Troubleshooting Guide

Symptom	Check These Items
THE LX220 POWER ON LIGHT DOES NOT LIGHT (The SOLAR ON light is not ON when the LX220 is in the "Manual ON" position.)	1. Push RESET button on LX220 Front Panel. 2. Check for tripped breaker at the main power panel. 3. Ensure that timers are turned on. ***4. Check for loose power wire nut inside LX220.*** ***5. Check for 120 vac power inside the LX220 with a voltmeter.*** 
PCS2 FAN DOES NOT TURN ON [Doesn't rotate] (Solar On light is ON. Sensor Service Required lights are OFF.)	1. Thermostat is set too low on the LX220. Turn it to the maximum clockwise position. 2. PCS2 is unplugged at attic outlet or power is missing. 3. Power is incorrectly wired at LX220. 4. LX220 relay is not activating; unplugged; or defective. 5. Internal motor thermal cutoff. Wait 15 minutes for it to cool off & retry. 6. Defective PCS2 power cord or plug. 7. Defective 15µf 370 vac starting capacitor. 8. Defective Motor. 9. Defective Solar controller.  ***10. Check for 120 vac at attic outlet with voltmeter.***
MOTOR HUMS AND DOESN'T ROTATE FAN BLADE	1. Turn power off for 15 minutes and check again in case of thermal overload. If motor is okay, it will restart after it has cooled down. ***2. Disconnect power to check motor starting capacitor: Remove the two brown wires on the starting capacitor, which is located inside the electrical panel. Temporarily connect a new capacitor to the two wires & insulate the terminals with electrical tape. Turn the power on and see if the motor now turns. Result A: Motor turns. This indicates that the starting capacitor is defective. Result B: Motor still hums. This indicates a defective motor. Test assumes that the motor is cool to touch and has not been thermally overloaded. Replace defective capacitor and reassemble.*** 

PCS2 OR FILTER PUMP DOES NOT TURN OFF (Tapping the internal LX220 relay turns the system off.)	1. Relay's wing nut is too tight. Loosen the relay's mounting wing nut so that the wing nut is just holding relay in place. Overtightening of the wing nut can close the gap between the relay's contacts. This can cause the relay to operate and appear like the system is turned on. ***Caution: Dangerous power may be exposed near this relay.*** 
VALVE OPERATOR ROTATES IN THE WRONG DIRECTION ("Solar On" turns water off to PCS2.)	1. Valve was mis-staged as it was assembled. Turn valve operator switch to other "ON" position. I.E. From ON1 to ON2 or vice versa.
VALVE OPERATOR DOES NOT ROTATE TO PROPER STOP POSITION. (Valve stops before it should.)	1. Internal limit switch needs adjusting. 2. Internal cam needs adjusting. 3. Internal mechanical stop needs adjusting. 4. Defective valve operator. Replace.
VALVE OPERATOR ROTATES IN ONE DIRECTION ONLY (Valve rotates to ON position but will not rotate to OFF. POWER ON and SOLAR ON lights are both on. Sensor Service Required lights are both OFF.)	TEST: Reverse the VOR Switch. ON1 to ON2 or vice versa. <u>Result A: Valve still does not rotate.</u> 1. Defective limit switch mechanical stop inside of valve operator. Loose screw on stop, etc. 2. Defective internal limit switch in valve operator. 3. Defective limit switch circuit in valve operator. 4. Defective valve operator. <u>Result B: Valve now rotates in other direction.</u> This indicates that the valve operator is okay. 1. Defective LX220 circuit board or internal wiring. 2. Defective solar controller.
VALVE OPERATOR ROTATES SLOWLY (Valve operator creeps and doesn't reach its end stops.)	1. Transformer plug to LX220 printed circuit board is reversed causing 12 volts at valve operator instead of the required 24 volts. 2. Defective valve operator.

VALVE OPERATOR ROTATES ONLY WHEN VOR SWITCH IS FLIPPED (Valve operator rotates to stop positions but only when operated from the valve operator switch itself. Turning the LX220 switch to Manual ON or AUTO does not operate the valve. Sensor service lights are OFF. Power ON light lit.)	1. The LX220 is wired for 220 vac operation but is supplied with 120 vac.
WATER SENSOR SERVICE LIGHT IS ON	1. Shorted pool water temperature sensor. 2. Open water sensor. 3. Cable problem from LX220 to water sensor. 4. Loose screw at WTR terminals in LX220 control.
SOLAR SENSOR SERVICE LIGHT IS ON	1. Attic temperature sensor is connected in parallel with PCS2's internal float wires. Connect temperature sensor in series with PCS2 white wires. 2. Loose screw at LX220 control SOL terminals. 3. Cable problem from SOL terminals in LX220 control to the attic temperature sensor. 4. PCS2 is mounted upside down causing open float condition. 5. Leak detection float inside PCS2 is detecting excess water and has opened the attic temperature circuit. 6. Leak detection float inside PCS2 is defective [open circuit vs. closed circuit switch]. 7. Shorted attic temperature sensor [ohmmeter reads a shorted condition across disconnected sensor wires]. 8. Open attic sensor [ohmmeter reads infinity across disconnected sensor wires].
INSUFFICIENT HEATING (PCS2 does not appear to be heating the pool.)	1. Poor solar weather [No Sunshine]. 2. Pump Timer(s) out of sync with solar energy collection time. 3. Water flow valves to PCS2 are shut off. 4. Bypass valve operator does not route water to PCS2. VOR switch is in the wrong "ON" position. 5. Pool Cleaner water flow interfering with PCS2 water flow. OR, low water flow to PCS2. 6. LX220 is not in "AUTO" mode. 7. LX220 control does not supply power to PCS2. 8. PCS2 water flow and fan power are out of sync with each other. 9. Defective temperature sensor(s) or Open internal float circuit (prevents auto mode from activating). *List is continued in next page right column >>>>*

	10. Attic temperature sensor is located in the discharge air stream of the PCS2. 11. Attic sensor not located at the peak of the attic. 12. Defective fan motor on PCS2. 13. No airflow through unit's water coil. Coil is facing the wrong direction inside the attic. 14. Insufficient airflow caused by obstacles, coil too close to wall, etc. 15. PCS2 is located on the floor of a large standup attic. The PCS2 should be located as close to the peak of the attic as is possible. Heat rises in attics. 16. Short circuiting of the PCS2 airflow. Unit is mounted in such a way that air discharged from the face recirculates back to the intake of the coil. Thus the coil does not take in heated air on a regular basis: instead, it recycles cooler discharged air. 17. Poor location for the PCS2 inside of the attic. 18. PCS2 Fan Set at Medium or Low Speed 19. Excessive pool water cooling caused by an attached waterfalls. It masks performance of PCS2 or offsets the heat gains of the PCS2. Waterfalls on a pool can have a dramatic cooling effect on pool temperature.
PCS2 TURNS ON AT NIGHT; TURNS ON TOO EARLY OR TURNS ON TOO LATE (No attic heat is available for the pool. The attic is cooler than the pool or the same temperature. Or, the attic is warmer than the pool, but the PCS2 does not turn ON)	1. Pool water temperature sensor exposed to cooling winds, rain, etc. giving the LX220 a false indication of cold water temperatures [the attic falsely appears much warmer than the pool causing the PCS2 to turn ON]. Solution: Insulate the pipe around the water temperature sensor and cover with plastic to waterproof. 2. Sun heating water sensor causing it to give a false reading, which fakes out solar control electronics.
SHORT SEASON (The swimming season is not as long as you would like but the PCS2 is heating the pool.)	1. LX220 is not in "AUTO" mode. 2. Heat loss opportunity exceeds heat gain opportunity. I.E. The pool is uncovered and the nights are cold causing excessive heat loss, which is not recovered during the solar day. Solution: Use a pool blanket or cover to eliminate the excessive heat convection losses, which occur directly from the surface of the pool. This will allow the pool to retain the free solar heat and extend the swimming season. This can be an important factor at the front and back ends of the swimming season. 3. Solar heating capacity and pool heat retaining capacity are no longer adequate for the current season's weather. Solution: Use a backup heater located down stream from the PCS2 to further extend the swimming season until the pool has to be winterized [if required].

EXCESSIVE VIBRATION	1. Unbalanced fan blade. 2. Loose fan blade. 3. Loose motor mounting or cabinet hardware. 4. Mounting may require foam base for PCS2 to sit on. 5. Rigid mounting of PCS2 to building structure. 6. Contamination on fan blade causing imbalance. 7. Motor bearings defective. 8. Unusual mounting may require rubber isolation dampening devices. 9. PCS2 mounted using rigid pipes that are not supported properly. 10. ***TEST: Set fan speed to Medium or Low and observe results. Improvement may indicate motor or motor mounting problems.*** 
HIGH PRESSURE AT FILTER (Total pressure should be less than 22-27 lbs. in the typical installation with a clean filter.)	1. Backwash and clean filter. 2. Check position of valves within support system. Incorrectly positioned valves can restrict water flow and increase pressure with the system. 3. Contact pool servicer. Problem is not in PCS2 system.
POOR CIRCULATION (Pool water gets cloudy.)	1. Clean filter. 2. Check valve positions. 3. Check water flow rate from pump. 4. Check pump sizing. 5. Contact pool servicer. Problem is not in PCS2 system.
HIGH ELECTRIC BILL	1. Check to see how many hours the filter pump is running. 2. Check the condition and size of the filter pump. 3. Wire the filter pump to the LX220 power relay and use a minimum runtime timer to ensure that only a minimum filtration time is achieved. Place LX220 in AUTO mode. This combination maximizes solar heat collection and minimizes the energy required to accomplish it. 4. Problem is not the PCS2. It only draws 6.0 amps maximum and its energy use is easily determined within a range of $7.00 minimum to $20.00 per month maximum depending upon local electricity rates. At 9¢ per kilowatt-hour and 10 hours per day, the PCS2 will cost an estimated $18.63 per month to operate. 5. Have an energy audit performed. 6. Problem is not in the PCS2 system if it is working.