



POUNDS OF SALT NEEDED FOR 3000 PPM RESIDUAL

Salt Level Before Addition	Pool / Spa Volume in Gallons													
	234	469	937	1875	3750	7500	9375	11250	13125	15000	18750	22500	26250	30000
0 ppm	5.5	11	23	46	93	187	233	280	327	375	468	562	656	750
320 ppm	5	10	20	41	83	167	208	250	292	335	418	502	586	670
640 ppm	4.5	9	18	36	73	147	183	220	257	295	368	442	516	590
960 ppm	3.5	7	15	31	63	127	158	190	222	255	318	382	446	510
1280 ppm	3	6	13	26	53	107	133	160	187	215	268	322	376	430
1600 ppm	2.5	5	10	21	43	87	108	130	152	175	218	262	306	350
1920 ppm	2	4	8	16	33	67	83	100	117	135	168	202	236	270
2240 ppm	1	2	5	11	23	47	58	70	82	95	118	142	166	190
2560 ppm	12 oz.	1.5	3	6	13	27	33	40	47	55	68	82	96	110
2880 ppm	3 oz.	6 oz.	12 oz.	1.5	3	7	8	10	12	15	18	22	26	30
3000 ppm	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NOTE: ABOVE CHART BASED ON 1 POUND OF SALT ADDED TO 1 MILLION POUNDS OF WATER (APPROXIMATELY 120,000 GALLONS) WHICH EQUALS 1 PPM OF SALT.

KILOS OF SALT NEEDED FOR 3000 PPM RESIDUAL

Salt Level Before Addition	Pool / Spa Volume in Cubic Meters													
	0.89	1.775	3.547	7.097	14.194	28.388	35.484	42.581	49.678	56.775	70.969	85.163	99.356	113.55
0 ppm	2.5	5	10	21	42	85	106	127	148	170	212	255	297	340
320 ppm	2.2	4.5	9	18	38	76	94	113	132	152	190	228	266	304
640 ppm	2	4	8	16	33	67	83	100	116	134	167	200	234	268
960 ppm	1.5	3	7	14	28	58	72	86	101	116	144	173	202	231
1280 ppm	1.3	2.7	6	12	24	48	60	72	85	97	121	146	170	195
1600 ppm	1.1	2.2	4.5	9	19	39	49	59	69	79	99	119	139	159
1920 ppm	0.9	1.8	3.6	7	15	30	38	45	53	61	76	92	107	122
2240 ppm	0.4	0.9	2.2	5	10	21	26	32	37	43	53	64	75	86
2560 ppm	0.3	0.6	1.3	2.7	6	12	15	18	21	25	31	37	43	50
2880 ppm	0.08	0.1	0.3	0.6	1	3	4	4.5	5	7	8	10	12	14
3000 ppm	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Cyanuric Acid / Stabilizer Conditioner

Cyanuric acid, CYA, (also known as stabilizer or conditioner) prevents rapid breakdown of chlorine by sunlight and inhibits the corrosive effects of chlorine and bromine. Regulations may exist regarding use of Cyanuric acid in public pools; please consult your pool professional. Use the chart below to determine the amount of Cyanuric acid needed. Test water with test kit that includes CYA testing; then use the chart below to determine the amount to add.

POUNDS OF CYANURIC ACID NEEDED FOR 75 PPM RESIDUAL

CYA Level Before Addition	Pool / Spa Volume in Gallons										
	312	625	1250	2500	3750	5000	7500	10000	15000	20000	30000
0 ppm	3 oz.	6 oz.	0.75	1.5	2.25	3	4.5	6	9	12	18
12 ppm	2.5 oz.	5 oz.	10 oz.	1.25	1 lb/14 oz.	2.5	3.75	5	7.5	10	15
25 ppm	2 oz.	4 oz.	0.5	1	1.5	2	3	4	6	8	12
37 ppm	1.5 oz.	3 oz.	6 oz.	0.75	1 lb/2 oz.	1.5	2.25	3	4.5	6	9
50 ppm	1 oz.	2 oz.	0.25	0.5	0.75	1	1.5	2	3	4	6
62 ppm	.5 oz.	1 oz.	2 oz.	0.25	6 oz.	0.5	0.75	1	1.5	2	3

NOTE: ABOVE CHART BASED ON 1 POUND OF CYANURIC ACID ADDED TO 41,500 POUNDS OF WATER (5,000 GALLONS) WHICH EQUALS 25 PPM OF CYA.

Normal required Cyanuric Acid levels are 60 -80 ppm. To add, pour around the perimeter of the pool.
 Allow CYA to dissolve and circulate for 24 hours before measuring again.
 Pre-dissolving any chemical prior to addition to pool water is advised.

KILOGRAMS OF CYANURIC ACID NEEDED FOR 75 PPM RESIDUAL

CYA Level Before Addition	Pool / Spa Volume In Cubic Meters										
	1.18	2.366	4.731	9.463	14.194	18.925	28.388	37.85	56.775	75.7	113.55
0 ppm	0.08	.17	0.34	0.68	1	1.3	2	2.7	4	5.4	8.1
12 ppm	0.07	0.14	0.28	0.56	0.85	1.1	1.7	2.2	3.4	4.5	6.8
25 ppm	0.05	0.11	0.22	0.45	0.68	0.9	1.3	1.8	2.7	3.6	5.4
37 ppm	0.04	0.08	0.17	0.34	0.51	0.68	1	1.3	2	2.7	4
50 ppm	0.02	0.05	0.11	0.22	0.34	0.45	0.68	0.9	1.3	1.8	2.7
62 ppm	0.01	0.02	0.05	0.11	0.17	0.22	0.34	0.45	0.68	0.9	1.3

**NEEDED BY INSTALLER**

- 1) Required amount of salt
- 2) Hacksaw, Pipe Cutters or Cable Saw
- 3) Tape measure & Permanent Marker
- 4) Screwdrivers: Flat head & Phillips head
- 5) Drill with 1/4" (6mm) masonry-drill bit for block or stucco
- 6) Voltmeter - To determine AC voltage to Command Center

7) Test kit for Chlorine/Bromine, Calcium Hardness, pH, Total Alkalinity, and Cyanuric Acid (stabilizer).

We recommend the Taylor Technologies® Model K-2005 Test Kit or Guardex 4 in 1 OTO Test Kit for Bromine Applications.

- 8) P.V.C. Glue
- 9) P.V.C. Cleaner / Primer
- 10) Assorted P.V.C. Fittings & Pipe
- 11) Assorted Electrical Hookup Components

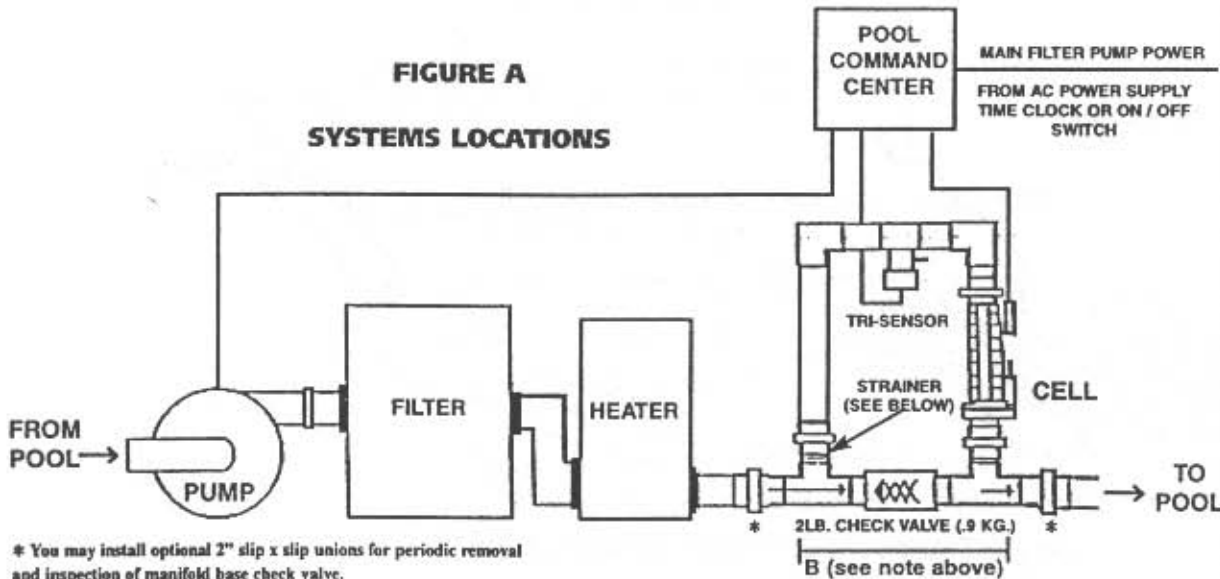
SUPPLIED BY AUTOPILOT

- 1) Residential Installation / Operation Manual
- 2) Limited Warranty with Warranty Card (Must Return)
- 3) AUTOPILOT® Command Center
- 4) Manifold which contains:
 - Chlorine/Bromine Production Cell
 - Tri-Sensor
 - Automatic spring check valve
 - Cell Unions
 - Strainer Union
- 5) Salt test strips & vial with mounting hardware.

Command Center

Placement of the Command Center in a shaded, well ventilated area away from direct sunlight is strongly suggested. Mount the Command Center on a vertical flat surface within 6 feet (1.83m) of cell and manifold with anchors (provided), and 8 feet (2.44m) from farthest valve to be controlled. NOTE: Install at least 5 ft. (1.53m) from the inside wall of the pool or spa.

FIGURE A
SYSTEMS LOCATIONS



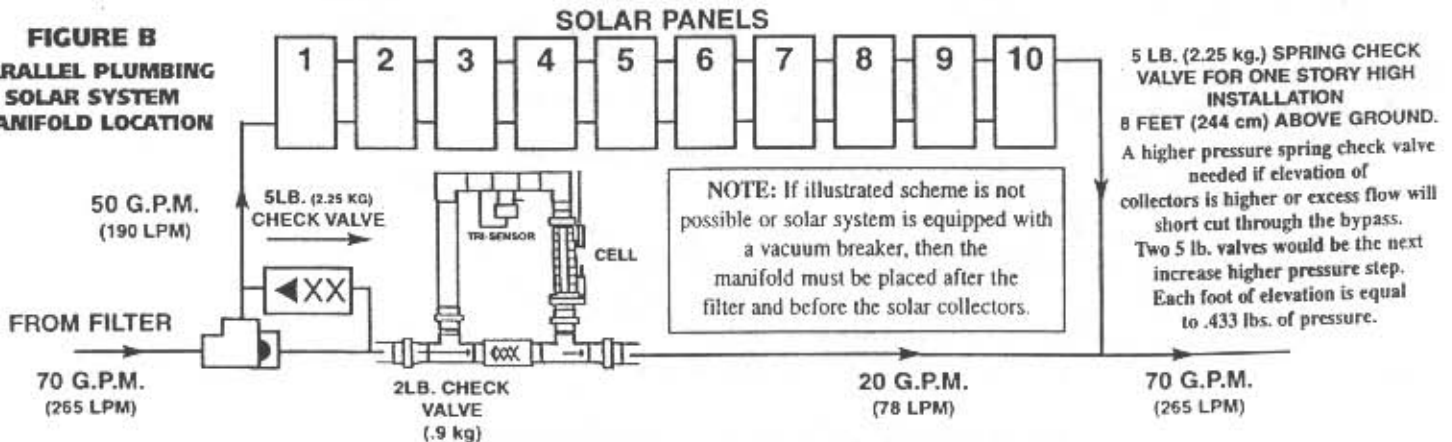
* You may install optional 2" slip x slip unions for periodic removal and inspection of manifold base check valve.

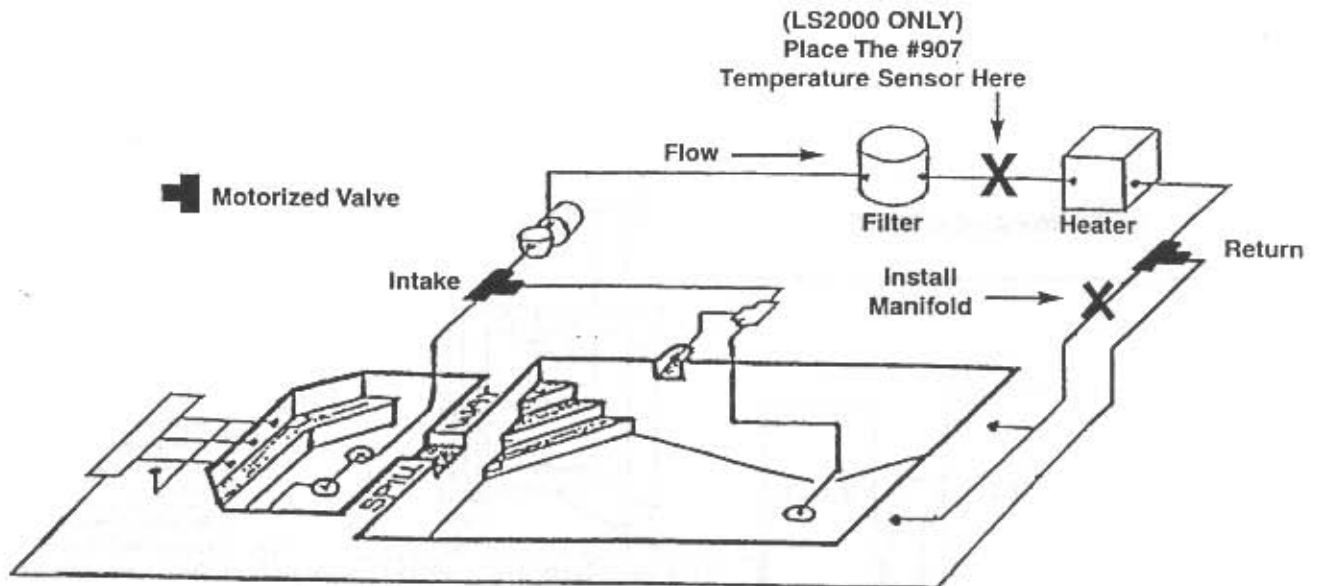
B - See Indicated Below On Diagram
The minimum amount of pvc pipe that must be cut out of the recirculation system plumbing is as follows:
For 2" pipe
the minimum length = 10 3/4"
For 1 1/2" pipe *
the minimum length = 11 3/8"
*NOTE: This measurement may vary depending on the socket depth of the 2" x 1 1/2" reducer bushing being used. The above measurement was taken with a SCH 40 J.B. Plastics standard bushing.
For metric / foreign versions equipped with A/P part # 19059 (68mm) metric adapter, the minimum length = 34.25cm (13 1/2").

Manifold Positioning & Installation

Determine location of command center mounting to make sure the DC cell cord and tri-sensor cord will reach the manifold. Then position manifold in piping as indicated above. See page 10 for pool/spa combination. The cell MUST remain easily removable for inspection or cleaning. The manifold should be positioned last in line after the filter or heater, and be installed in any position in relation to the proper direction of flow. See figure B below for recommended location for the manifold in conjunction with a solar system. NOTE: The proper location of the manifold should be after the heater on the pool return for a single pump system or also last in line on the pool return for a dual pump system.

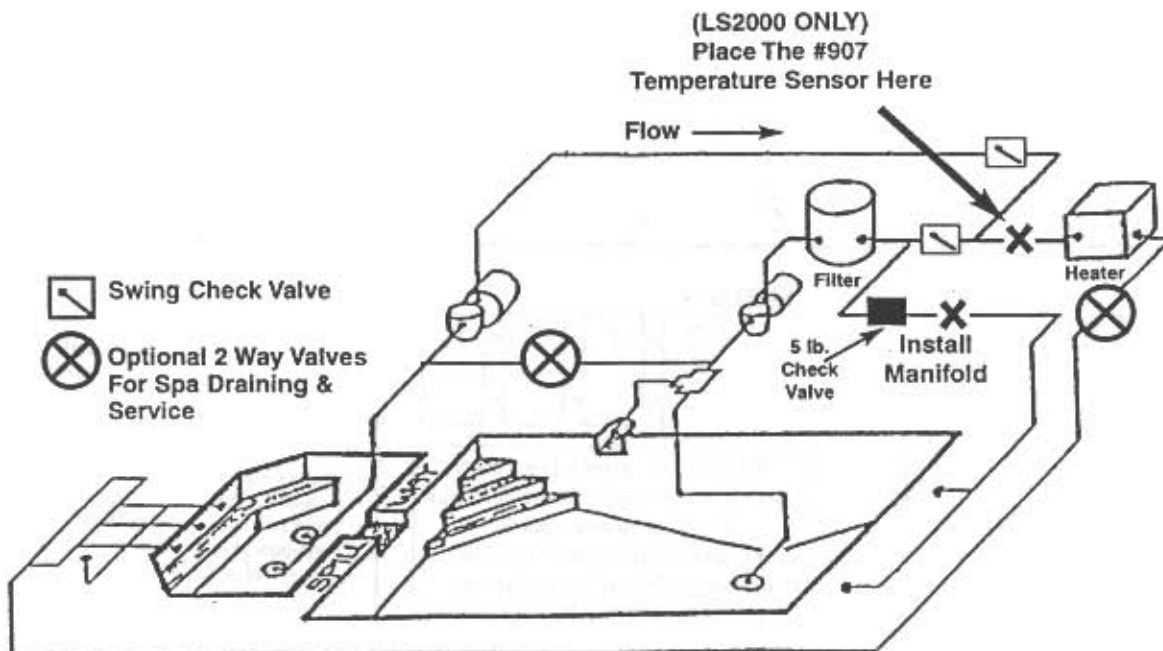
FIGURE B
PARALLEL PLUMBING
SOLAR SYSTEM
MANIFOLD LOCATION





Single Pump Pool / Spa Combination

NOTE: If this scheme is desired and the spa is raised, a Swing Check Valve must be installed after the Return Motorized Valve on the Spa Jet line to ensure spa drain down does not occur.



Dual Pump Pool / Spa Combination

NOTE: If this scheme is desired and the spa is raised, a 5lb. Check Valve must be installed on the Pool Return line before the manifold to ensure adequate spa spillover.



graph below represent the chlorine production capabilities at different GPM / M³/HR flow rates. Just match your GPM / M³/HR rate to the left side and look across graph until your flow rate crosses the production line. Then looking down you will see what PPM of chlorine your cell is capable of producing for the specific flow rate.

**FLOW RATE IN
GPM / M³/HR**

100 / 22.71

90 / 20.439

80 / 18.168

70 / 15.897

60 / 13.626

50 / 11.355

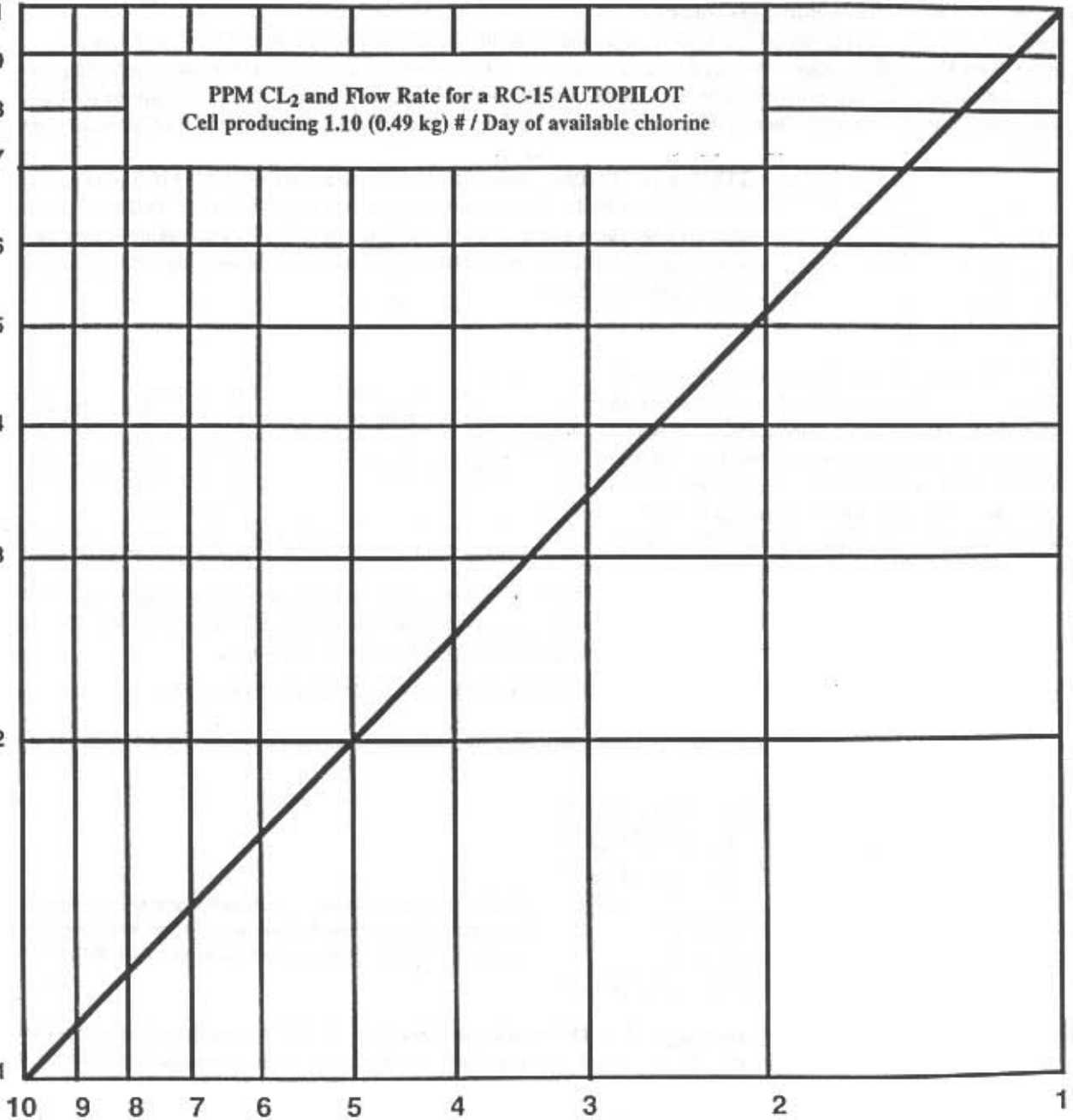
40 / 9.084

30 / 6.813

20 / 4.542

10 / 2.271

PPM CL₂ and Flow Rate for a RC-15 AUTOPILOT
Cell producing 1.10 (0.49 kg) # / Day of available chlorine



PARTS PER MILLION CHLORINE

NOTE: After exiting the manifold at a flow rate of 100 GPM / 22.71 M³/HR the water would have a chlorination level of 1 PPM to be equally distributed thru the pool returns.



High - Low Voltage Wiring

STEP 1 - High Voltage Wiring

All electrical equipment must be located five feet or more from closest pool or spa waterline. Use the grounding terminal provided on the bottom right side of the Command Center for grounding. Bond all equipment, including the Command Center, to earth ground.

NOTE: The right side of the Command Center is for high voltage (120 - 240VAC). The left side is for low voltage wiring. Do not pull high voltage wires through the low voltage compartment.

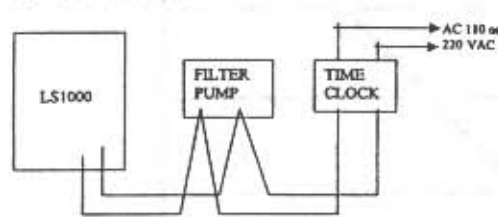
STEP 2 - Command Center Wiring

Open Command Center door and remove the screw from the top of the inside panels, below the fuse. Open the right panel (high voltage side). Remove bottom knockouts as necessary for quantity of equipment. Connect conduit clamps securely in place.

STEP 3 - Connect Conduit from the Sub-Panel

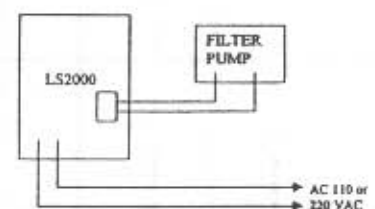
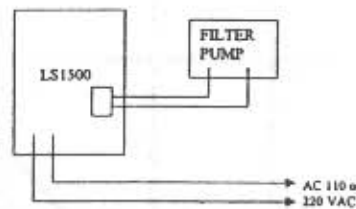
Depending on equipment, you may need to run 3/4" (1.9cm) or larger conduit from the sub-panel to right side of Command Center.

STEP 4 - Wire from the sub-panel - The panel is factory wired for either 110VAC or 220VAC (but not both), depending on model number ordered. Ensure that the AC voltage used matches the Command Center voltage setting. Improper wiring will damage the Command Center, which is not covered under warranty. Connect AC power to the two hookup wires at the bottom right side of the Command Center, labeled 110 VAC or 220 VAC.



STEP 4 a LS1000: Connect the AutoPilot from to the **LOAD SIDE** of the external time clock, Compool/Jandy filter pump relay or on/off switch so that AUTOPILOT operates only when the filter pump operates. For flexibility, ease of wiring and making connections, #14 gauge stranded wire is recommended for interconnection between the external control system and the Command Center.

STEP 4 b LS1500: Connect the main filter pump circuit directly from the sub-panel circuit breaker to the **LINE** terminals of **RELAY 2** on the right side of the Command center. Also *shared* at these terminals are the Command Center hook-up wires. From the **LOAD** terminals of **RELAY 2**, connect the main filter pump hook-up wires to the pump motor. This will allow these models to *always* have AC power and be ready to control the operation of the main filter pump.

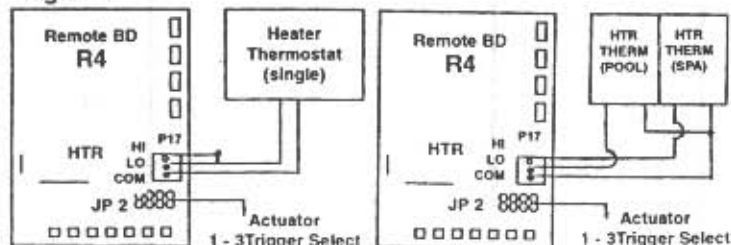


LS2000: Connect the main filter pump circuit directly from the sub-panel circuit breaker to the **LINE** terminals of **RELAY 1** on the right side of the Command Center. Also *shared* at these terminals are the Command Center hook-up wires. From the **LOAD** terminals of **RELAY 1**, connect the main filter pump hook-up wires to the pump motor. This will allow these models to *always* have AC power and be ready to control the operation of the main filter pump.

NOTE: EACH PIECE OF EQUIPMENT MUST BE WIRED TO THE SUB PANEL FROM A SEPARATE BREAKER.

OPTIONAL STEPS

Figure 1



NOTE: Figure 1 allows single thermostat heater to run EITHER pool or spa. However the thermostat must be manually changed when switching to the opposite setting. The ON / OFF switch of heater will deactivate heater if desired.

a) Heater Connections LS2000 Only (See page 16 - 17 for other details) - A dual thermostat pool heater can be controlled to either HIGH or LOW thermostat settings by the AUTOPILOT. On the Remote Board is a 3-pin black connector marked (P17) HTR which connects to a Single-Pole-Double-Throw (SPDT) relay on the remote board. The COM connection is the relay common. When the filter pump is running (TIME CLOCK 1 has tripped) COM signal is connected to LO and completes the thermostat circuit, enabling heat. When the filter pump is not running (TIME CLOCK 1 is off) the COM signal is not connected to either LO or HI, opening the thermostat and disabling the heater. Just below the 3-pin HTR connection is jumper bank labeled JP2 ACT 1-3 TRIGGER SELECT. To connect the COM signal to the HI signal, place the jumper across either RLY 1 (relay 1) RLY 2 (relay 2) RLY 3 (relay 3) or RLY 4 (relay 4). When that relay 1, 2, 3, or 4 energizes, the COM signal will connect to the HI signal ONLY while TIME CLOCK 1 is tripped. **NOTE: The actuator's are also controlled by JP2.**

b) LS1500 Command Center - THE LS1500 has a timer and relay that controls the filter pump. Connect the filter pump to relay #2. **NOTE: The filter pump voltage must be the same as the LS1500 voltage.**

Section 3 a



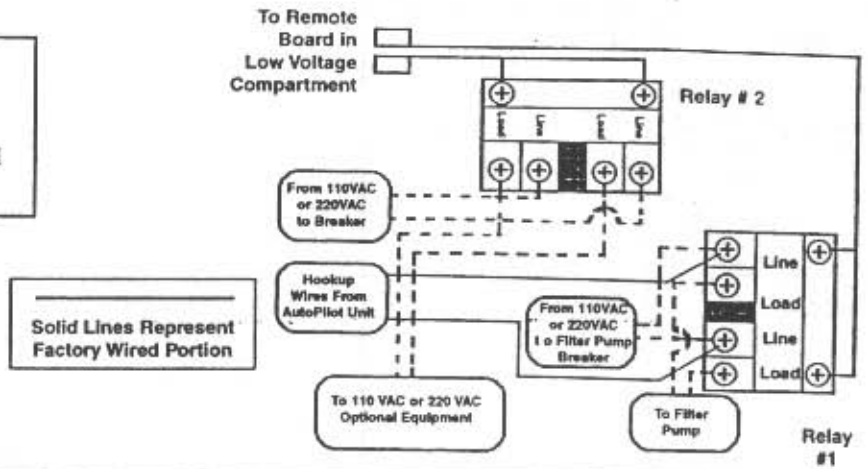
Relay Wiring Diagram

OPTIONAL STEPS CONTINUED

RELAYS LS2000 Only - Relay 1 is pre-installed from the factory and controls the filter pump. You may add additional relays as required, up to 4 total, to operate equipment such as waterfalls, fountains, lights, etc. To connect route the low-voltage wire harness from the relay coil, through the center dividing plate into the correct relay connection, either RLY 1, RLY 2, RLY 3, or RLY 4 on the Remote Board.

NOTE: Models that come with all four relays are pre-wired and marked from the factory. All motors wired via high voltage relay must be protected with individual circuit breakers and properly sized wire gauges.

Figure C
LS2000 High Voltage
Relay Connection



Section 3 b



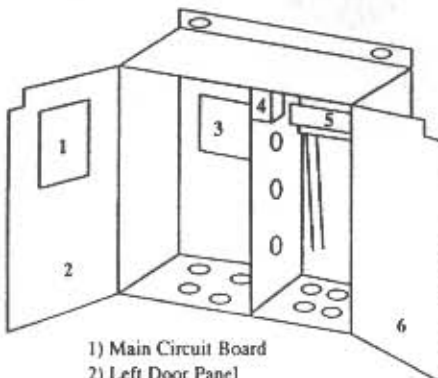
Electronic Component Location: LS1000, LS1500 & LS2000

d) Chlorine/Bromine Controller Interface - The main circuit board has two male terminals marked P4 & P5 ORP that can be used to interface with a chlorine/bromine controller. This is a dry-contact input. If an ORP controller is used, its output voltage (normally 115V AC) should be wired to the coil contacts of a normally-closed relay or contactor. The relay contacts are then used only to break the connection between two ORP terminals on the main board. Page 17 diagram shows exact location.

E: When an ORP controller is interfaced with the command center your output dial should be set on maximum.

e) 24 VAC Valve Actuator's LS2000 Only - These actuator's will follow any one of relays 1 through 4 by setting JP2 jumper, located on bottom right of Remote Board. For example, if JP2 is set to RLY 4, whenever button RLY 4 is pressed, RELAY 4 will energize (if installed) and the clear relay on the Remote Board will "click", turning the actuators. Pressing RLY 4 again will de-energize RELAY 4 (if installed) and turn the actuator's the opposite way. Relays 2, 3 or 4 do not have to be installed to operate the actuators. Page 18 diagram shows exact location.

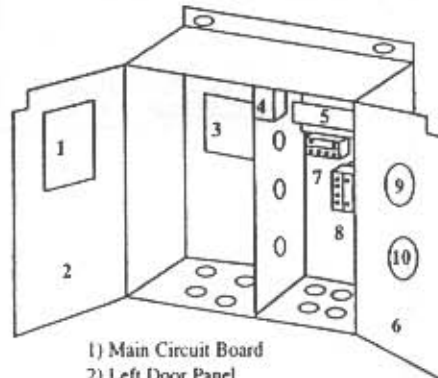
LS1000 MODEL Electric Component Location



- 1) Main Circuit Board
- 2) Left Door Panel
- 3) Power Supply Board
- 4) Slo-Blo Power Fuse (3 amp)
- 5) Transformer
- 6) Right Door Panel

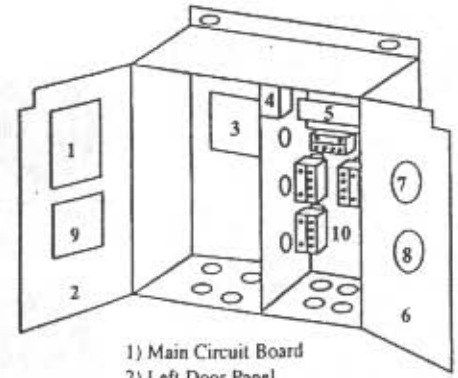
NOTE: Additional fuses (2 amp & 10 amp) located on the power supply board. See page 17 for location.

LS1500 MODEL Electric Component Location



- 1) Main Circuit Board
- 2) Left Door Panel
- 3) Power Supply Board
- 4) Slo-Blo Power Fuse (3 amp)
- 5) Transformer
- 6) Right Door Panel
- 7) Relay #1 (Boost Cycle T/C Extender Only)
- 8) Relay #2 (Filter Pump Hookup)
- 9) Time Clock # 1
- 10) Optional Time Clock #2

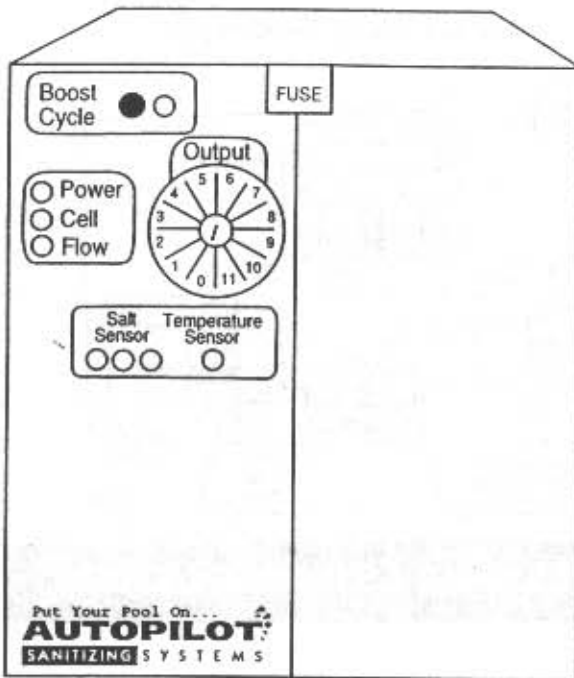
LS2000 MODEL Electric Component Location



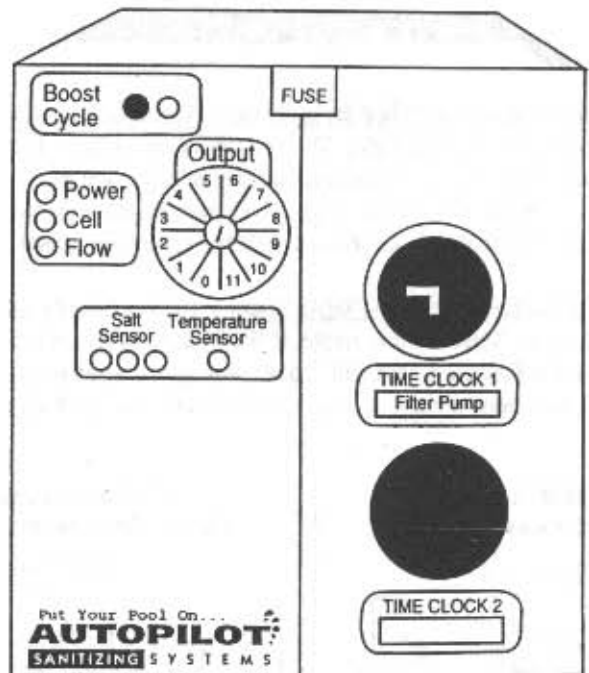
- 1) Main Circuit Board
- 2) Left Door Panel
- 3) Power Supply Board
- 4) Slo-Blo Power Fuse (3 amp)
- 5) Transformer
- 6) Right Door Panel
- 7) Time Clock #1
- 8) Time Clock #2
- 9) Remote Board
- 10) 1 to 4 High Voltage Relays



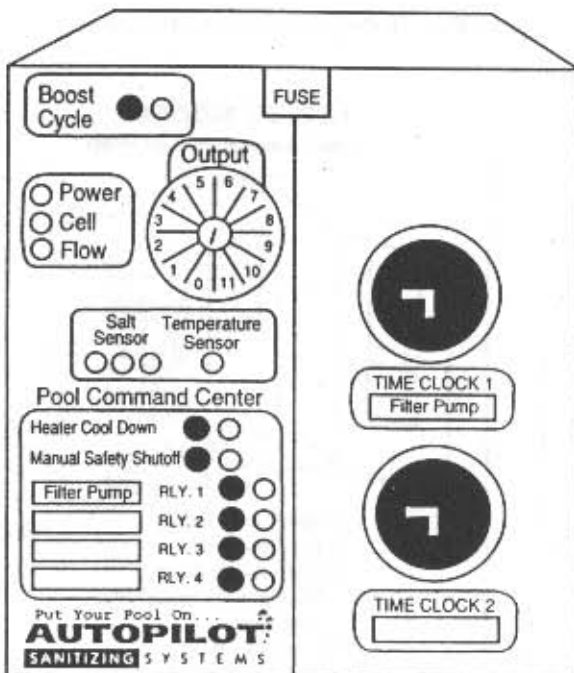
LS1000 Model



LS1500 Model

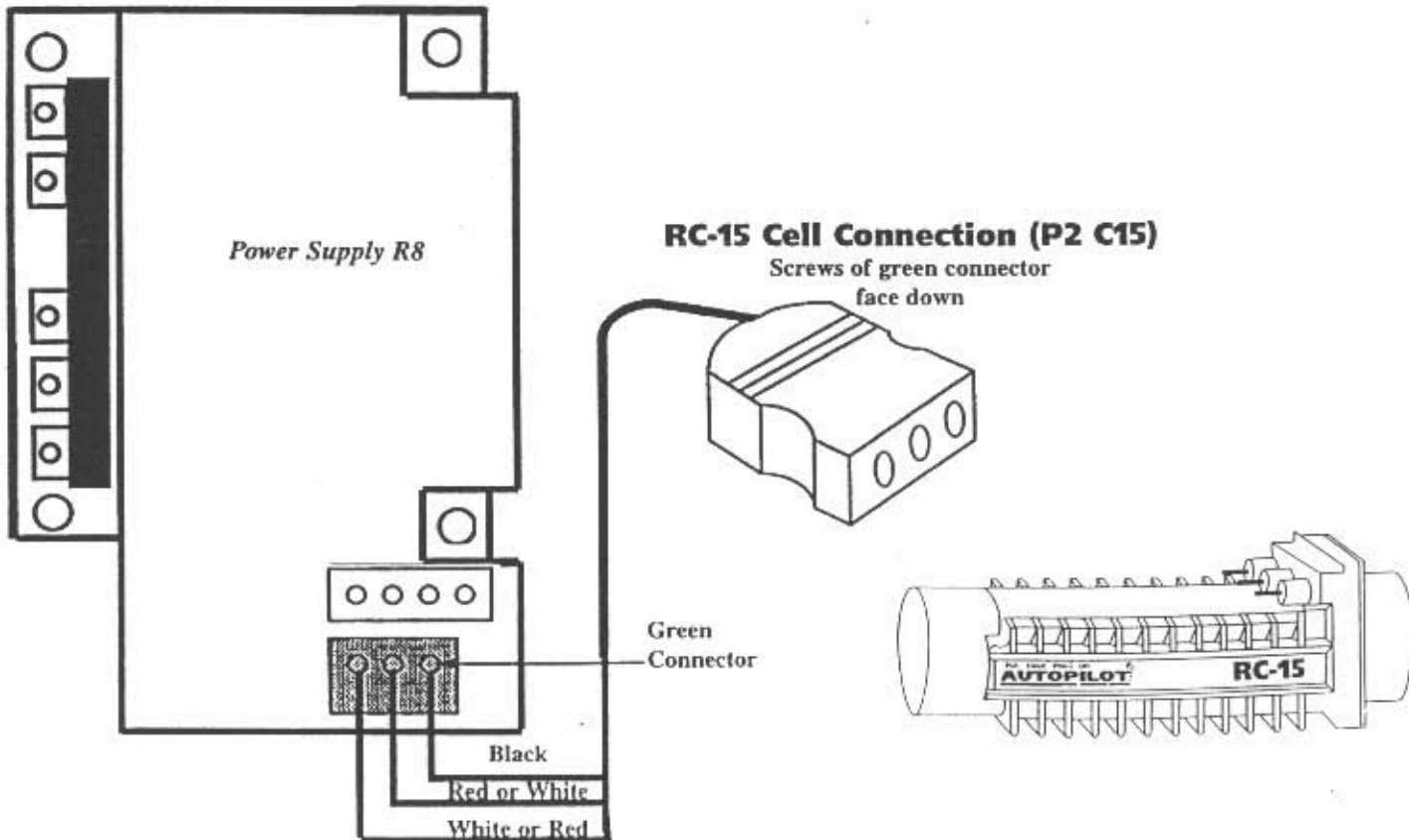
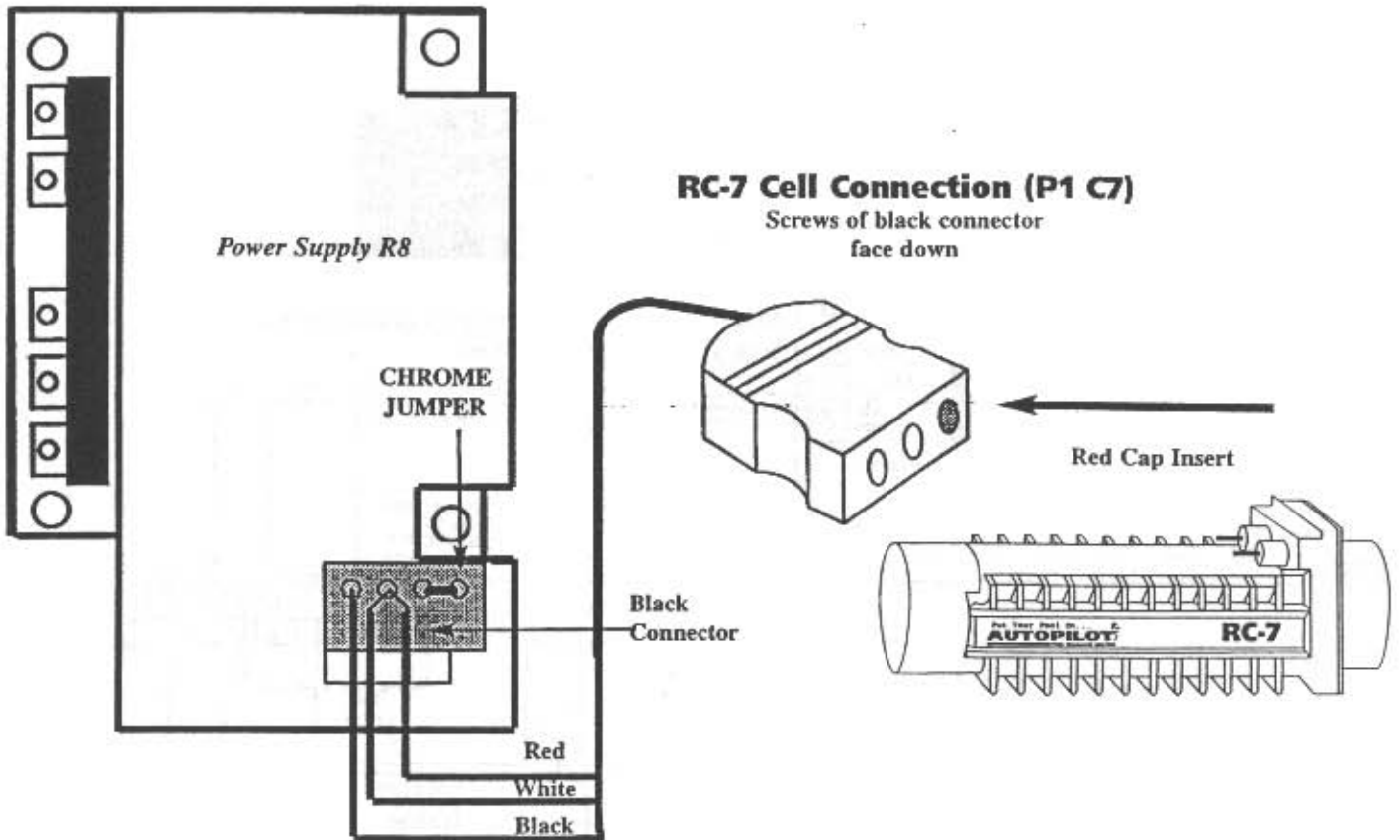


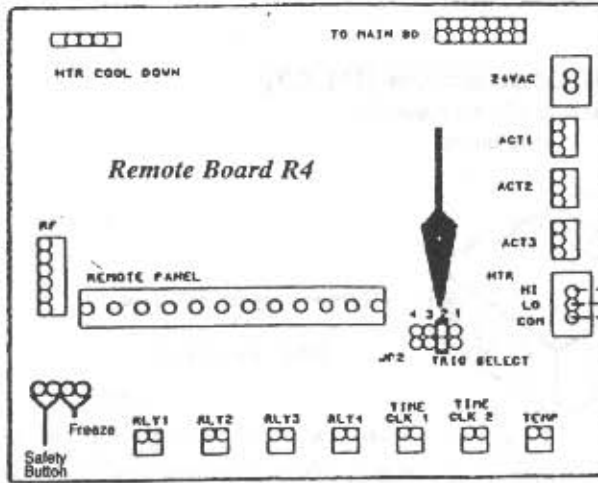
LS2000 Model





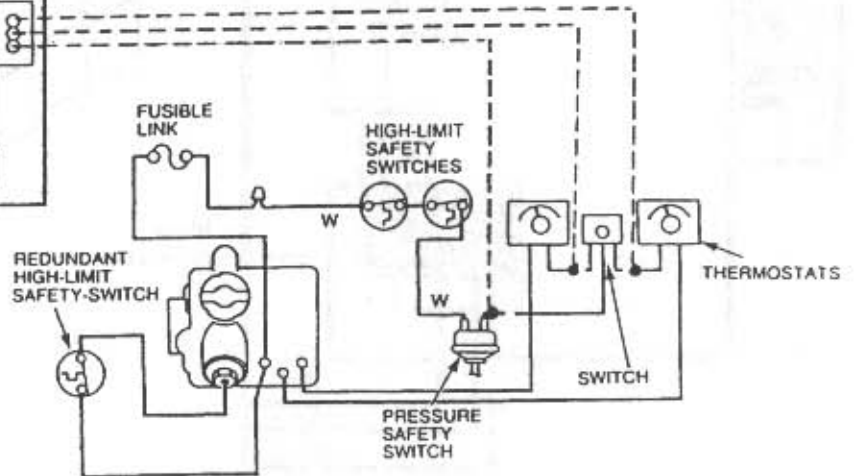
Cell Cord Wiring Diagram





**Dual Thermostat
Fossil Fuel Heaters or
heat Pumps**

NOTE: Arrow points to jumper which selects the button to prompt spa isolation.

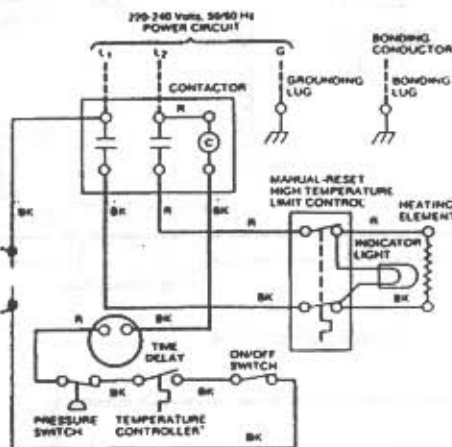
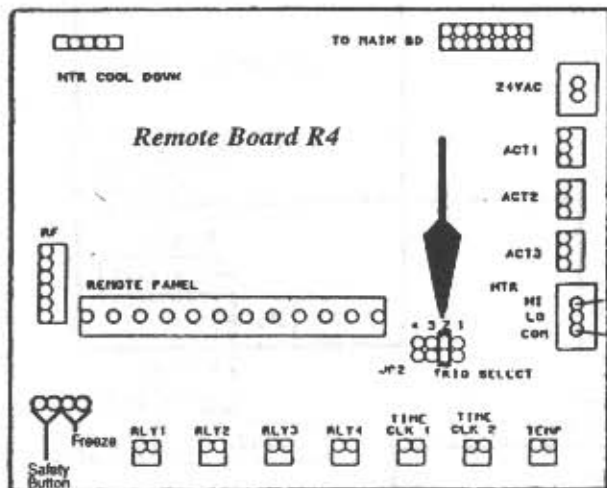


**Some Heaters Require Special
Wire Harness
(To interface with existing circuitry)**

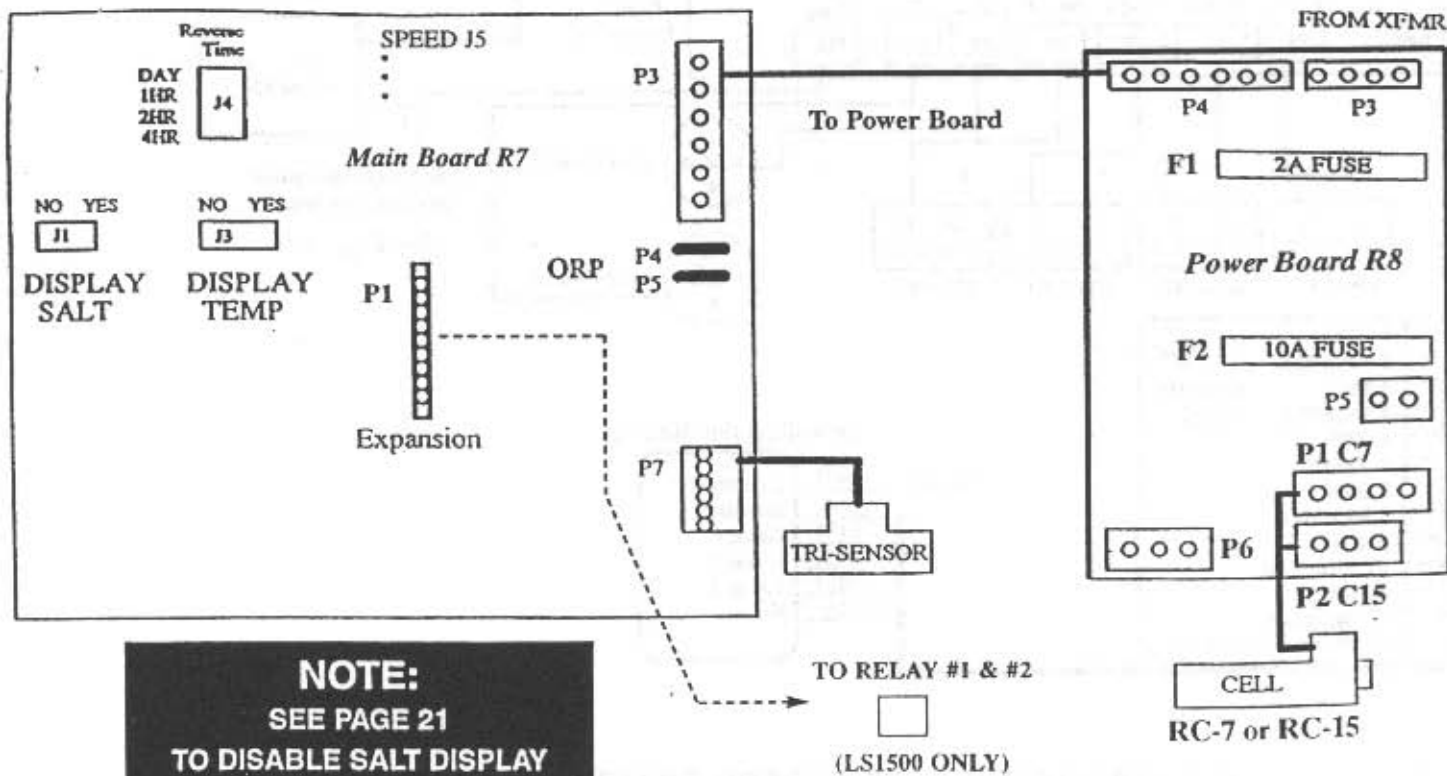


Pool Heater Wiring Diagram (LS2000 Only)

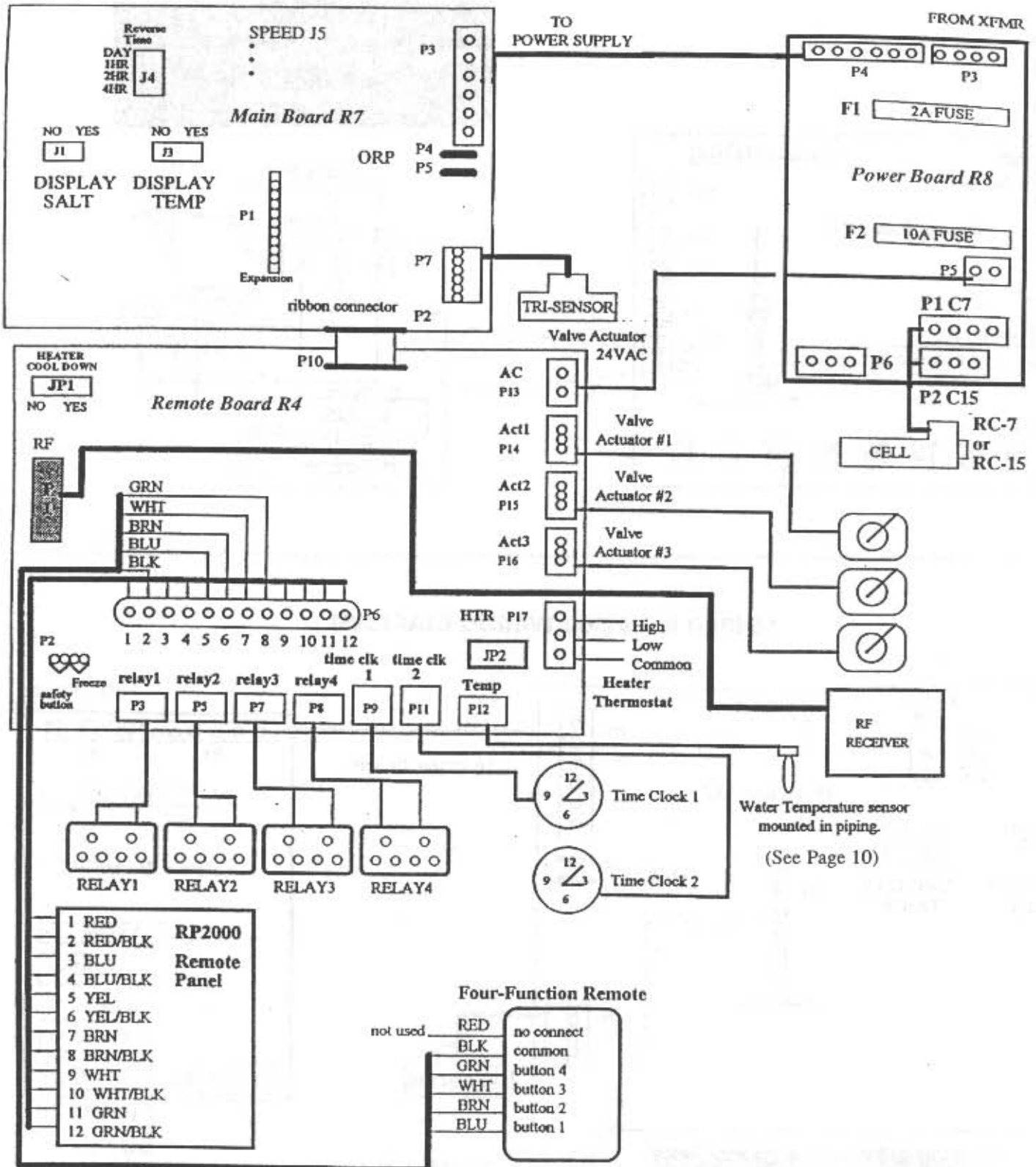
Single Thermostat
 Electric Resistance Fossil or Heat Pump
 (Wired for heating)



LS1000 & LS1500 WIRING DIAGRAM



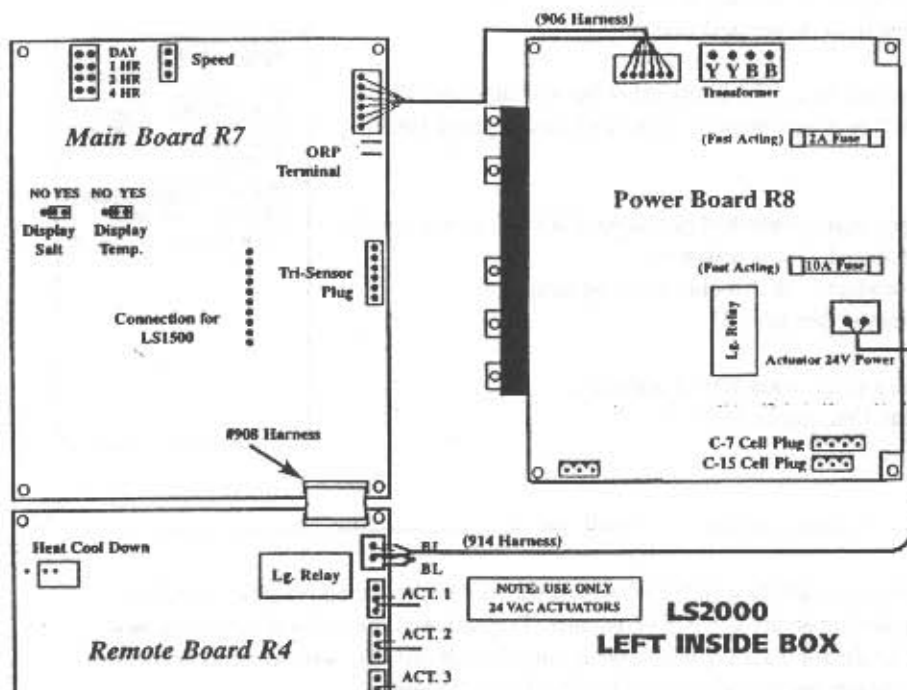
NOTE:
 SEE PAGE 21
 TO DISABLE SALT DISPLAY



SEE FOLLOWING PAGE (19) FOR PANEL LOCATIONS

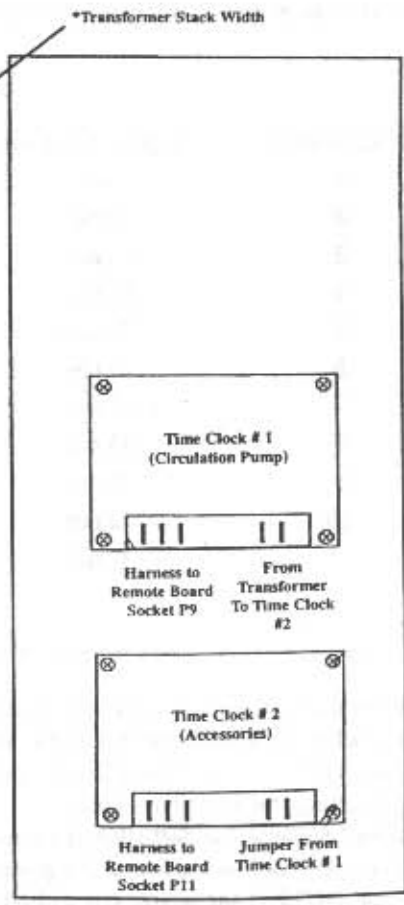
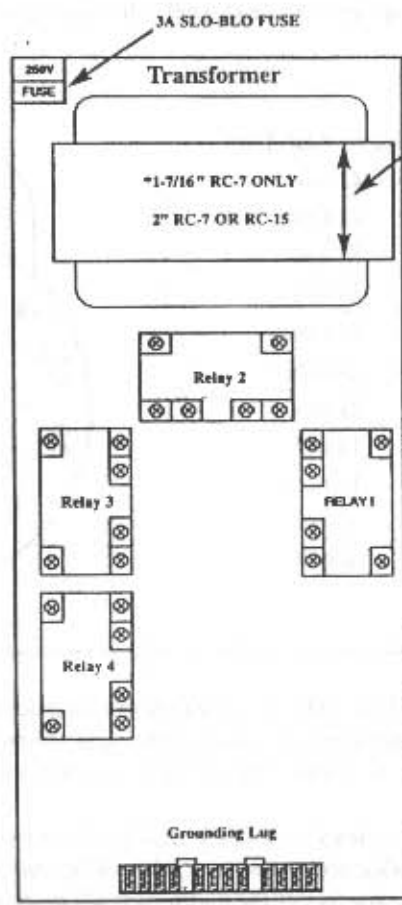
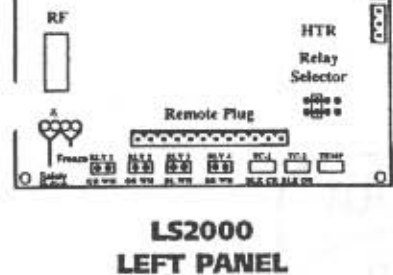


LS2000 Inside Panel Diagrams



RELAY COLOR CODE

- Relay 1 Green / White
- Relay 2 Orange / White
- Relay 3 Blue / White
- Relay 4 Brown / White





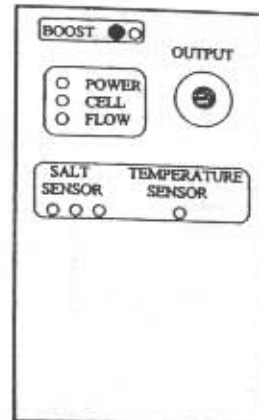
Indicator Lights

- A. Power**
On (Green Light) Indicates that the Command Center is receiving AC power.
Off (No Light) Indicates there is no power going to the Command Center.

NOTE: When energized the LS1500 will not display a green power light. This is normal. When the slide switch or tripper on the filter pump timer is set to the "ON" position, the power light will display green, the filter pump will start and the unit will be enabled.

- B. Cell**
Off (No Light) No chlorine/bromine is being produced (controlled by Output dial / Cell in rest mode).
On (Green Light) chlorine/bromine is being produced. Cell is activated.
On (Red Light) No chlorine/bromine is being produced. See Trouble Shooting section.
On (Cycling Green, Red, Green, Red) CVC enabled. See page 23..

- C. Flow**
On (Green Light) System is ready for operation and the water flow is adequate.
On (Red Light) Inadequate flow through system. Cell deactivated.
Off (No Light) System is deactivated.

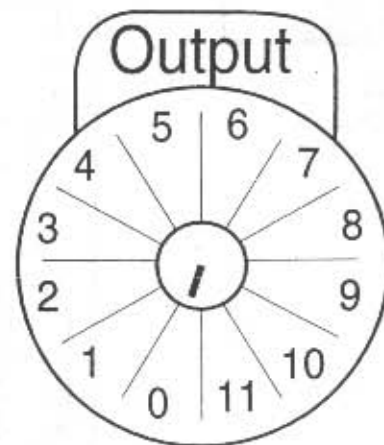


Output Dial

This is a percentage timer that regulates the amount of time the system is to produce chlorine/bromine during the filter pump running cycle. The output is regulated according to the setting of this dial. Each setting has a memory cycle of 48 minutes. The setting of the dial will determine how long the cell will produce chlorine/bromine and how long it will be in the rest mode. While in the rest mode your cell light will be off to indicate that no chlorine/bromine is being produced. Below is a chart that indicates the on and off periods of each output setting.

NOTE: Any interruption of power, will cause the current memory cycle to reset itself, when power is restored.

Dial Setting	Approx. On-Time	Approx. Rest-Time
1	3 min.	45 min.
2	6 min.	42 min.
3	12 min.	36 min.
4	18 min.	30 min.
5	21 min.	27 min.
6	24 min.	24 min.
7	27 min.	21 min.
8	33 min.	15 min.
9	36 min.	12 min.
10	42 min.	6 min.
11	42 min.	6 min.



Boost Cycle

The Boost Cycle when activated is indicated by a green light, which overrides the preset chlorine/bromine output setting, and the Command Centers #1 Time Clock in models LS1500 & LS2000. It operates the system on a maximum output setting for 17 hours, or until the power is turned off, which ever comes first. When the Boost Cycle is completed or the system is turned back on, it will automatically reset itself back to the original dial and time clock settings for normal operation.

NOTE: The models LS1500 & LS2000 allow the Boost Cycle to extend itself to a complete 17 hour running cycle, without possible interruption due to external time clock settings. If a power interruption occurs, Boost Cycle will be canceled and the unit will reset itself to the original dial setting. **NOTE:** Your boost cycle will follow the parameters of the dial setting 11, as shown above.



Of Sodium Bromine

SODIUM BROMIDE (OPTIONAL) - 100 PPM

Where Cyanuric acid is not available or where its use is restricted, bromine can be used as an alternative sanitizer to chlorine. The AUTOPILOT will convert sodium bromide to bromine in the same way that it converts sodium chloride to sodium hypochlorite.

NOTE: Bromine pools do not require the addition of Cyanuric acid. Typical chlorine stabilizer provides no U.V. protection for bromine. However cyanuric acid is known to reduce the corrosive effect of oxidizers.

To produce hypobromous acid (bromine sanitizer), we recommend initially adding 6 pounds (2.7Kg) of sodium bromide for every 12,000 gallons (46 cubic meters) of pool water capacity. To maintain the sodium bromide level; add 1 pound (0.45Kg) of sodium bromide for every 50 pounds (22.5 Kg) of sodium chloride added to the pool.

REMEMBER: For the AUTOPILOT System to operate properly, the pool water must contain the recommended level of both salts as previously specified. (When used, sodium bromide is added in addition to the normal amount of sodium chloride required.)

NOTE: Refer to your Taylor Pool & Spa Water Chemistry Testing & Treatment Guide (part # 2004B) from Taylor's Test Kit # K-2005. Use of an OTO test kit to measure residual bromine levels is required.

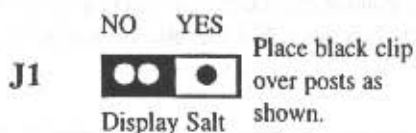
Salt Monitor

The salt monitor (in the Tri-Sensor) measurement occurs about two minutes after the restart of flow detection/start up. **ALWAYS DOUBLE CHECK YOUR SALT LEVEL WITH SALT TEST KIT**, or by going to your Pool Dealer before adding salt. **LIGHT READOUTS INDICATE AS FOLLOWS:**

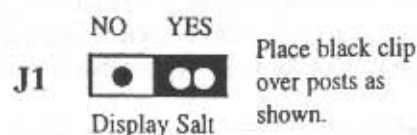
- OFF** The measurement delay has not elapsed, or the J1 "Display Salt" jumper has been set to "No".
ALWAYS DOUBLE CHECK SALT WITH TEST KIT BEFORE ADDING SALT.
- B. GREEN** If lit, indicates salt level GOOD.
- C. YELLOW** If lit, indicates time to CHECK SALT.
- D. RED** If flashing, indicates LOW SALT, and power to production cell off. (No chlorine production), to protect cell.

The AUTOPILOT measures the salt level of the pool water and displays the status with a green, yellow, or flashing red light. The lights are calibrated to read the salt level plus 300 ppm Total Dissolved Solids at water temperatures between 75°F (24°C) and 80°F (27°C). In water temperatures below 70°F (21°C), the measured salt level is displayed lower than it actually is, and a higher level than the actual reading is registered in warmer water temperatures. At 75°F (24°C), water containing 2500 ppm salt will display a green light, but at 65°F (18°C) it will display yellow or possibly red, turning off the chlorine cell.

To Disable Salt Check:



To Display Salt Check:



**NOTE: SEE PAGE 19
FOR LOCATION ON MAIN BOARD**

"Optional" Temperature Sensor (Cold Water Cut Off)

This light will glow green when the temperature of the pool water is adequate for chlorine/bromine production. It will glow red when the water temperature is too cold for efficient chlorine/bromine production, in the low 50's. The temperature light will turn red and the cell light will go dark and automatically stop producing chlorine/bromine to extend the life of the cell.

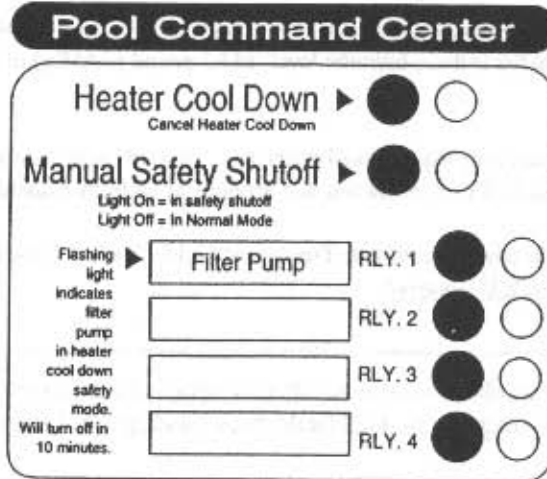
NOTE: During cold water conditions, lower your Output Control Dial to protect the cell from damage.



Heater Cool Down

Heater cool down is a special 10-minute automatic fossil fuel heater protection circuit. When TIME CLOCK # 1 ends its cycle, the heater thermostat is disabled, shutting off the heater (if installed and connected). The filter pump and the sanitizing generator will continue to operate for 10 additional minutes. During this cool-down cycle, the heater cool-down yellow light will be lit and the filter pump (RLY 1) light will be flashing. The cool down protection feature will also be activated when the RLY 1 button is manually or remotely activated. To cancel, press CANCEL HEATER COOL DOWN button. The filter pump will turn off. **CAUTION:** Canceling this delay can cause equipment damage. **NOTE:** Set the jumper labeled JP1, heater cool down to "NO", when utilizing a heat pump.

See page 18



Manual Safety Shut-Off

The MANUAL SAFETY SHUT-OFF button allows you or service personnel to override the remote control panel and time clocks while servicing the pool equipment. Pressing this button will de-activate all high-voltage relays (located on the right side of the Command center) and the equipment connected to them indicated by the red light. Pressing the button again will return the relays to their previous state indicated by no light and operation of enabled equipment. For example, if the filter pump is running, and you need to clean the pump strainer, press the MANUAL SAFETY SHUT-OFF BUTTON. The filter pump (and all other high-voltage equipment) will stop operating. When you're done cleaning the pump strainer, press the MANUAL SAFETY SHUT-OFF button again to restore pump operation. **NOTE: An exterior on/off switch may be installed as an additional safety feature when the Command Center is intended to be locked.** With regards to commercial spa applications, some states mandate an "all off" emergency safety shut off, using a 2 conductor cable and approved switch, this task is easily performed. Call 1.800.922.6246 for further details.

Time Clock One

Time Clock One is a 24-hour time clock, offering 96 - 15 minute timing cycles. Time Clock One controls the sanitizing system and the filter pump. A button labeled RLY 1 is included to manually turn the filter pump and sanitizing system on/off. This time clock can also be used with 2 speed pumps for continuous operation, running on low speed when enabled.

Time Clock Two (Optional)

An optional time clock can be added to the system to control additional equipment. Time clock #2 also allows a 2-speed filter pump to be controlled from low to high speed while time clock #1 controls the On/Off running cycle of the filter pump. Manual control is performed by the RLY 2 button on the left panel. This timer can also be used to operate motorized valve actuators, without the need for a high voltage relay.

Relay 2, 3 & 4 (Optional)

If installed, these three relays can operate additional equipment. Each relay is controlled by its corresponding button on the front panel. Like all auxiliary functions, when the RLY 2, 3, or 4 button is pressed, the adjacent green light illuminates and the relay energizes, activating the connected equipment. When the RLY 2, 3 or 4 button is pressed again, the adjacent light goes dark and the equipment de-activates. These buttons are useful for controlling yard lights, spa controls, waterfalls, etc. **NOTE: Pressing these buttons will turn adjacent light on whether equipment is connected or not.**



Time Clock(s) LS1500 & LS2000 Only - The Time clocks operate equipment at a pre-set time for a desired period. On the model LS1500 Time Clock # 1 operates filter pump (relay # 2) and the chlorination cell. On model LS2000 Time Clock # 1 always operates the filter pump (relay # 1) and chlorinating cell, and can be manually controlled by pressing the RLY 1 FILTER PUMP button. Time Clock # 2 operates relay # 2, which can be other equipment such as low /high-speed pumps, waterfalls, lights, etc. It is manually controlled by pressing the RLY 2 button. The unit is factory shipped with one or two Time Clocks pre-wired, depending on the model number ordered.

NOTE: Each Command Center is factory wired to either 110VAC or 220VAC. (The time clock installed at the factory matches this voltage and will only operate at this voltage. Operating at a voltage different from the factory-set wiring will result in damage to the control panel not covered under warranty.)

CVC Circuit

Your AutoPilot is equipped with an exclusive *back-up* protection feature called CVC, a.k.a. **Cell Voltage Clamp**, this circuit protects the cell from cold water conditions and low residual salt levels. It also has the ability to protect itself when the cell scales and when the cell approaches the end of its lifecycle. The presence of a cycling green, red, green, red cell light indicates that CVC is enabled. When this occurs, regardless of any other SALT SENSOR and TEMPERATURE SENSOR lights being displayed, please check the following items for possible cause; *Cold water, low salt, a scaled cell or a failing or depleted cell*. Your AutoPilot can also operate within a salt range from 2000 ppm up to 35000 ppm. We strongly recommend that you maintain your residual salt level between 2500 and 3000 ppm. Maintaining this range will protect any metal pool equipment from corrosion which could occur if the residual salt level is greater than 6000 ppm.

NOTE: If your Command Center serial number is greater than 711000, it is equipped with this feature.



LS1000 & LS1500 Models Only

Before operating the AUTOPILOT System, perform the following steps to ensure proper installation and operation:

- A. Turn ON all circuit breakers to the pool equipment.
- B. Set the chlorine output dial at position five.
- C. Turn the pump on by switching the time clock or pump switch to the on position.
The POWER, CELL, FLOW, and TEMPERATURE SENSOR indicators should light green.

NOTE: Follow instructions on Time Clock face plate to set the ON and OFF times for filter pump on the LS1500.

Approximately two minutes after the FLOW light turns green the salt level will be tested and the SALT MONITOR will light either GREEN, AMBER or FLASHING RED, showing the salt condition of the pool. IF A GREEN or AMBER salt light is displayed than the cell is re-powered. If the FLASHING RED salt light is displayed, please refer to the trouble shooting section of this manual.

NOTE: Be sure to monitor the chlorine/bromine level for the next few days and properly adjust the chlorine/bromine output according to AUTOPILOT'S required levels. **DO NOT EXCEED SANITIZER LEVELS REQUIRED!**

LS2000 Model Only

INSTALLATION CHECK

Before operating the AUTOPILOT SYSTEM, perform the following steps to ensure proper installation and operation:

- A. Turn ON all circuit breakers to the pool equipment. Manually operate each piece of equipment.
- B. Turn the pump on by pressing the button labeled FILTER PUMP.
The POWER, CELL, FLOW and TEMPERATURE SENSOR indicators should light.
- C. Press FILTER PUMP button again. The green light next to this button should begin to flash, indicating it is in HEATER COOL-DOWN MODE. The CANCEL COOL-DOWN yellow light should also be on. Press CANCEL COOL-DOWN button. The filter pump should turn off, and the CELL, FLOW, TEMPERATURE SENSOR lights should also turn off. If no heater is installed on the system, the COOL-DOWN mode can be disabled by moving the COOL DISABLE, JP1 jumper to the left, labeled NO. JP1 is located on the top left side of the Remote Board. See diagram on page 18.
- D. If additional high-voltage relays are installed, check their operation by pressing each of RLY 2, 3 and 4 buttons on/off. The associated equipment should operate.
- E. If actuator's valves are installed, set JP2 ACT 1-3 TRIGGER SELECT on the Remote Board to correctly follow the desired button (RLY 1, 2, 3 or 4) and operate the valves.

NOTE: Follow instructions on Time Clock face plate to set the ON and OFF times for filter pump and relay # 2 operation. Set the output dial at position five. Turn on the pump by pressing FILTER PUMP button. The POWER, CELL, FLOW and TEMPERATURE SENSOR indicators should light GREEN. Approximately two minutes after the FLOW light turns green the salt level will be tested and the SALT MONITOR will light either GREEN, AMBER or FLASHING RED, showing the salt condition of the pool.

NOTE: Be sure to monitor the chlorine/bromine level for the next few days and properly adjust the chlorine/bromine output according to AUTOPILOT'S required levels. If a GREEN or AMBER salt light is displayed, then the cell is re-powered. If the FLASHING RED light is displayed, please refer to the trouble shooting section in this manual.


PROBLEM
CAUSE
SOLUTION

Efficient sanitizer production.

- | | |
|---|---|
| <ul style="list-style-type: none"> A. The test kit reagents or test strips are old or expired. B. The unit is set too low in relation to an increased sanitizer demand C. The bather load has increased. D. Sanitizer loss due to intense sunlight exposure. E. The body of water being sanitized leaks. F. The blue wire on the 906 harness between the 803 power board and the 800 main board is broken or not connected. | <ul style="list-style-type: none"> A. Retest with new reagents or test strips. B. Turn up the output dial and/or increase the filter pump run time. C. Press the BOOST CYCLE button on the Command Center and allow the filter pump to operate 24 hours (where applicable remove the "OFF" tripper from the external time clock) to super-chlorinate / brominate the water. D. Check the stabilizer level and add cyanuric acid if needed. (Refer to the Cyanuric Acid Needed for 75 PPM section, page 7.) If on bromine, replenish bromine residual. E. Repair the leak and rebalance the water being sanitized. (Refer to the Pool Water Preparation section, page 5.) F. Replace or reconnect this wire. |
|---|---|

2. Scale build-up within the cell.

- | | |
|--|--|
| <ul style="list-style-type: none"> A. The water being sanitized contains high pH, alkalinity and calcium hardness. B. The unit is not reversing polarity. C. The reversal relay on the 803 power board has failed. D. The white wire on the 906 harness between the 803 power board and the 800 main board is broken or not connected. | <ul style="list-style-type: none"> A. Calculate Langelier's index to assure balanced water. (See page 5) Adjust the water chemistry and mix 1 part muriatic acid to 4 parts water. Pour this solution into the cell and allow it to clean the cell for no longer than 15 minutes. Repeat if necessary. Drain and rinse with fresh water and re-install. Reset REVERSE TIME to 2 hr. (or 1 hr) in high hardness water areas only if manual cell cleaning has been necessary. Dilute pool water with fresh water if necessary. B. The J4 jumper on the 800 main board is set to the "DAY" setting. Set the jumper to "4HR". C. Replace the 803 power board. D. Replace or reconnect this wire. |
|--|--|

3. DC plug and cell terminals burned.

- | | |
|--|--|
| <ul style="list-style-type: none"> A. The cell cord plug is not securely pushed onto the cell terminals allowing moisture to seep into the plug. B. The cell terminals leak. | <ul style="list-style-type: none"> A. Ensure that the cell cord plug is pressed completely onto the cell terminals. Check the cell terminals and clean with a dry cloth to remove all dirt and corrosion. B. Shut off the main filter pump and patch the cell terminal(s) with epoxy putty and leave the filter pump off for 24 hours. |
|--|--|

4. Premature cell failure. (Requires replacement cell. Normal cell life, if sized and operated correctly, is 5 -7 years.)

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| <ul style="list-style-type: none"> A. The J1 jumper on the 800 main board is set to "NO" disabling the salt sensor and allowing the unit to operate (unprotected) at low salt levels. B. Abnormally high cell usage due to an insufficient cyanuric acid level. | <ul style="list-style-type: none"> A. Move the J1 jumper to "YES". Check and add salt if needed. (Refer to the Salt Requirements Needed For 3000 PPM section, page 6.) B. Check the stabilizer level and add cyanuric acid if needed. (Refer to the Cyanuric Acid Needed for 75 PPM section, page 7.) |
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5. White flakes in the water.

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| <p>This occurs when excessive calcium hardness is present in the water being sanitized. This should cease after a few days.</p> | <p>Monitor the pH and adjust if necessary. (Refer to the Pool Water Preparation section, page 5.)</p> |
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6. No POWER light.

- | | |
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| <ul style="list-style-type: none"> A. Incoming AC power for the main filter pump is not present. B. Blown fuses. C. The unit is not wired properly. | <ul style="list-style-type: none"> A. Ensure that the main filter pump circuit breaker is set to "ON". B. Check the 3A slo-blo power fuse and the 2A fast acting control fuse labeled F1 on the 803 power board and replace if necessary. C. Rewire the unit. (Refer to the Wire from the sub-panel section, page 12.) |
|--|---|



PROBLEM	CAUSE	SOLUTION
7. No CELL light.	<p>A. The unit is in rest mode.</p> <p>B. The unit was powered up with the output dial set to "OFF".</p> <p>C. Red FLOW light</p> <p>D. Flashing red SALT SENSOR light.</p> <p>E. Red TEMPERATURE SENSOR light.</p> <p>F. The 800 main board has failed.</p>	<p>A. This is normal. (Refer to the Output Dial section, page 20.)</p> <p>B. Shut the system off, wait at least 15 seconds and re-power with the output dial set between 1 and 11.</p> <p>C. See section 9.</p> <p>D. See section 10.</p> <p>E. See section 11.</p> <p>F. Replace the 800 main board.</p>
8. Red CELL light.	<p>A. The cell is scaled.</p> <p>B. The cell cord is disconnected from the cell or wired improperly.</p> <p>C. The cell fuse may be blown. NOTE: If an LS2000 Command Center is being used with valve actuators, the valve actuators will not rotate if this fuse is blown.</p> <p>D. The unit is not receiving the proper incoming AC voltage. Typically, a factory wired 220VAC unit is only receiving 110VAC.</p> <p>E. The 803 power board has failed.</p>	<p>A. See section 2.</p> <p>B. Ensure that the cell cord is firmly pressed onto the cell and wired properly. (Refer to the Cell Cord Wiring Diagram section, page 15.)</p> <p>C. Check the 10A ceramic slo-blo cell fuse labeled F2 on the 803 power board and replace if necessary.</p> <p>D. Using a voltmeter measure the secondary AC voltage from the transformer. Unplug the black 4 position connector which holds the transformer secondary wires and plugs into the 803 power board socket labeled P3. If the unit is wired properly, the voltage measurement across the yellow wires, with the unit switched on, should be 30-35VAC. Further, the voltage measurement across the blue wires, with the unit switched on, should be 10-15VAC. Any other values would indicate that the unit is not receiving the proper voltage at this point.</p> <p>E. Replace the 803 power board.</p>
9. Red FLOW light.	<p>A. Water exiting the filter is being diverted away from the inlet of the manifold.</p> <p>B. The Cell is scaled.</p> <p>C. Check the condition of the filter.</p> <p>D. Check the condition of the strainer union at the inlet side of the manifold.</p> <p>E. Ensure that the tri-sensor is not installed opposite in relation to the actual water flow.</p> <p>F. The 956 tri-sensor cable may have failed.</p> <p>G. The 800 main board may have failed.</p> <p>H. The tri-sensor may have failed.</p>	<p>A. Increase the flow rate above 15 gallons per minute to activate the flow switch in the tri-sensor.</p> <p>B. See section 2.</p> <p>C. If the filter is dirty, clean the filter to increase the overall flow rate.</p> <p>D. If it is clogged; remove, clean and reinstall.</p> <p>E. Extract the tri-sensor and re-install if necessary.</p> <p>F. Replace the 956 tri-sensor cable.</p> <p>G. Replace the 800 main board.</p> <p>H. Replace the tri-sensor. NOTE: If the tri-sensor is installed in a factory single cell manifold, order a 909GO-1.5; If the tri-sensor is installed in a 2"x2"x2" PVC tee, order a 909GO-2.0.</p>
10. Amber and flashing red SALT SENSOR lights.	<p>A. The residual salt level is below the 2500 ppm minimum.</p> <p>B. Cold water is causing the unit to display inaccurate salt lights.</p> <p>C. Scale formations are present on at least one salt blade at the tri-sensor.</p> <p>D. The 956 tri-sensor cable may have failed.</p> <p>E. The 800 main board may have failed.</p> <p>F. The tri-sensor may have failed.</p>	<p>A. Check the residual salt level and add if necessary. (Refer to the Salt Requirements Needed For 3000 PPM section, page 6.)</p> <p>B. Check the temperature of the water and measure the residual salt level.</p> <p>C. Extract the tri-sensor; inspect, clean and re-install.</p> <p>D. Replace the 956 tri-sensor cable.</p> <p>E. Replace the 800 main board.</p> <p>F. Replace the tri-sensor. NOTE: If the tri-sensor is installed in a factory single cell manifold, order a 909GO-1.5; If the tri-sensor is installed in a 2"x2"x2" PVC tee, order a 909GO-2.0.</p>



PROBLEM	CAUSE	SOLUTION
Red TEMPERATURE SENSOR light. (Optional Hookup)	<p>A. The water being sanitized is below 60° F.</p> <p>B. The 956 tri-sensor cable may have failed.</p> <p>C. The 800 main board may have failed.</p> <p>D. The tri-sensor may have failed.</p>	<p>A. This is normal and protects the cell from extreme cold water exposure, which could shorten cell lifecycle. Further, when the temperature of the water increases, the red light will automatically display green.</p> <p>B. Replace the 956 tri-sensor cable.</p> <p>C. Replace the 800 main board.</p> <p>D. Replace the tri-sensor. NOTE: If the tri-sensor is installed in a factory single cell manifold, order a 909GO-1.5; if the tri-sensor is installed in a 2"x2"x2" PVC tee, order a 909GO-2.0.</p>

MODEL LS2000 ONLY

12. Equipment not operating.	<p>A. The incoming AC power for the main filter pump is not present.</p> <p>B. Blown fuses.</p> <p>C. The unit is not wired properly.</p> <p>D. The MANUAL SAFETY SHUTOFF is enabled.</p> <p>E. The incoming AC power for the auxiliary equipment is not present.</p>	<p>A. Ensure that the main filter pump circuit breaker is set to "ON".</p> <p>B. Check the 3A slo-blo power fuse and the 2A fast acting control fuse labeled F1 on the 803 power board and replace if necessary.</p> <p>C. Rewire the unit. (Refer to the Wire from the sub-panel section, page 12.)</p> <p>D. Disable the MANUAL SAFETY SHUTOFF.</p> <p>E. Ensure that the auxiliary equipment circuit breaker(s) is set to "On"</p>
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Notes



We recommend that only a factory-authorized dealer or qualified electrician perform parts replacement in the field, or return unit to factory for service.

Replacing a Transformer

1. Turn off incoming AC power at breaker.
2. Disconnect incoming wiring from wire nuts and fuse.
3. Disconnect blue and yellow wires to black connector using small screwdriver.
4. Remove the transformer screws using either a screwdriver or a socket or a nut driver.
The transformer heat sink will come out with the transformer. Make sure to re-install this heat sink with new thin transformers only.
5. Replace transformer.
6. Re-connect 4-prong connector to blue and yellow wires. (See page 15 for color coding)
7. Re-connect incoming power.

Replacing Power Supply Board

1. Turn off incoming AC power at breaker.
2. Unplug 4-prong connector coming from transformer. (Upper center of board)
3. Unplug 6-wire harness going to main board. Unplug 2 wire harness to remote board (LS2000 ONLY).
4. Unplug DC Cell Cord. (Bottom left corner of power board)
5. Remove 4 screws holding metal plate/circuit board to back of box.
6. Replace new power supply.
7. Plug in DC Cell Cord, 6-wire harness to main board and 2-wire remote harness (LS2000 ONLY), and transformer power connector.

Replacing Main Circuit Board

1. Turn off incoming AC power at breaker.
2. Unplug tri-sensor connector from center right side of board.
3. Unplug 6-wire harness coming from power supply board.
4. For LS2000 systems, remove the ribbon connector on bottom right of the board going to remote board. On model LS1500 remove the connector at the center of the main board (P1)
5. Using needle nose pliers or a small screwdriver 1/8" (3mm), squeeze small plastic standoff connector's on all four corners of the board while pulling board away from panel.
NOTE: This process may be easier by removing hinged door and holding in opposite hand, but be careful not to loosen wires or connectors.
6. Replace board by placing over plastic standoffs and snapping into place.
7. Plug in 6-wire harness and tri-sensor cord.
8. For LS2000 systems, plug in the ribbon connector from the main board to the remote board. Ensure the plug is on all the pins of both sides of the connector. For LS1500 systems replace the connector to P1 in the center of the main board.

Replacing Remote Circuit Board (LS2000 ONLY)

1. Turn off incoming AC power at breaker.
2. Unplug ribbon connector from the bottom right of main board to the top right of the remote board.
3. Unplug all wiring harnesses from the bottom and right side of the remote board.
NOTE: colors and locations of plugs for re-connections later.
4. Using needle nose pliers or a small screwdrivers, squeeze the small plastic standoff connector's on all four corners of the board while pulling board away from the panel.
5. Place new Remote board over plastic standoffs and snap into place. Be careful of the buttons and lights. Ensure buttons still travel freely once installed and do not bend over.
6. Plug in ribbon connector from the main board to the remote board. Make sure they are squarely connected and tight.
7. Reconnect all harnesses to the remote board. All plugs go in only one way.



Record The Following Information

Installer _____

Date Installed _____ Model Number _____

Command Center Serial Number _____

Cell Serial Number _____ Pool Gallons _____

Factory Direct Customer Assistance...

HOTLINE: 1.800.922.6246 or 1.954.772.2255

FAX: 1.954.772.4070

E-MAIL: autopilot@swimstuff.com

Visit Us On The Internet @

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Notes

1. *Tell your friends about the soft, silky water and great convenience of having your pool on **AutoPilot!***
2. *Call **1-800-922-6246** to make sure your factory warranty has been registered, and if you have any questions unresolved by your **Authorized AutoPilot Dealer.***
(Office Hours 9 am - 5 pm Eastern Time)
3. *Give us the names of a fellow pool owner who buys an **AutoPilot** and receive a free gift!*
4. *Relax, Exercise and Have Fun In Your Pool !*

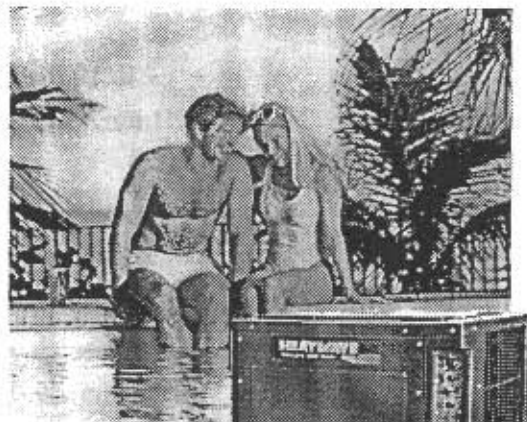
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