






PCS3 Troubleshooting Guide

Symptom	Check These Items
<p>THE GL235 POWER ON LIGHT DOES NOT LIGHT</p> <p>(The SOLAR ON light is not ON when the GL235 is in the “Manual ON” position.)</p>	<ol style="list-style-type: none"> 1. Check for tripped breaker at the main power panel. 2. Check for blown 2-amp fuse inside GL235. 3. Ensure that timers are turned on. 4. Check for loose power wires inside GL235. 5. Check for 120 vac power inside the GL235 with a voltmeter. 
<p>PCS3 BLOWER DOES NOT TURN ON [Doesn't rotate]</p> <p>(Solar On light is ON. Check Sensor light is OFF.)</p>	<ol style="list-style-type: none"> 1. Power is incorrectly wired at GL235. 2. PCS3 is unplugged at switched attic outlet or power is missing or the attic outlet is not wired properly. 3. Thermostat is set too low on the GL235. Turn it to the maximum clockwise position. 4. GL235 2-Amp fuse is blown. Replace fuse. 5. GL235 relay is not activating or defective. 6. Internal PCS3 blower motor thermal cutoff. Wait 15 minutes for it to cool off & then retry. 7. Defective PCS3 power cord or plug. 8. Defective Motor starting capacitor. 9. Defective Motor. 10. Defective Solar controller. 11. Check for 120 vac at attic outlet with voltmeter. 
<p>MOTOR HUMS AND DOESN'T ROTATE BLOWER CAGE</p>	<ol style="list-style-type: none"> 1. Turn power off for 15-30 minutes and check again in case of thermal overload. If motor is okay, it will automatically reset/restart after it has cooled down. 2. Disconnect power to check the 20 microfarad 120 vac motor starting capacitor: Remove the two wires on the starting capacitor, which is located behind the front panel and accessed by removing the left side panel. Connect a new capacitor and insulate the terminals with electrical tape. Turn the power on and see if the motor turns. <u>Result A:</u> Motor turns. This indicates that the starting capacitor was defective. <u>Result B:</u> Motor still hums. This indicates motor is defective. This test assumes that the motor is cool to touch and has not been thermally cutoff by an overload. 

<p>PCS3 DOES NOT TURN OFF</p>	<p>1. The PCS3 is not wired for automatic operation by routing the power through the GL235 internal relay at terminals 5 and 6. Review the wiring diagrams on pages 14-15 and correctly wire the PCS3 so it can be controlled by the GL235.</p> <p>Caution: Cutoff all power before working on the power connections to the GL235. </p>
<p>VALVE OPERATOR ROTATES IN THE WRONG DIRECTION</p> <p>("Solar On" turns water off to PCS3.)</p>	<p>1. Valve was mis-staged as it was assembled. Turn valve operator switch to the other "ON" position. I.E. From ON1 to ON2 or vice versa.</p>
<p>VALVE OPERATOR DOES NOT ROTATE TO PROPER STOP POSITION.</p> <p>(Valve stops before it should.)</p>	<p>1. Internal limit switch needs adjusting. 2. Internal cam needs adjusting. 3. Internal mechanical stop needs adjusting. 4. Defective valve operator. Replace.</p>
<p>VALVE OPERATOR ROTATES IN ONE DIRECTION ONLY</p> <p>(Valve rotates to ON position but will not rotate to OFF. POWER ON and SOLAR ON lights are both on. Sensor Service light is OFF.)</p>	<p>TEST: Reverse the VOR Switch. Turn it from ON1 to the ON2 position or vice versa.</p> <p><u>Result A: Valve still does not rotate.</u></p> <p>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.</p> <p><u>Result B: Valve now rotates in other direction.</u> This indicates that the valve operator is okay.</p> <p>1. Defective GL235 wiring at VOR plug or terminals. 2. Defective solar controller.</p>
<p>VALVE OPERATOR ROTATES SLOWLY</p> <p>(Valve operator creeps and doesn't reach its end stops.)</p>	<p>1. VOR power at the GL235 printed circuit board is reversed causing 12vac to be at the valve operator instead of 24vac. (12vac is used on older VORs) 2. Defective valve operator. 3. GL235 is powered with 110 volts at the 220 volt terminals. Correctly wire the GL235 for 110vac. Caution: Wiring 220vac power to the 120vac power terminals of the GL235 will permanently damage the control and void its warranty. </p>

<p>VALVE OPERATOR ROTATES ONLY WHEN VOR SWITCH IS FLIPPED</p> <p>(Valve operator rotates to stop positions but only when operated from the valve operator switch itself. Turning the GL235 switch to Manual ON or AUTO does not operate the valve. Sensor service light is OFF. Power ON light lit.)</p>	<ol style="list-style-type: none"> 1. The GL235 is wired for 220 vac operation but is supplied with 120 vac.
<p>CHECK SENSOR LIGHT IS ON STEADY</p>	<ol style="list-style-type: none"> 1. Shorted pool water temperature sensor. 2. Open pool water sensor. 3. Cable problem from GL235 to pool water sensor. 4. Loose screw at water sensor terminals in GL235.
<p>CHECK SENSOR LIGHT IS ON AND FLASHING</p>	<ol style="list-style-type: none"> 1. Attic temperature sensor is connected in parallel with PCS3's internal float wires. Connect the temperature sensor in series with PCS3 white wires. 2. Loose screw at GL235 solar sensor terminals. 3. Cable problem from solar sensor terminals in GL235 control to the attic temperature sensor. 4. PCS3 is mounted upside down causing open float condition. Don't laugh, it has happened. 5. Leak detection float inside PCS3 is detecting excess water and has opened the attic temperature circuit. 6. Leak detection float inside PCS3 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].
<p>INSUFFICIENT HEATING (PCS3 does not appear to be heating the pool.)</p>	<ol style="list-style-type: none"> 1. Poor solar weather [No Sunshine]. 2. Pump Timer out of sync with solar energy collection time causing pool to cool too much time. 3. Water flow valves to PCS3 are shut off or restricted. 4. Bypass valve operator does not route water to PCS3. VOR switch is in the wrong "ON" position. 5. Pool Cleaner water flow interfering with the PCS3 water flow. OR, low water flow to PCS3. 6. GL235 is not in "AUTO" mode. 7. GL235 control does not supply power to PCS3. 8. PCS3 water flow and blower power are out of sync with each other resulting in no heat transfer. 9. Defective temperature sensor(s) or Open internal float circuit (prevents auto mode from activating). <p style="text-align: right;"><i>List is continued in next page right column >>>></i></p>

	<ol style="list-style-type: none"> 10. Attic temperature sensor is located in the discharge air stream of the PCS3. 11. Attic sensor not located at the peak of the attic. 12. Defective blower motor on PCS3. 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. PCS3 is located on the floor of a large standup attic. The PCS3 should be located as close to the peak of the attic as is possible. Heat rises in attics. 16. Short circuiting of the PCS3 airflow. The PCS3 is mounted in such a way that air discharged from the face recirculates back into the intake of the coil. Thus the coil does not take in heated air on a regular basis: instead, it recycles the cooler discharged air. 17. Poor location for the PCS3 inside of the attic. 18. Excessive pool water cooling caused by an attached waterfall. It masks performance of PCS3 or offsets the heat gains of the PCS3. Waterfalls on a pool can have a dramatic cooling effect on pool temperature.
<p>PCS3 TURNS ON AT NIGHT; TURNS ON TOO EARLY OR TURNS ON TOO LATE</p> <p>(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 PCS3 does not turn ON)</p>	<ol style="list-style-type: none"> 1. Pool water temperature sensor exposed to cooling winds, rain, etc. giving the GL235 a false indication of cold water temperatures [the attic falsely appears much warmer than the pool causing the PCS3 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.
<p>SHORT SEASON (The swimming season is not as long as you would like but the PCS3 is heating the pool.)</p>	<ol style="list-style-type: none"> 1. GL235 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 PCS3 to further extend the swimming season until the pool has to be winterized [if required].

<p>EXCESSIVE VIBRATION</p>	<ol style="list-style-type: none"> 1. Unbalanced squirrel cage assembly on motor. 2. Loose squirrel cage assembly. 3. Loose motor mounting or cabinet hardware. 4. Mounting requires a foam base for PCS3 to sit on. 5. Rigid mounting of PCS3 to the building structure. 6. Contamination on squirrel cage causing imbalance. 7. Motor bearings are defective. 8. PCS3 mounted using rigid pipes that are not supported properly inside the attic.
<p>HIGH PRESSURE AT FILTER (Total pressure should be less than 22-27 lbs. in the typical installation with a clean filter.)</p>	<ol style="list-style-type: none"> 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 PCS3 system.
<p>POOR CIRCULATION (Pool water gets cloudy.)</p>	<ol style="list-style-type: none"> 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 PCS3 system.
<p>HIGH ELECTRIC BILL</p>	<ol style="list-style-type: none"> 1. Check to see how many hours the filter pump is running. 2. Check the condition and size of the filter pump. 3. Slave the filter pump to the GL235 power relay using an external relay as shown online and also use a minimum runtime timer. This will ensure that only the minimum filtration time is achieved since the pump is usually the cause of high electric bills. Place GL235 in AUTO mode. This combination maximizes solar heat collection and minimizes the energy required to accomplish it with the pump. 4. Problem is not the PCS3. It only draws 5.0 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 PCS3 will cost an estimated \$18.63 per month or less to operate. 5. Have an energy audit performed. 6. Problem is not in the PCS3 system if it is working.