



Aeration System

Owners Manual



Follow directions in this manual for all Savio2 Aeration systems 1-6.

SAVIO₂ AERATION

Savio₂ is Savio Engineering's newest large aeration system. This system is designed to improve water quality, protect your fish, and create a healthier aquatic ecosystem. Savio₂ aeration helps break up thermoclines that can develop over time in static water. Savio₂ air compressors operate efficiently in water depths down to 40 ft. In the Savio₂ Aeration Systems, the air is forced through rubber membrane weighted disc diffusers and circulates the water to promote higher oxygen levels throughout the pond or lake. Also, it helps prevent fish kills from pond turnover. Savio₂ creates a healthier environment during the hot summer months, allowing your fish to stay in deeper sections of your pond. During winter months, Savio₂ maintains a hole in the ice for natural pond gases to escape. These reliable, low-maintenance units are designed for continuous or intermittent operation.

SLOW START

CAUTION: If you are new to aeration and installing aeration in an established pond, read "Start Up" on Page 14.



Protect Your Koi Fish

Help prevent fish kills from pond turnover



Improve Water Quality

Reduce green water & add oxygen to your water



Built for Year-Round Use

During winter, keep a hole in the ice for natural pond gases to escape

WARNINGS

We have provided many important safety messages in this manual and on your product. Always read and follow all safety messages.

Correct installation is your responsibility. Make sure you have the proper installation and that installation clearances do not block airflow. Blocking airflow of the product in any way can cause the product to overheat.



- Disconnect electrical power at the circuit breaker or fuse box before installing this product.



- Install where it will not encounter water or other liquids.
- Install this product where it will be protected from the weather.
- Electrically-ground this product.

The safety of you and others is extremely important. Failure to follow these instructions can result in electrical shock, fire, or death.

Operation Criteria

- Pump only clean, dry air.
- Operate at 32°F – 104°F (0°C – 40°C).
- Protect the unit from dirt and moisture.
- Do not pump flammable or explosive gases or use in an atmosphere containing such gases.
- Protect all surrounding items from exhaust air. The exhaust air can become very hot.
- Connect the weighted tubing to heat tubes, to prevent weighted tubes from melting.
- Corrosive gases and dust will damage the unit. Water vapor, oil-based contaminants, or other liquids must be filtered out.
- This pump is oil-free and requires NO lubrication.
- Do NOT use this product with an extension cord. Doing so will void the warranty.
- Do NOT “hardwire” install this product. Doing so will void the warranty.

DIFFUSER ASSEMBLY

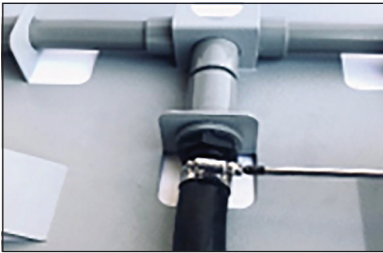
1. $\frac{3}{4}$ " x $\frac{3}{8}$ " NPT barbed fitting is designed to be used with $\frac{3}{8}$ " I.D. tubing. Screw in barbed fitting until snug.



2. Slip hose clamp over tubing about 3" and push tubing tightly onto the fitting.



3. Slide hose clamp back over tubing and fasten with screwdriver or nut driver.

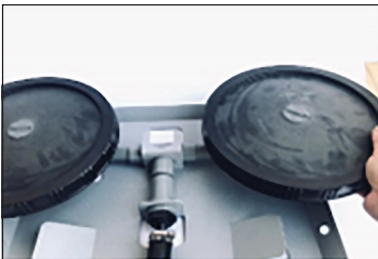


4. To protect the barb and prevent it from breaking while under pressure, fit padded hose clamp over tubing. Use washer. Insert 10mm bolt with washer on both sides of base and tighten nut to clamp down tubing.

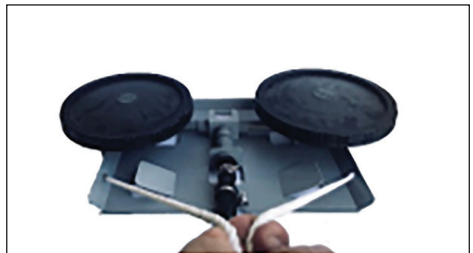


- 17.5mm clamp for $\frac{3}{8}$ " tubing
- 25.5mm clamp for $\frac{1}{2}$ " tubing

5. Screw diffuser(s) onto $\frac{3}{4}$ " FPT on top of unit. Snug fitting by hand, do not over tighten.



6. Use rope looped through holes in the base to assist lowering assembly to pond bottom. Carry only by base, do not lift by diffusers.



WEIGHTED TUBING KIT INSTALLATION INSTRUCTIONS

IMPORTANT – READ CAREFULLY BEFORE INSTALLATION

Parts Included:

3/8" Tubing Kit – Parts Included:

- (#38100WTK)
- 3/8" Diameter x 100' Aeration Tubing
- (1) 3/8" Barb x 3/8" Barb Fitting
- (2) 3/8" Tubing Clamp

5/8" Tubing Kit - Parts Included:

- (#58100WTK)
- (1) 5/8" Diameter x 100' Aeration Tubing
- (2) 3/8" Barb x 5/8" Barb Fitting
- (1) 5/8" Barb x 5/8" Barb Fitting
- (2) 5/8" Tubing Clamp
- (2) 3/8" Tubing Clamp

*Depending on individual installations, not all fittings will be used. Please see illustrations for necessary fitting.

Installation Tools Needed:

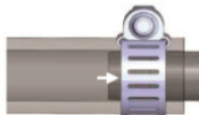
5/8" socket/nut driver, 1/4" socket/nut driver, 9/16" socket/nut driver, flathead screwdriver, utility razor or tubing cutter

Installing Savio Weighted Tubing to Barb Fittings

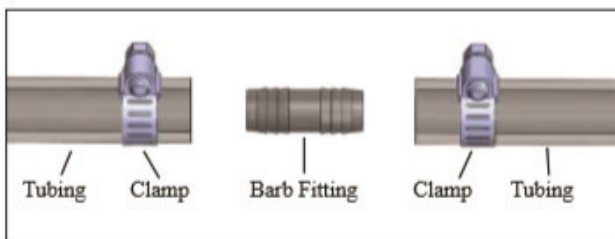
1. Trim hose square. Outer diameter must be free of score marks, burrs and sharp edges
2. Loosely slide tubing clamp onto tubing. Insert tubing over barbed fitting. Tubing must completely cover barbed portion of fitting.



3. Slide tubing clamp over tubing and barbed portion of the fitting. Tighten clamp using a socket/nut driver or flathead screwdriver.



Mended Tubing Connection



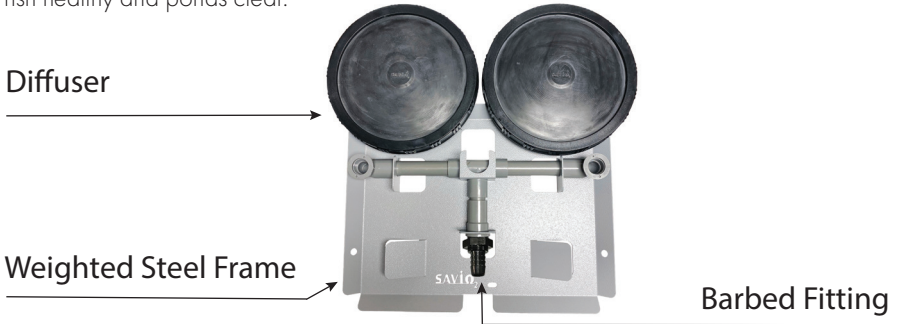
Savio₂ Diffuser

Benefits

- Increases oxygen levels for healthy and happy fish.
- Lowers levels of dissolved toxic gases and ammonia.
- Reduces sludge buildup on pond bottoms.
- Promotes beneficial bacteria growth.
- Helps maintain an open hole in the ice during winter to release trapped toxic gases.

Installation Instructions

Pond aeration is an important component in establishing and maintaining a healthy pond environment. 10" diffuser discs produce high oxygen transfer microbubbles to help keep fish healthy and ponds clear.

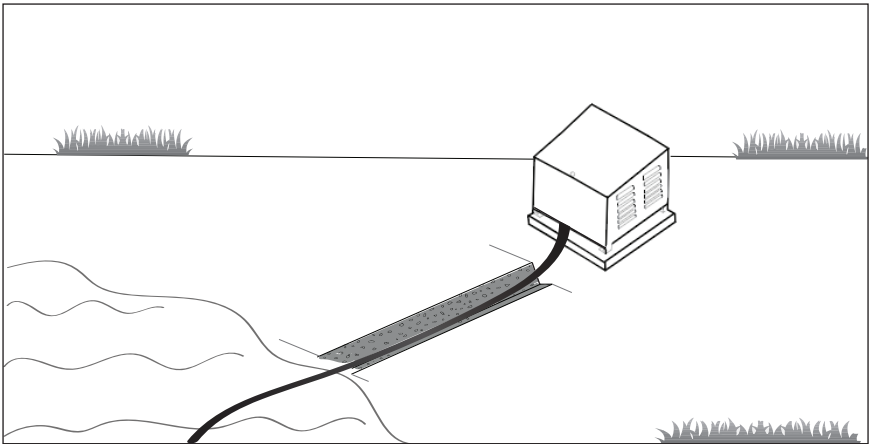


1. Determine placement location that will best aerate the deepest area of the water feature.
2. Use provided clamps to attach weighted tubing to the barb on the diffuser.



(Weighted tubing sinks better and keeps your aeration tubing at the bottom of your water feature.)

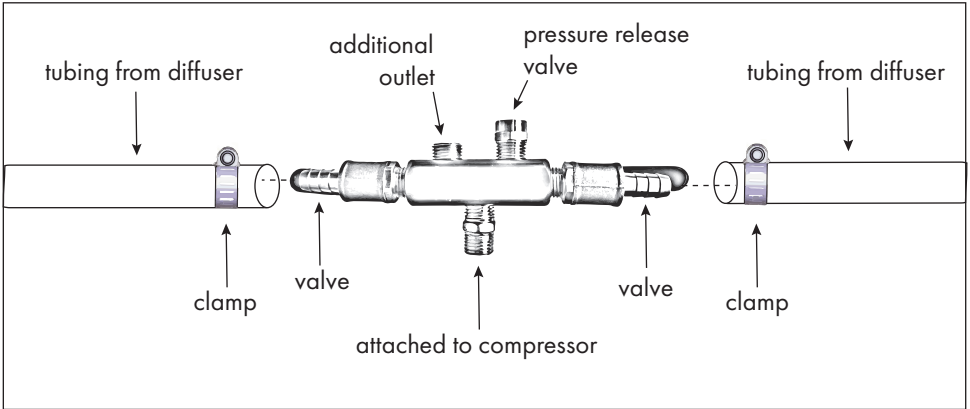
3. Unwind tubing and make sure that there are no kinks or bends in the line. (Use 2 clamps and a double-barb if you need to connect 2 weighted tubes)
4. Secure the other end of the weighted tubing near the cabinet and provide 3'–5' of extra tubing to work with. (Secure the tubing tight enough so it will not be easily pulled into the water, but not so tight to damage the tubing)
5. Place the diffuser in a boat and slowly go to the location for the diffuser. (If using a boat with an engine, be careful to not cut the tubing with the propeller by holding the tubing out of the way or backing the boat into position)
6. Lower diffuser to bottom of pond or lake. (depending on the depth of water, this can be done by dropping the diffuser with the steel base down, or by attaching a rope and slowly lowering into place)
7. Return to the compressor and cabinet and connect the weighted tubing to the compressor barb and secure with hose clamps.
8. Dig a small channel from the edge of the water to the cabinet and bury the weighted tubing.



If you live in an area where the water will freeze, you will need to wrap the weighted tubing approximately 4 feet deep into the water with insulation foam. For best results use a closed-cell polyurethane foam.

Aeration Pump Manifold

The Aeration Pump Manifold is included on some Savio2 systems. These manifolds allow you to provide air to multiple diffusers in different locations around the pond with a single air pump. Some manifolds have magnetic valves.



Regulator shut off valves come in a $\frac{3}{8}$ " barb width. These valves allow you to turn the air on and off, plus they allow you to control the air pressure to each diffuser. When diffusers are different distances away from the air pump, you can adjust the valves so each diffuser has the same amount of bubbling. See image above.

The additional outlets on the manifold give you space for pressure gauges and pressure relief valves. These allow you to monitor the pressure and the relief valve allows your system to vent backpressure to prevent damage to your pump. See image above.

IMPORTANT:

Be sure to use 24" heat tubes and run those out of the cabinet or away from the pump to prevent weighted tubes from melting.

If disassembled, be sure to use Plumber's Tape (Teflon tape) to seal threads.

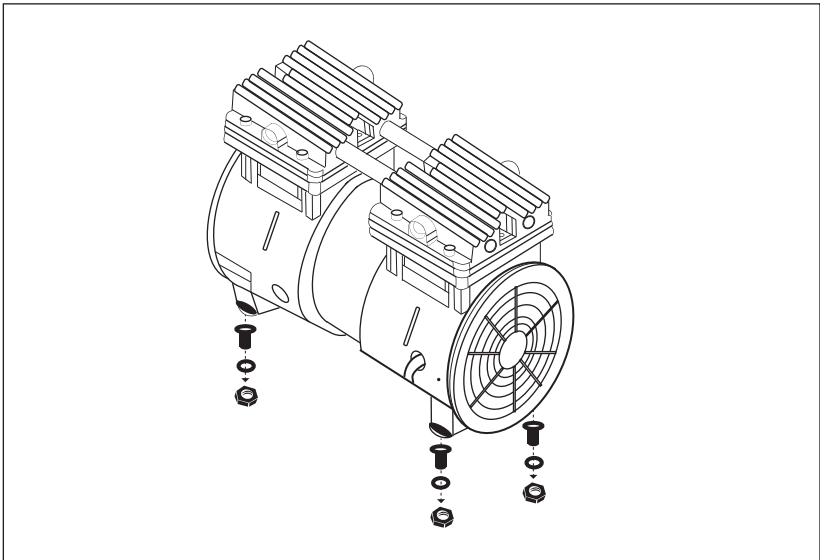
Make sure that all items are installed correctly and securely.

NO CABINET INSTALLATION

Mounting

This product can be installed in any orientation. Mounting the product to a stable, rigid operating surface and using shock mounts will reduce noise and vibration.

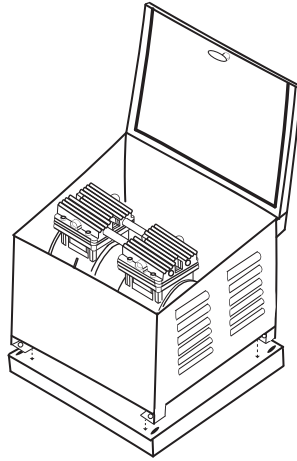
- To prolong the life of your air compressor, it should be kept out of the weather. If you are not using a Savio2 cabinet, be sure to use a vented cover or install in a covered location.
- We recommend installing with a fan and 24" of heat resistant tubing to run from pump to weighted tubing. (Use double barb to connect the 2 tubes)
- Install the pump where it can only intake and pump clean, dry air.
- Operate at 32°F – 104°F (0°C – 40°C).
- Protect the unit from dirt and moisture.
- Protect all surrounding items from exhaust air. This exhaust air can become very hot.
- If you use a cabinet, be sure that the cabinet is not too small, or the pump will overheat.



CABINET INSTALLATION

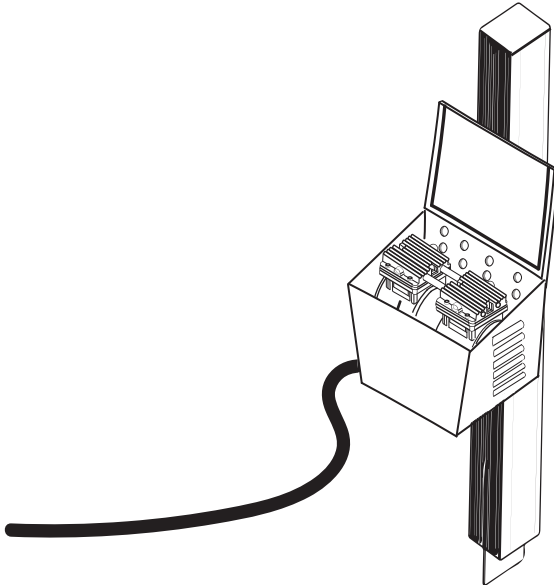
Large Cabinet (base mount)

Choose a location for your cabinet that will allow access to electricity. Make sure that the cabinet is placed far enough back to prevent exposure to water if the water feature could flood. The cabinet can rest directly on the ground or foundation (use holes on the base to secure the cabinet to a foundation).



Small Cabinet (post mount)

The small cabinet can easily be attached to a wall or post. Savio2 Wall and Post-Mount Cabinets include eight $\frac{3}{8}$ " mounting holes to provide more installation options. Measure and pre-drill holes smaller than your lag screw, then attach cabinet using screws. Tighten screws to hold cabinet securely (you may need a second person to hold the cabinet in place while installing). For mounting, we recommend using $\frac{5}{16}$ " lag screws that are 2" or greater with a washer. (lag screw not included)



AIR COMPRESSORS

SO2400	SO2750	SO21100
		

These Rocking Piston Compressors will deliver a reliable and efficient performance.

Each unit includes:

50 PSI pressure-relief valve

Vibration mounts

Intake air filter assemblies.



Rocking Piston Compressors are continuous-duty, oil-free, aeration compressors that are a great choice for aerating ponds and other deep water applications.

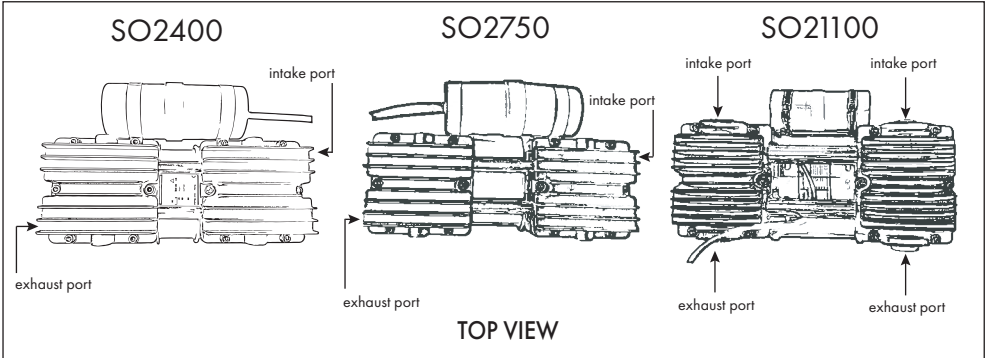
Aeration provides a better solution than chemical treatments. With aeration, there are no chemicals, electricity, or motors in the water which all are hazardous for humans and pets. Savio2 Aeration: "The Clear Solution" for every application from industrial-scale projects to small backyard ponds. The compressors are easy to install and maintain.

- Solutions for large and small features
- Keeps a hole in the ice open to protect fish, boats, and docks
- Keeps the water moving to deter mosquito hatches
- Reliable and oil-free
- Speeds up organic decomposition by increasing oxidation at the bottom of the pond
- Designed and built for continuous use (For ponds with fish, slowly build up to continuous use when first starting an aeration system)
- For indoor and outdoor use
- Keeps thermocline from forming and helps prevent turnovers and winter-kills
- Whisper-quiet
- Extremely low energy
- Great for Winter and Summer

AIR PUMP INSTALLATION

Tubing

Your Savio2 Aeration System should come fully assembled. If your pump is only partly assembled, remove plugs from the intake and exhaust ports. Wrap the threaded end of the fittings with plumber's tape (also called Teflon tape) and screw into the correct threaded ports. (Be sure to connect the intake and exhaust plumbing to the correct inlet and outlet ports.) Connect heat tubes to barbed end of exhaust and run tube outside of the cabinet.



Accessories

This product has an external intake and filtration. Check the filter periodically and replace when necessary. See Page 11

Install relief valve(s) at inlet or outlet or both, to monitor performance. Check valves may be required to prevent back streaming through the pump.

Depending on your system, it may come with a manifold to connect multiple diffusers. You should use barbed valves to control the air pressure to each diffuser. (if you are running 2 or more diffusers, the weighted tubing is likely to be longer for 1 diffuser than another. The valves help you control and have consistent pressure at all diffusers)

Motor Control

It is your responsibility to contact a qualified electrician and assure that the electrical installation is adequate and conforms with building codes and regulations.

Your electrician should determine the correct overload setting required to protect the motor. Incoming line fuses must be able to withstand the motor's starting current.

Electrical Connection

Do not modify the plug provided. If it will not fit the outlet, have the proper outlet installed by a qualified electrician. The plug must be plugged into an outlet that is properly installed and grounded following your local codes and ordinances.

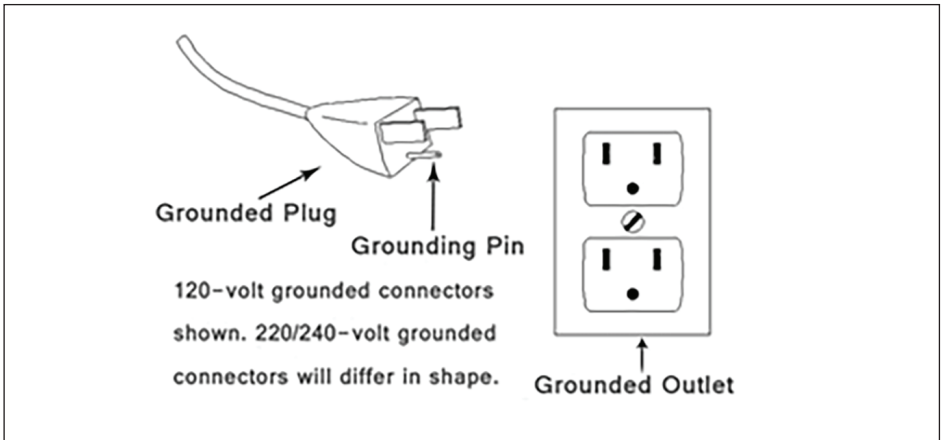
If repair or replacement of the cord or plug is necessary, do not connect the grounding wire to either flat blade terminal. The wire with insulation that is green or green with yellow stripes is the grounding wire. Check the condition of the power supply wiring. Do not permanently connect this product to wiring that is inadequate for the requirements of this product.

Failure to follow these instructions can result in death, fire, or electrical shock.

Check with a qualified electrician or serviceman if the grounding instructions are not completely understood, or if you are not sure whether the product is properly grounded.

Power Supply Cord

For either 120-volt or 220/240-volt circuits connect power supply cord grounding plug to a matching grounded outlet. Do not use an adapter. (See diagram.) Additionally, you should bond your air pump to your cabinet.



In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current.

Operation Warning

- Install proper safety guards as needed.
- Keep fingers and objects away from openings and rotating parts.
- When provided, motor terminal covers must be in place for safe operation.
- Product surfaces become very hot during operation, allow product surfaces to cool before handling.
- Airstream from the product may contain solid or liquid material that can result in eye or skin damage, wear proper eye protection.
- Wear hearing protection. The sound level from the motor may exceed 70 dB(A).
- Do not start against a vacuum or pressure load.

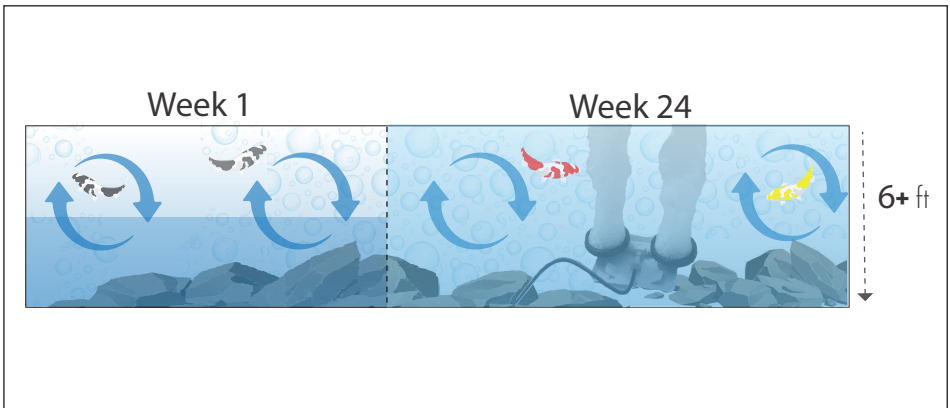
Failure to follow these instructions can result in burns, eye injuries, or other serious injuries.

START UP

If the motor fails to start or slows down significantly while under load, shut off and disconnect from the power supply. Check the plug, cord, and switch for damage. If equipped, the thermal protection switch may have tripped and, the motor can restart after cooling.

Starting Aeration

Ponds and lakes deeper than 6–7 feet are likely to have a thermocline; a separation of warmer water and cooler water below. The lower cooler water contains lower oxygen levels, and is high in other gases. The top warmer water contains most of the oxygen. Bottom aeration breaks this thermocline up to mix the water together providing oxygen to all the water. At first, this mixing lowers the oxygen levels in the top warmer water. To prevent suffocating your fish, bottom aeration should be started slowly. Start aerating your pond or lake for only one hour a day for the first week. Then steadily increase by 1 additional hour each week, until the pond aerator is on 24 hours. Installing an aeration system at the beginning of a pond installation will prevent the stratification from occurring.



Measuring Thermocline

Take temperature readings of the water at 2-foot increments to tell if the lake or pond has low oxygen levels. Do this by using a thermometer and lowering it into the water 2-feet, 4-feet, etc. Each time, leave the thermometer in the water long enough to get the correct temperature at that level. You have stratification if any level is 4°F cooler than the prior reading and aeration will help add oxygen to deeper sections of your pond.

MAINTENANCE

Disconnect the electrical power supply cord before performing maintenance on this product.

Pump surfaces become very hot during operation, allow surfaces to cool before handling.

Check the intake filter after the first 500 hours of operation.

Clean the filter and determine how frequently the filter should be checked to ensure the product's performance.

It is your responsibility to:

- Regularly inspect and make necessary repairs to maintain proper operation.
- Disconnect electrical power supply from the unit.
- Make sure that air pressure is released before starting maintenance.
- Remove the filter cover.
- Check the filter felt. Replace the felt if it is covered with contamination or show signs of increasing differential pressure.
- Re-install felt and filter cover.

Failure to follow these instructions can result in burns, eye injury, or other serious injury.

ROCKING PISTON AIR COMPRESSORS



Item No: SO2400 - 0.5HP		Air Flow Rate (L/min@bar)	Technical Specification
Dimension	271*128*194 mm	102 L/min@0 bar 70 L/min@2 bar 55 L/min@4 bar 46.7 L/min@6 bar 35 L/min@8 bar	Voltage: 120 Power: 550W Pressure: Continuous 7.0 bar Intermittent 8.0 bar Restart 1.0 bar Noise: ≤52dB(A) Speed: 1440rpm/1700rpm Temperature: -5°C-40°C Thermal protector: 135°C
Weight	8.5 kg.		



Item No: SO2750 - 1HP		Air flow rate (L/min@bar)	Technical Specification
Dimension	271*128*216 mm	120 L/min@0 bar 99.5 L/min@2 bar 80 L/min@4 bar 70 L/min@6 bar 60 L/min@8 bar	Voltage: 120 Power: 750W Pressure: Continuous 7.0 bar Intermittent 8.0 bar Restart 1.0 bar Noise: ≤52dB(A) Speed: 1440rpm/1700rpm Temperature: -5°C-40°C Thermal protector: 135°C
Weight	9.5 kg.		



Item No: SO21100 - 1.5HP		Air flow rate (L/min@bar)	Technical Specification
Dimension	305*156*288 mm	280 L/min@0 bar 219 L/min@2 bar 180 L/min@4 bar 160 L/min@6 bar 120 L/min@8 bar	Voltage: 120 Power: 1500W Pressure: Continuous 8.0 bar Intermittent 9.0 bar Restart 1.0 bar Noise: ≤60dB(A) Speed: 1440rpm/1700rpm Temperature: -5°C-40°C Thermal protector: 135°C
Weight	17.5 kg.		

To boost efficiency and extend your air pump's life, use these air pumps at their optimal depths. Running the pump at a lower depth than recommended will most likely break the diaphragm and will also void the one year warranty on the diaphragm.

TROUBLE SHOOTING

Symptoms	Possible Causes	Solutions
<p>Difficult to start or fails to start</p>	<ol style="list-style-type: none"> 1. No power supply 2. Machine parts damaged 	<ol style="list-style-type: none"> 1. Confirm power to motor 2. Replace worn part(s)
<p>Suddenly stopped working and the pumps/motors are hot to the touch</p>	<ol style="list-style-type: none"> 1. Thermal protector powered on/unit overheated 2. Work environment temperature is too hot 3. Power supply fuse blown 	<ol style="list-style-type: none"> 1. Allow the motor to cool down for at least 10 min then reset the thermal protector 2. Ensure the space is properly ventilated or air conditioned 3. Unplug the power plug and check the circuit and its controls
<p>Reduced airflow</p>	<ol style="list-style-type: none"> 1. Dust filter too dirty 2. System leak 3. Part(s) worn-out/damaged 	<ol style="list-style-type: none"> 1. Take apart filter assembly and clear it or replace it 2. Leak-proof the system 3. Replace the worn /damaged part(s)

Faults	Reasons	Dealing With
The pressure can't be increased or increased to a certain extent	Motor leak	Check and exclude
	Exhaust leak	Replace the exhaust pipe
	Piston ring over-wear	Replace the piston ring
	There is some dirt on the valve, sealing is lax	Clean or replace the valve
	Seal is leaking	Replace the seals
Motor temperature is too high	Pressure is higher than rated pressure	Use pump within the rated pressure
	Voltage is too high or too low	Install stabilizers
	Capacitor damaged	Replace the capacitor
	Motor bearing damaged	Replace bearings
Machine has excess vibration	Machine not balanced	Place the compressor on flat ground
	Damping spring loose or damaged	Tighten the screws or replace the spring
	Crank screws loose	Install the crank again
	Excessive wear of piston rings	Replace the piston ring
No power	Power failure	Restart the power supply
	Plug and outlet connection is bad	Use the high-quality outlet
	Motor failure	Repair by professional
Loud noise	Excessive wear of piston rings	Replace the piston ring
	Bearing damaged	Replace the bearing
	Foreign matter blocking the inhalation	Clean the foreign matter
Difficult to start or won't start	Foreign matter blocking the air outlet	Clean the foreign matter
	Voltage is too low	Adjust the use voltage to rated voltage
	Plug and outlet connection is bad	Check outlets
	Pressure more than 5 bar	Reduce the pressure on the pump and remove tubing
	Temperature is too low; the exhaust valve was frozen by water	Should work within 23°F environment

WARRANTY

Savio Engineering provides a manufacturer's limited warranty of 2 years from original purchase date. Warranty does not cover consumables or wear items. Warranty is non-transferable. Within the warranty period, Savio will repair materials with manufacturing deficiencies at their discretion.

This warranty does not cover faults caused by improper use, installation, and handling of the device, or as a result of wear and tear. Savio Engineering does not assume liability for consequential damage caused by the failure of the product.

Removal of cord or ground-pin voids warranty. Warranty is void if the product is not used in accordance with instructions. For warranty claims, please contact your dealer or place of purchase.

S A V I O

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Thanks for your business! We appreciate it!