Troubleshooting Guide- Operational

	Explanation	Common Problems	Related Solution
Air relief valve (air bleeder)	This device is on top of the filter. It is used to let the air escape and allows the tank to fill with water. It is critical to open the bleeder before restarting the motor. The force of the water can compress the air and can cause excessive pressure which can damage the equipment.	a. The valve wont open b. Water keeps squirting out even when closed c. The valve is open and nothing comes out	a. The unit needs to be disassemble with tools and lubricated b. The rubber seal ring on the inside of the unit is damaged or missing & needs replacement c. The passage is clogged with debris and needs to be disassembled and unclogged
Backwash	The process of running water through a filter the opposite direction to flush the filter of debris and contaminants freeing up the filter to be less restricted so the water can pass through the filter quicker.	a. The water flow (flowrate) didn't increase after the backwash and the tanks pressure is still higher than usual. b. No water is coming out of the pipe.	a. More backwashing is needed, be sure that the hair and lint strainer is cleaned before backwashing. b. The pump must be primed (see priming procedures at backwash chart)
Cartridge	The element in a filter covered with pleats of fabric to strain debris and contaminants from the water passing through it	a. The filter becomes clogged and requires cleaning. b. The filter fabric rips and allows dirty water to pass through.	a. Remove the filter element replace with the previously cleaned set and rinse dirty elements with pressure or soak in a degreaser (TSP) b. The damaged filter needs replacement
Caulking	Material used in a joint to create a waterproof seal	Splitting from the sides of the joint, holes where it was applied too thin. Problems will allow water to seep into joint	Remove old caulk, clean joint, tape both sides of joint, apply caulk compound, strike to smooth finish, pull tape and allow to cure (dry)
Centrifugal Force	The outward Force created by an object in circular motion. The force that is used by water pumps to move water.	N/a	N/a
Chlorinator	A mechanical device or pump that delivers chlorine to a body of water.	a. Pump tube wears out	a. Replace pump tube assembly
		b. Strainer clogged	b. Replace or clean strainer
		c. Injection fitting clogged	c. Replace or clean injector
		d. Tubing cracked or split allowing air to disrupt suction force or the chlorine to leak	d. Search for leak possibly shorten tubing to eliminate leak which is common at the ends or replace all tubing
Circulation System	The combination of pipes, pump, and any other components through which water flows in a closed loop (from the body of water, through the components, and back to the same body of water).	a. Filters clogged	a. Backwash or change cartridges
		b. Strainer clogged	b. Clean strainer (a must before each backwash)
		c. Loss of prime	c. Familiarize yourself with each systems

			needs, depending on system design and equipment there will be different procedures, refer to pool data chart
		d. Water leaks	d. Seal all rubber with a lubricant like silicone, seal all thread connection with Teflon compound or threaded joint tape
Coping	The cap on the edge of a pool or spa mounted on the bond beam	a. Cracks	a. A crack can be repair with mortar or epoxy, this is a temporary repair to insure a smooth safe surface, if in poor condition replacement is required
		b. Hollow or delaminating at bonding surface	b. Reset stone by removing stone cleaning surfaces and reapplying in a fresh mortar bed
Discharge	The flow of water out of a pipe or port	In a filtration system the greatest pressure is achieved at the pump discharge which is the piping from the pump to the filter, due to the pressure this is a common location for water leaks and needed repairs	The PVC piping and fittings must be removed and replaced to reseal the threaded discharge, this commonly is a repair that is conducted by an experienced repair technician. It is not possible to
Effluent	The water discharging from a pipe or equipment		
Erosion System	A type of chemical feeder in which granular or tablet sanitizer is slowly dissolved by constant flow of water through the device	a. Chemical fumes b. Slow addition of chemical	a. Be sure to wear safety gear when checking system, try to add chemicals to an empty feeder only b. A supplemental chemical such as granular chlorine may be needed for superchlorination
Filter Run	The time between cleanings, expressed as the total running time of the system, also called the filter cycle.	Inconsistent or irregular cleaning can result in turbid water, awareness of the filter run will allow the prediction of cleaning frequency	Consistent record keeping including changes in flowrates, tank pressure, and pressure differential will reveal the patterns of the filter run
Flow Meter	A device for measuring the rate of water passing through a given pipe, expressed in gallons per minute (gpm).	a. Commonly the float may become stuck indicating an inaccurate reading b. The painted numerals on the flowmeter will become faded	a. Lightly tap the top of the flowmeter to vibrate the float and dislodge it, be careful not to exert too much force on the unit, it is plastic and will break b. Replace all flowmeters which have faded numerals to avoid rule violation
Flow Rate	The volume of water passing a given point in a given time, expressed in gallons per minute (gpm).	Flowrates which are lower than the requirement	A low flowrate will be unacceptable to county inspectors and indicative of a pump or filter restriction, or an improperly sized pump. High flowrates are acceptable as long as the rate does not exceed the filter systems capacity. Valves Water level Strainer/skimmers Backwash/clean cartridges
Gate Valve	A valve that restricts water flow by raising and lowering a disc across the diameter of the pipe by means of a worm drive.	Stripped threads at the worm drive, the round handle will keep spinning without moving the disc, problem is not visible	Damaged valves need repair or replacement

Gauge	Refers to a measuring device, as in pressure gauge. Typically 0 - 60p.s.i. Used to measure tank pressure, influent pressure and effluent pressure on filtration systems	Some gauges are made with metal components which do not last in pump rooms due the chemical fumes accelerating the deterioration	Replace any gauge that does not "zero out" when the system is off. Replace when needles are damages or the unit fills with water
Gunite	A dry mixture of sand that is mixed with water at the job site and sprayed onto contoured and supported surfaces to build a pool or spa, creating the shell of the pool	In situation where the shell has not properly been waterproofed damage to the top of the pool shell (bond beam) can occur with freezing temperatures	When the coping removed damage can become evident and must be repaired by removing all of the deterioration and rebuilding with mortar
High-rate Sand Filter	A filter using sand for the filtration media designed for flows in excess of 5 gpm but less than 20 gpm (less than 15 gpm in some codes) per square foot. Strains impurities larger than 50 to 80 microns. Uses pool water to clean dirty filters	a. Channeling b. If internal components fail sand will be forced to pool c. Sand erosion	a. May need to change filter sand due to the channeling of water around the sand rather than through it b. Internal components can be replaced but when this occurs it is indicative of future labor intensive maintenance needs, recommend replacement of complete unit c. Years of water passing over each grain makes them round instead of faceted and rough, smooth sand does not catch and trap dirt as effectively
Hose Bibb (also bib)	The faucet to which a garden hose is attached.	Requires a backflow preventer, will fail inspection from county if missing	Be sure all hose bibs have backflow preventer which are in place and operating properly to protect the potable water supply
Hydrostatic Valve	A check valve located in the main drain of a pool to relieve hydrostatic pressure created by rising groundwater. The valve allows groundwater into the pool, but does not let water out.	If the spring loaded top is stuck open, the pool will leak at this location	Before a pool is filled it is important to check proper operation. Once a pool is filled and diagnosed as leaking this could be a source
Impeller	Rotating part of a pump that creates centrifugal force to create suction. The impeller is said to be closed, if it is shrouded (covered) on both sides of the vanes, or semi open if it is shrouded on one side, while the interior surface of the volute creates a partial shroud on the other side.	If an impeller gets clogged, obstructed, or if it gets damaged in any way the flowrate will be reduced causing filtration problems	Protect the impeller with a clean strainer basket, which is intact and has no holes and is not damaged. Be sure the basket is always in place especially at pool start up
Laterals	The slotted horizontal collection tubes at the bottom of a sand filter, installed on the drain manifold hub.	Broken laterals wiil allow filter sand to pass through the filter and into the pool	It is difficult and labor intensive to repair the laterals, this type of internal break in a tank is indicative of the wear of the tank, we recommend tank replacement
Leafmaster	A brand name; leafmaster is a term applied to any device that vacuums large debris from a pool by means of water pressure created with a garden hose.	Leafmasters will not work in shallow water. The wheels commonly break. The bag if not properly secured will blow off of the body	Be sure to check equipment before trying to use. Make sure the bag is secured. The greater the water pressure the better the performance of the unit
Leaf Rake	A large open net secured to a frame that attaches to a telepole that is used to skim debris from the surface of the water.	Different from a leaf net, the screen is like a bag which will hold a greater capacity of debris	Keep it clean, excessive weight may cause the net material to rip and allow debris to pass through
Main Drain	The suction fitting located in the lowest portion of a body of water. The principal intake for the circulation system	Single drains can be an entrapment hazard	Dual drain conversion is the best solution; some municipalities have made dual drain a requirement. NEVER operate the drain without the skimmer open. Commonly called "single sourcing", injuries or death

			may occur
Manifold	An assembly or component that combines several other components together. A pipe fitting with several lateral outlets for connecting on pipe with others.	Filter manifolds or suction manifolds may develop leaks or valves need replacement	Suction leaks will allow air in; pressure leaks will allow water out. Correct by diagnosing leak source and repair/ replace equipment as needed
Niche	The housing built into the wall of a pool	The conduit (plastic tube) which protects the cord for the light in the back of the niche is a common source for water leaks	When the pool is empty a conduit sealer can be inserted into the back of the niche at the gap around the cord inside of the conduit (also called butyl tape)
NPT	National Pipe Thread. The generally accepted standard specifications for threaded plumbing pipe and fittings.	NPT threading is slightly tapered so when the treaded fitting is tightened a seal occurs, must use threaded joint compound the make the seal water/air tight	The joint compound will dry out causing leaks. Heat will distort the threads and break the seal. When the thread are distorted the fitting, plug or device will need repair/replacement
Plaster	A hand-applied combination of white cement, aggregates, and additives that covers the shell of a gunite pool or spa to waterproof and add beauty. Plaster can also be colored.	Separation or failure of the bond in layered materials, such as plaster to gunite also referred to as “plaster pops. Constant exposure to pool water and surface cleaning chemicals will cause the surface to become more abrasive	Repalstering needs to occur when the surface is cracked, chipped or has popped, also if the surface becomes too rough. Underwater patching of plaster can occur with epoxy (pool putty)
Pressure Gauge	A device that registers the pressure in a water or air system, expressed in pounds per square inch (psi)	Gauges are sensitive, and are subject to deterioration while in an environment like a pool pump room with chemical fumes	Replace at once, if there is problems with inaccurate readings, sticking needles, or if the don’t “zero out”
Prime	The process of initiating water flow in a pump to begin circulation by displacing air in the suction side of the circulation system.	Air is displaced usually by filling with water and resealing the strainer, be sure valves are closed to prevent water from running back to the pool. (not required on a flooded suction system). Before starting be sure to check that there is enough water in the pool and that no skimmer weirs are stuck in the upright position restricting waterflow to the skimmer line	The physics involved in displacing the air may require some trial and error testing. Listen to the sound the pumps make when working properly, listen for spraying noises or a gurgling sounds to determine your completion. Turn off pump Close valves at suction manifold Open and clean strainer Fill with water Properly seal strainer lid. Be sure it is seated properly to eliminate air entering at lid. Insure all valves after pump are in proper filter positions Open air relief valves on top of filter tanks this will allow water to displace air as tanks fill (unopened air valves will allow air to compress to dangerously high levels) Turn on pump and slowly open suction valves to allow pool water to enter the strainer and pump
PSI	Pounds per square inch.	N/a	N/a
PVC	Polyvinyl Chloride. The type of plastic pipe and fittings most commonly used in pool and spa plumbing.	Connections are made by gluing the pipe together with connectors. Where a glue joint (slip joint) is mostly trouble free. Threaded connectors are	Each time a treaded connection is utilized a thread sealant must be applied to the threads before screwing together. If threads have been distorted by heat (pump running dry) the piping section

		common leak points.	must be rebuilt with new fittings.
Return	The line and/or fitting through which water is discharged into a body of water. Also called an inlet.	Return fittings are designed with removable plates, which allow the flow of water through the unit to be regulated. The returns closest to the pump get more flow; the ones farthest away get less. The returns are adjustable. Plastic covers can break and screw holes threads strip out	Repairs to returns are easiest when the pool is empty. Always check for problems before filling. Repairs are difficult when required under water, a quick repair is to secure the cover with underwater epoxy resin or put in an oversized stainless steel screw.
Sight Glass	A clear glass or plastic section of pipe that allows viewing of the water in the line. Used when backwashing filters, a way to know when the discharge water is clean by water clarity.	Can be a source of a water leak	Be sure all parts are properly installed and rubber seals are properly lubricated.
Skimmer	A part of the circulation system that removes debris from the surface of the water by drawing surface water through it.	If the water level is not high enough in the pool to keep the water flowing into the skimmer, it will suck air into the pump and cause the pump to loose prime. The weir can get stuck on the side walls if not aligned and will restrict water from flowing into the skimmer also causing the same effect	Keep the water level at proper levels, keep the baskets clean, and make sure the weir is in place and not rubbing the skimmer wall. Also check for cracks, as this plastic device is susceptible to damage causing water leaks.
Strainer Basket	A plastic or stainless steel mesh container that strains debris from water flowing through it inside the strainer pot.	If missing or if there are holes, debris will pass thru and will clog the pump impeller. If not regularly cleaned flow will be restricted	Check basket regularly to insure proper placement, lack of holes and to clean out debris
Strainer Pot	*(Or hair and lint strainer.)* The housing on the intake side of a pump that contains a strainer basket and serves as a water reservoir to assist in priming	The lid can be metal or plastic. The metal lid can rust and will obstruct an airtight seal. The plastic lid, mostly on smaller pumps is mostly maintenance free.	Overhauls which, involve removing rust and lubricating the rubber seal, will prevent air leaks (sucking air). Keep the plastic lids properly lubricated and clean
Teflon Tape	A thin fabric provided on a roll used to coat threaded plumbing fittings to prevent leaks	If not wound onto the threads in the proper direction the tape can unravel as the threads are turned. The use of Teflon on plastic fittings can distort the threads (recommend thread sealant paste)	Restrict use to metal and copper fittings; this is a product which use should be restricted. Always wrap the threads going counterclockwise.
Telepole	A metal or fiberglass pole that extends to twice its original length, the two sections locking together. The telepole is used with most pool and spa cleaning tools	The metal pole end can become bent restricting the removal and installation of the cleaning tools. The locking mechanisms can be problematic.	Always treat with care and hang poles rather than stand on ends. Keep the locking mechanism lubricated and do not over extend pole and push too hard, this may result in the pole bending
Turbidity	Cloudiness	Turbidity restricts the ability to see “through” the water of a pool	Keep the filtration system clean at proper flow rates and keep chemicals at proper levels
Turnover Rate	The amount of time required for a circulation system to filter 100 percent of the water in a particular body of water.	Most jurisdictions are changing from a 8-hour turnover to a 6-hour turnover rate. When renovating a pool the pump may	Once the pump is sized and installed the turnover rate cannot be altered or changed, it can only be maintained by checking and maintaining your flowrate

		be required to be upgraded for faster flow rates	*(see flowrate)* and maintaining as instructed
Valve	A device in plumbing that controls the flow of water. Three common styles of valves are wafer, ball and gate. Wafer and ball style are similar, a wafer valve involves a circular disc and a ball valve has a sphere with a hole thru the center. Both style are connected to an arm style handle, which goes from open to closed position with a ¼ swing of the handle, when the handle is perpendicular to the valve and piping it is closed, when parallel, the valve is open. A gate style valve involves a sliding plate which is threaded, as you spin the wheel style handle the threaded rod connected to the sliding plate closes the valve as you spin clockwise and opens as you spin counterclockwise	The primary problem with the valves or valving systems (called manifolds) is not the failure of the valve, but more understanding the valve positions and how they are to be set at your pool for the desired mode. Secondary, is the problems with the valve, air leaking at valves on the suction side of the pump can be common, water leaks on the pressure side are also ordinary.	Valves with threaded connections can be reused during a plumbing repair if the valve opens and closes properly and doesn't leak. However, the correction of most valve problems involves the removal and replacement of the valve and the surrounding plumbing.
Weir	The barrier in a skimmer over which water flows. A floating weir raises and lowers its level to match the water level in a pool or spa. Another type is shaped like a barrel and floats up and down inside the skimmer basket. The design is such that the top ¼" to ½ " of water constantly flows into the skimmer basket. This flow pattern of water collects the floating debris in a pool. Proper skimmer function will reduce the need for vacuuming.	The weir can get stuck on the sidewalls of the skimmer if not aligned and will restrict water from flowing into the skimmer also causing the loss of flow, due to the pump sucking air. Weirs as with many pool parts have to be made of plastic, which is impervious to corrosion from pool chemicals. The plastic becomes brittle over time and the weirs commonly break or crack.	A weir can be trimmed to free an unobstructed pattern of movement, However, due to the fact that they are relatively inexpensive and the replacement is easy completed, this is a common replacement part through the summer. Frequently check all weirs for proper placement and unobstructed movement