



Water Works With Otterbine



CONCEPT₂ 60Hz **Owner's Manual**

A Guide to More Dependable
Water Quality Management
With Barebo Incorporated's
1-5 Horsepower Surface Spray
Otterbine Aerators



ROCKET₂



HIGH VOLUME₂



PHOENIX₂

Welcome Aboard!

Welcome to the growing family of people who depend on aerators for better water quality control and aesthetic improvement. All of us at Barebo, Inc. appreciate your confidence in our product.

Water Quality Specialists

Barebo, Inc. is a team of scientists, engineers, and crafts persons who specialize in efforts to improve water quality.

The **Concept₂** line of Otterbine aerators, made of stainless steel and high tech engineering plastics, reflects the results of aerator research and development programs that started in 1956, plus the experience gained through thousands of installations on commercial fish farms, golf courses, parks, and architectural applications.

In a continuous effort to bring our customers water quality management products and in response to customer request Otterbine introduces **OTTERSCHILD**. Otterschild is a blue lake dye that has been pre-packaged in water soluble packets. Just choose the recommended number of packages for your lake size and throw them in! Within hours your lake will have a healthy blue hue without the inconvenience and mess of measuring liquid lake dye. Call your distributor today for more details!

"Rolls Royce Quality"

We believe that today's Otterbine aerators are the finest products of their kind available. Because of their more efficient performance and reliability, some users call them the "Rolls Royce of Aerators."

Follow the Guidelines

You'll find guidelines for installing, operating, and maintaining your aerator in the following pages. We strongly recommend that you read, understand, and apply these guidelines. They will help you get better performance and dependability from your Otterbine aerator.



SUNBURST₂



TRI-STAR₂



AIRFLO



Otterbine aerators are built by skilled craft persons at Barebo, Inc.'s 25,000 square foot factory in Emmaus, Pennsylvania. Each step in assembly is followed by a quality assurance check to maintain high quality.

All Otterbine aerators are made of high-tech engineering plastics and stainless steel. Concept's computer aided design makes it the most efficient, effective aerator produced in the world.

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Aerator Equipment

Unpack and inspect your aerator, report any damage to the carrier that delivered your aerator. Make sure you have received the following:

- 1. Aerator** - you will find a label located on the housing of the aerator. Check the label to make sure you have received the correct horsepower and voltage aerator.
- 2. Power Control Center** - you will find a label inside of the Power Control Center door. This label lists the voltage and horsepower of the control center. Verify that the aerator and control center are the same horsepower and voltage.
- 3. Power Cable** - verify that you have received the correct length.
- 4. Warranty Registration Card** - make sure to fill in your Otterbine warranty registration card and send it back to the factory so that we can send you our bi-annual customer newsletter, which will keep you up to date on all the latest aeration news. **WARRANTY IS VOID UNLESS CARD IS RETURNED.**

Electrical/PCC Installation

This weather resistant NEMA 3R Power Control Center comes complete with a twenty-four hour on/off timer, magnetic contactor with overload relay, surge arrestor, disconnect, overcurrent protection, HOA switch, and ground fault protection (where applicable). All internal connections are pre-wired. All electrical specifications are located on the door of the Otterbine Power Control Center. Otterbine recommends that all **ELECTRICAL WORK BE DONE BY A QUALIFIED, LICENSED ELECTRICIAN**. Make sure that all electrical work conforms with local, state and national electrical codes.

NOTE: Otterbine suggests coordinating electrical installation with physical installation. The electrician will need to be on hand for a two minute dry-run test of the unit and will also need to check the running amperage after installation. **These electrical tests are a crucial part of the installation process and should not be ignored.**

A. Install the Otterbine Power Control Center as close to the pond as possible.



- CAUTION:** The Power Control Center should not be accessible from the water.
- ATTENTION:** la loite de control ne doit pas être accessible de l'eau.
- WARNING:** Screw connections may loosen during shipping, verify that all screw connections are tight before energizing PCC.
- CAUTION:** Otterbine recommends that the PCC not be mounted in direct sun light when installed outdoors.

B. Your Otterbine Power Control Center can be mounted indoors or outdoors.

- When mounting outdoors Otterbine suggests that you use a piece of exterior plywood and sturdy 4 x 4 post(s).
- When mounting indoors the PCC can be mounted directly to the wall.

C. Bring the incoming power into the panel on the opposite side of where the aerator cable is to exit.

D. Attach incoming power to the top of the disconnect. Otterbine recommends that all exterior incoming power cable and exterior aerator cable be encased in conduit.

E. Attach aerator power cable to the contact points on the overload relay in the Power Control Center. Make sure to always use Otterbine aerator cable. If Otterbine aerator cable is not used, the **WARRANTY IS VOID**.

CAUTION: Each cable should be in its own conduit to avoid nuisance tripping of the GFCI device.

NOTE: Wiring schematics are located on the following pages. Please note on all 460V units EPD/GFCI (Equipment Protection Device/Ground Fault Circuit Interrupter) is an optional accessory.

WARNING: All Otterbine submersible aeration systems must be installed in conformance with all local, state and national electrical codes. Otterbine aeration systems require the use of GFCI for safe operation. If the proper grounding and GFCI protection are not used, serious or FATAL electrical shock may occur.

ADVERTISSEMENT: Otterbine® fortement suggere qu'au panneau de branchement électrique un interrupteur avec control de defaut de masse soit installé, ou les personnes se trouverai près de l'eau.

SATELLITE CONTROLLERS: Custom control panels are available as an option for customers using computerized irrigation controllers. These panels will interface with the computer and allow you to run your units(s)/lights(s) remotely. See your local Otterbine distributor or call Otterbine directly for more information.

WARNING: A full three phase power supply is recommended for all three phase motors, consisting of three individual transformers or one three phase transformer. So called "open" delta or wye connections are not true three phase power supplies and are likely to cause problems of current unbalance. Open delta or wye power and phase converters often suffer from line unbalance which can cause poor motor performance, nuisance tripping or premature motor failure. **WARRANTY IS VOID** if a factory authorized phase converter is not used.



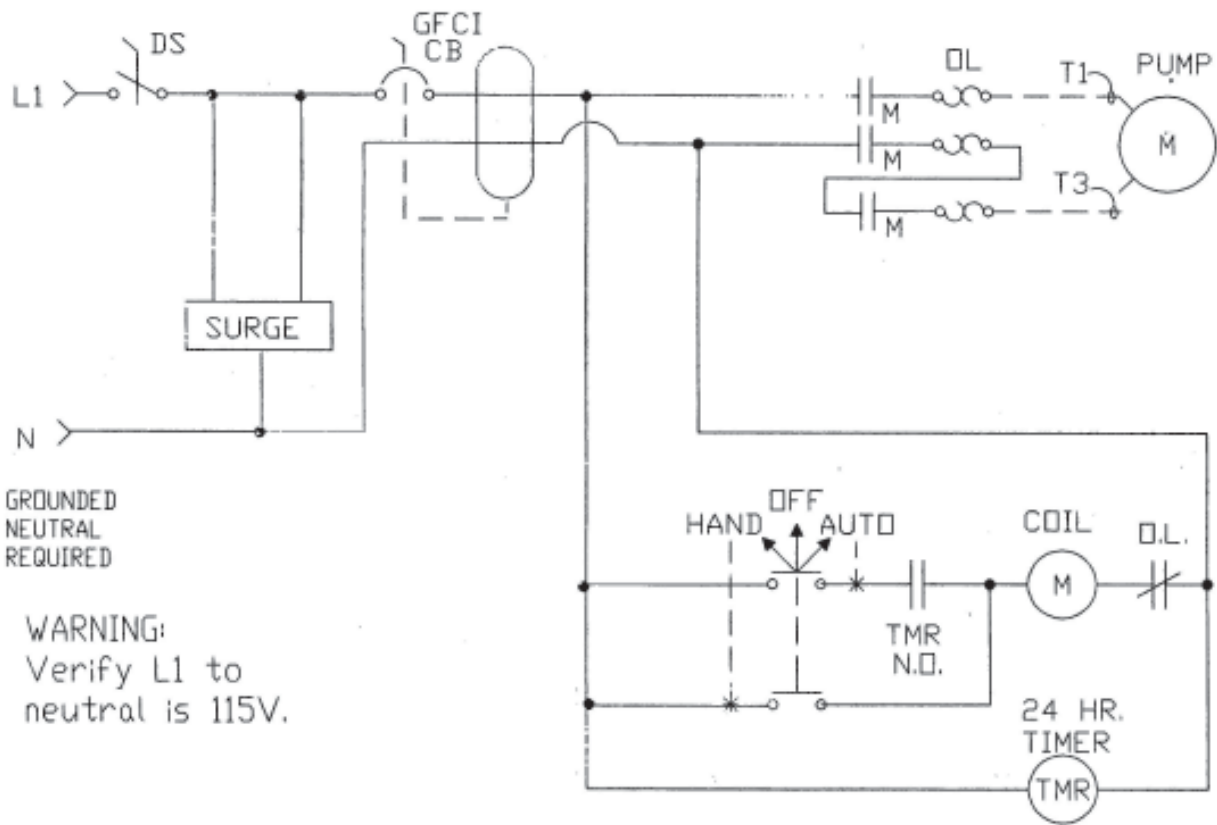
Earth Ground Symbol (used in PCC)

Timer Operation

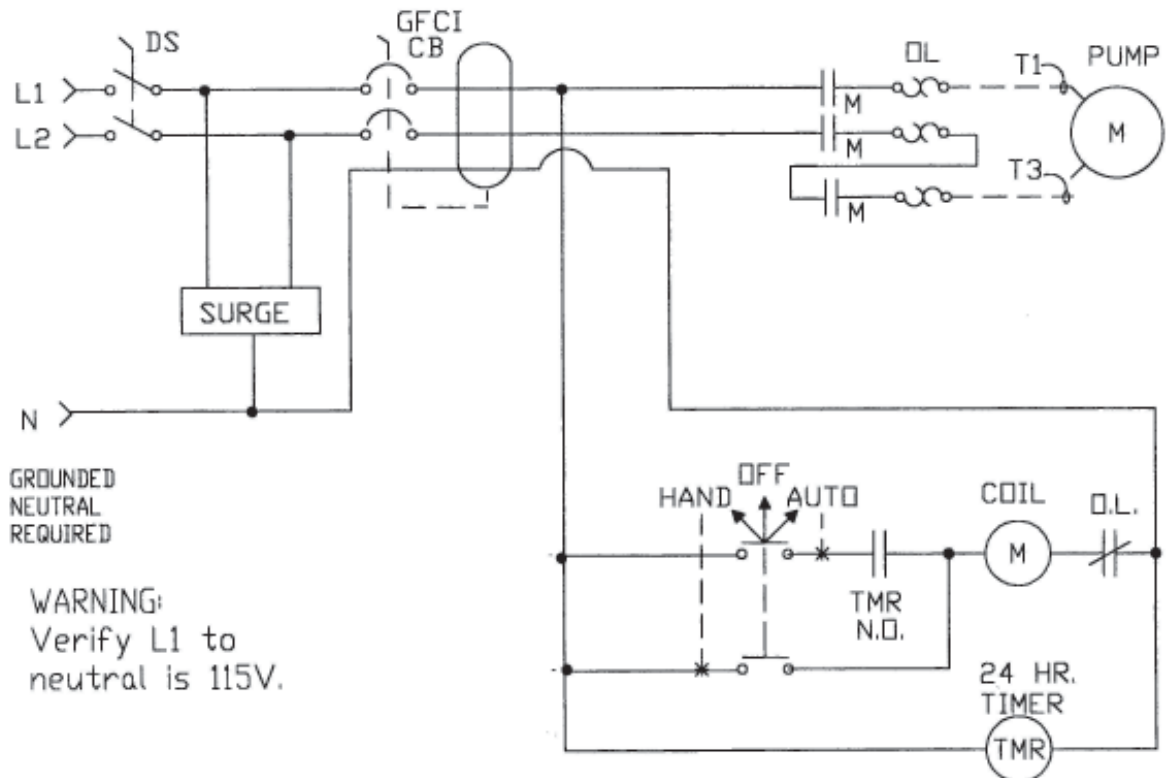


1. Push **in** (towards center) all of the tripper pins on the timer dial.
2. Pull **out** all of the tripper pins on the dial that are between the times you want the unit to run. Example: If you want the unit on from 7:00AM - 5:00PM, you would then pull out all of the tripper pins between those times. When the dial rotates to a tripper pin that is in, it will turn off.
3. Turn the dial clockwise to set the time of day. Close the panel and apply power. In case of power failure, reset timer.

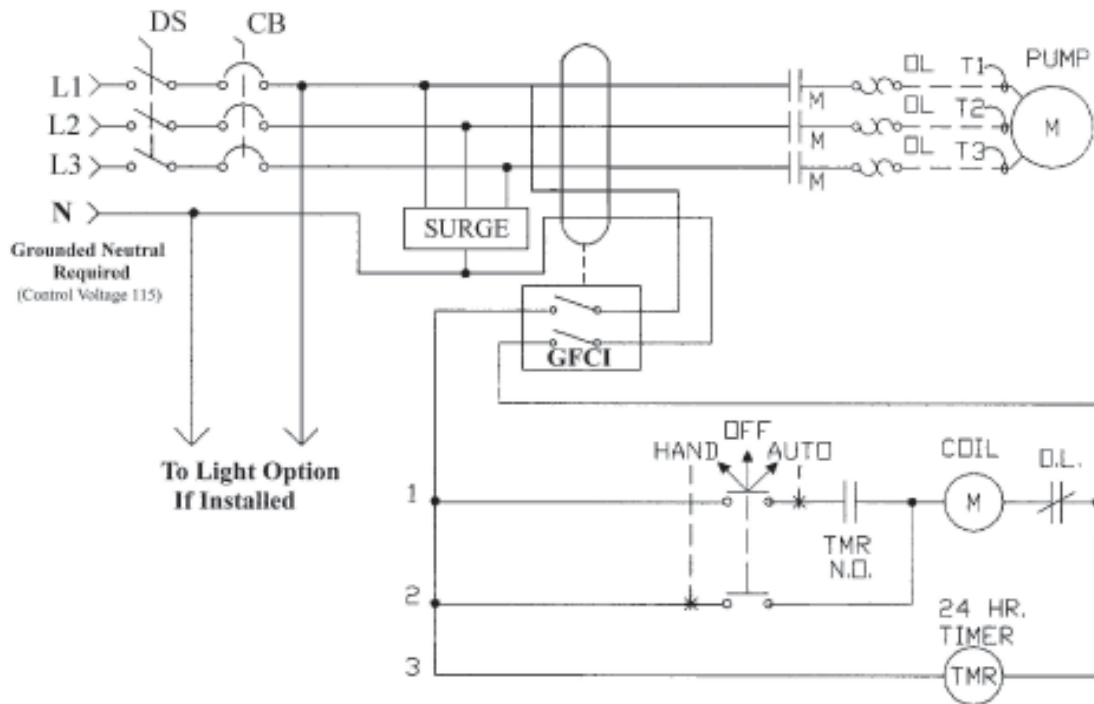
115 Volt 1 Phase 60 Hertz Schematic



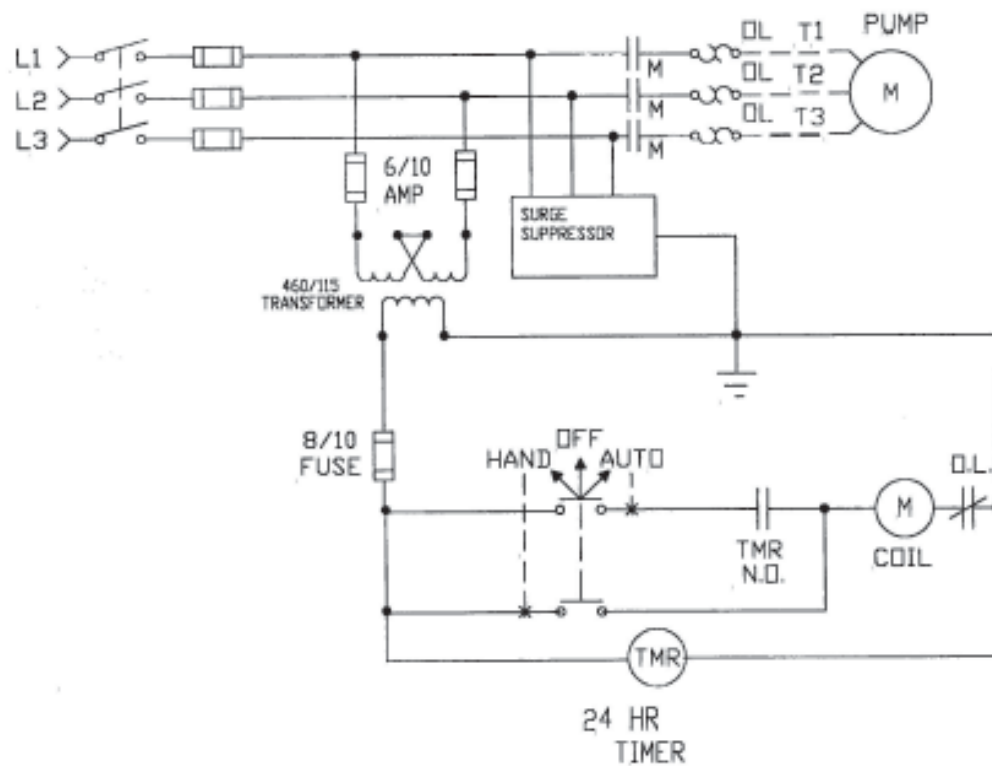
208-230 Volt 1 Phase 60 Hertz Schematic



208-230 Volt 3 Phase 60 Hertz Schematic

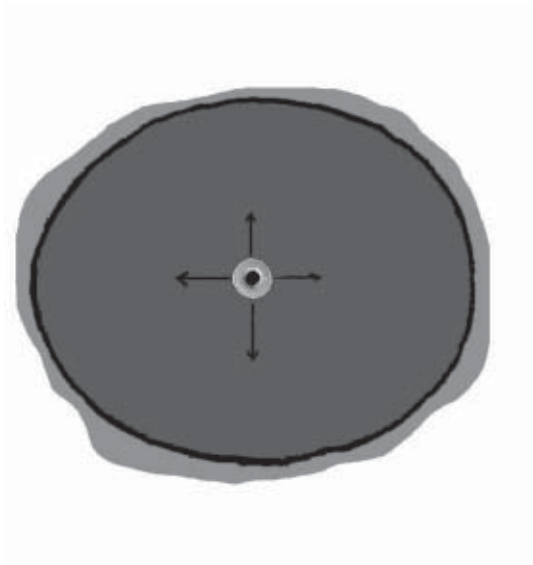
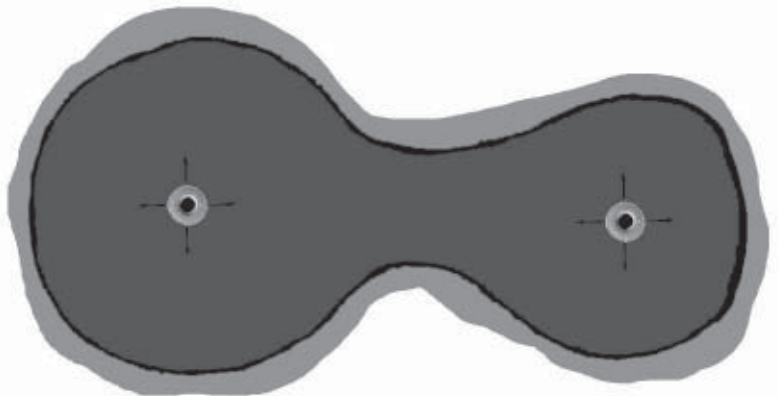
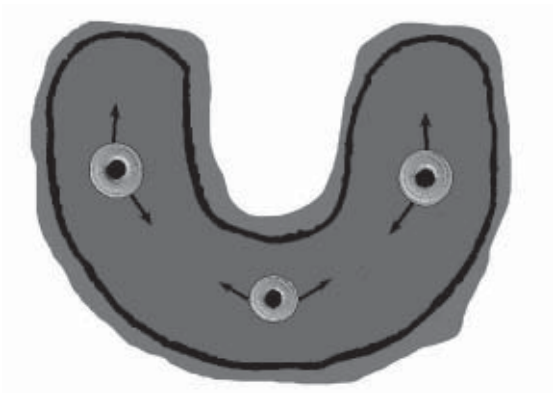
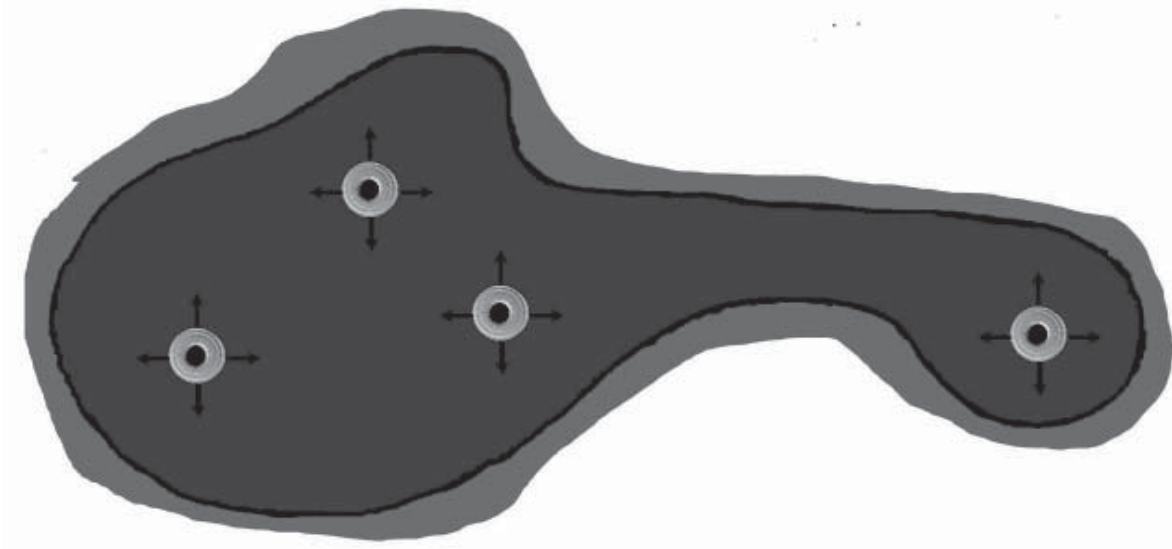


460 Volt 3 Phase 60 Hertz Schematic



Aerator Placement

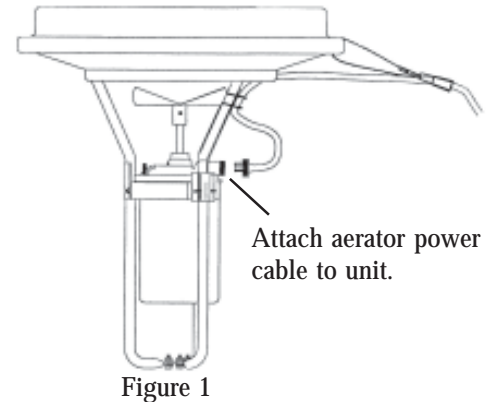
Aerator Placement -Placement is crucial to how quickly and efficiently your Otterbine aerator is able to clean your pond. The following diagram shows the most common ponds and the most effective aerator placement in these ponds.



Physical Installation

Prior to installation please measure your water depth. All 1-5 HP Concept₂ Otterbine aerators require at least **40"/1m** of water to run properly. If the water is too shallow, dig out a portion of the pond bottom directly under the aerator. If high waves or large fluctuations in water depth occur, it may be necessary to allow for more than the required **40"/1m**. Shorter support arms are available upon request. The shorter support arms change the minimum operating depth to **31"/77.5 cm**.

A. Attach your Otterbine power cable to the aerator. Align the pigtail connector on the cable up to the pin configuration on the bulkhead on the aerator. **HAND TIGHTEN** the coupling nut onto the bulkhead connector. **DO NOT OVER TIGHTEN -- OVER TIGHTENING WILL CAUSE A FRACTURE IN THE CONNECTOR AND COULD LEAD TO A SHORT CIRCUIT--**see Figure 1.



NOTE: You will notice a small amount of silicon compound on the female end of the aerator connector. This compound has been applied during assembly and is needed in order to make proper seal between the two connectors. **DO NOT REMOVE COMPOUND!** When servicing the aerator make sure to re-apply compound (Otterbine part# 48-0001).



**CAUTION: KEEP HANDS CLEAR OF THE IMPELLER
WHEN TRYING TO START THE AERATOR!
ATTENTION: BARDER VOS MAINS Á DISTANCE DE
LA TURBINE PORSQUE VOUS ESSAYEZ DE
DÉMARRER P'ÁERATEUR**

B. Have your electrician perform an on-shore dry-run test:

1. Check and compare the actual power supply at the site to the information on the aerator's nameplate in regard to: motor voltage, phase, and frequency. IF VOLTAGE VARIATIONS ARE NOT WITHIN THE RANGE ON THE FOLLOWING CHART, DO NOT OPERATE THE UNIT!

60 Hz	Minimum	Maximum
115	109	127
208-230	197	250
460	437	495
575	546	600

2. With the aerator on dry land, attach the power cable to the aerator and power supply.

3. Turn the handle mechanism on the exterior of the Power control center to the "ON" position.

4. Energize the unit by turning the "Hand, Off/Auto" switch to the "Hand" position. Run unit 2 minutes to break in seals. DO NOT RUN UNIT FOR MORE THAN 2 MINUTES -- MOTOR DAMAGE CAN OCCUR. Check for COUNTER CLOCKWISE rotation at this time.

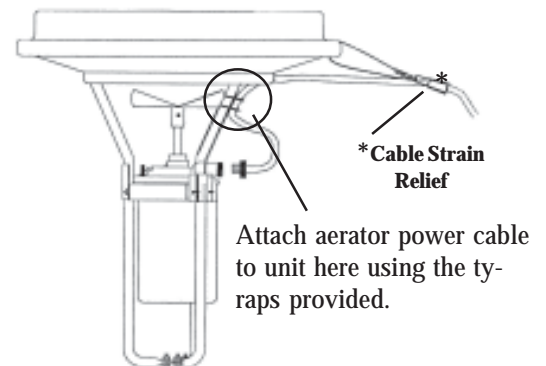
5. IF Steps 1-4 are successful, you are ready to install the unit in the water. Proceed with following instructions.

CAUTION: OTTERBINE® aerators are designed to run in a COUNTER CLOCKWISE DIRECTION and CURRENT UNBALANCE BETWEEN THE LEGS ON 3 PHASE UNITS SHOULD NOT EXCEED 5%. Steps "L-M" on page 12 determine current unbalance.

ATTENTION: les aérateurs Otterbine® sont desigènes pour fonctionner dans le sens contraire des aiguilles d'une montre et tout desequilibre entre chacune des phases de l'alimentation ne doit pas dépasser 5% voir "L-M page 12 pour déterminer le desequilibre.

C. Install the cable strain relief device. Pass the wire hoop through one of the holes in the float and around the aerator power cable. Re-attach the cable strain relief --see Figure 2.

D. Attach your aerator power cable to one of the support arms with the ty-raps provided. In corrosive, brackish, and salt water applications use two ty-raps to attach your power cable to the support arm--see Figure 2.



There are two different methods of securing your aerator, anchoring and mooring. Otterbine suggests mooring as it will be easier to install and service the aerator. On the next page you will find instructions for mooring the aerator; if you prefer to anchor your aerator, please see "Anchoring Your Aerator."

MOORING YOUR AERATOR:

- A. Proceed to page 11, follow steps E-K.**
- B. Proceed to page 13, follow steps L-O.**

ANCHORING YOUR AERATOR:

- A. Proceed to page 12, follow steps E-K.**
- B. Proceed to page 13, follow steps L-O.**

Mooring the aerator

An illustration showing how to moor an aerator is given in Figure 3.

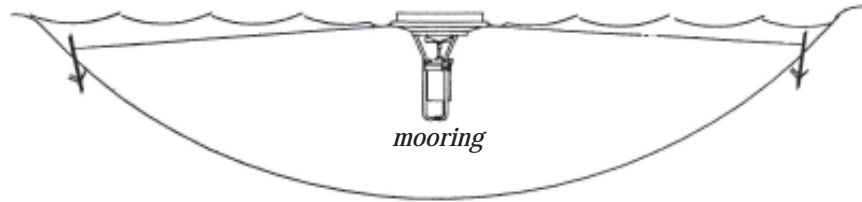


Figure 3

E. You will need the following items in order to moor your Otterbine aerator.

1. Use all brass and stainless steel hardware in the installation of your Otterbine aerator.
2. Otterbine recommends using 1/4"/.63 cm or 1/2"/1.25 cm polypropylene rope or stainless steel cable for your mooring lines.
3. At the mooring points themselves you will need a wooden stake, 1/2"/1.25 cm of rebar or a "duck bill" type earth anchor --see Figure 4.



Figure 4

- Duckbill Earth Anchors are driven into the ground, using a drive rod and heavy hammer, compacting the earth as they drive downward, until they reach the recommended depth. After removing drive rod, installer pulls up on cable. This planes or rotates the anchor into load lock position, like a toggle bolt in undisturbed earth.

F. Choose a suitable location for your Otterbine aerator. See the aerator location chart on **page 8** to determine the best aerator location for the most efficient and effective aeration.

G. Secure your first mooring point. If you are using a stake or 1/2"/1.25cm rebar, make sure to pound the mooring point securely into the ground on the outer edge of the pond. If you are mooring with an earth anchor, you will need to place the earth anchor two feet into the pond and then pound the earth anchor about two feet into the pond bottom. The earth anchor will allow your mooring lines to be virtually unnoticeable as it will be hidden two feet beneath the surface of the water.

H. Attach the mooring lines to the holes in the float. Use a strong, tight knot as it will secure the Otterbine aerator in its place.

I. Launch your aerator into the water. Walk one mooring line around to the other side of the pond.

J. Pull your Otterbine aerator into your previously chosen location.

K. Put in the other anchor or stake. Tie down your Otterbine aerator leaving enough slack in your lines to allow the aerator to turn 90° or 1/4 turn. The slack in the lines will allow for proper start up, wave action, and fluctuations in the water level. Proceed to step L (**page 13**).

Anchoring an aerator

An illustration showing how to anchor an aerator is given in Figure 5.

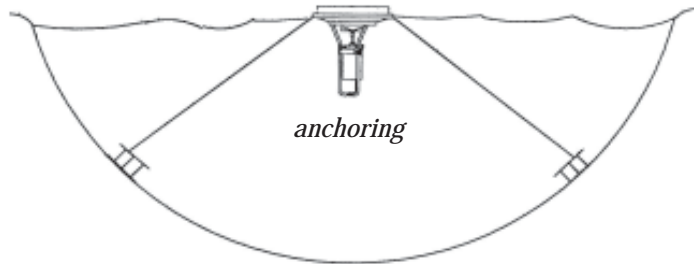


Figure 5

E. You will need the following items to anchor your Otterbine aerator:

1. Use all stainless steel and brass hardware in the installation of your Otterbine aerator.
2. Otterbine recommends using 1/4"/.63 cm or 1/2"/1.25 cm polypropylene rope or stainless steel cable for your anchoring lines.
3. Two 60 - 80 pound anchors/two 27 - 36 kilo anchors.
4. Small boat.

F. Choose a suitable location for your Otterbine aerator. See aerator location chart on page 8 so that you can place your aerator in the best location for the most efficient and effective aeration.

G. Launch your aerator into the water upside down, with the motor housing sticking up into the air. Take a piece of rope and pass it through one of the holes on the float.

H. In a small boat tow the aerator into your previously chosen location.

I. Determine where to locate the anchors. Where the anchors are located will vary depending on the depth of your pond. See the chart below to determine the best location for your anchors.

MAXIMUM DEPTH		DISTANCE BETWEEN ANCHORS	
feet	meters	feet	meters
5'	1.5m	11'	3.4m
6'	1.8m	15'	4.6m
7'	2.1m	20'	6.1m
8'	2.4m	30'	9.1m
9'	2.7m	40'	12.0m
10'	3.0m	55'	16.7m
11'	3.3m	70'	21.2m
12'	3.6m	85'	26.8m
13'	3.9m	100'	30.3m
14'	4.2m	120'	36.4m
15'	4.6m	140'	42.4m

J. Drop in the first anchor line. Place your aerator in the desired location and securely tie the anchor line to one of the holes on the outside edge of the float.

K. Drop in the second anchor line. Securely tie the anchor line to the hole on the outside edge of the float which is directly opposite of the first anchor line that was tied onto the float. Make sure the unit can rotate 90° or 1/4 turn. The slack in the anchoring lines will allow for proper start up, wave action, and fluctuations in the water level. Flip the unit over. Proceed to step L (page 13).

L. Energize your unit.

M. Have your electrician do the following while the unit is in the water under load:

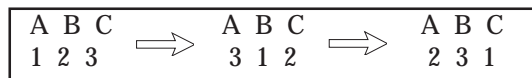
1 PHASE UNITS: Record running voltage & running amperage, power control center serial #, and cable length and size on the sticker inside the power control panel. Go to step N.

3 PHASE UNITS:

1. Check the direction of the rotation. Three-phase motors can run in either direction depending on how they are connected to the power supply. When the three cable leads are first connected to the power supply, there is a 50% chance that the motor will run in the right direction.

2. Establish the correct motor rotation by running in both directions. Change rotation by exchanging any two of the three motor leads. **The rotation that gives the lowest current readings is always correct. Failure to do the above MAY CAUSE THE MOTOR TO FAIL WITHIN ONE WEEK OF RUNNING TIME. MOTOR FAILURE DUE TO REVERSED POLARITY WILL NOT BE COVERED UNDER WARRANTY.**

3. Check current readings in amps on each leg using the three possible hook-ups. Roll the motor leads across the starter in the same direction to avoid motor reversal. EXAMPLE:



4. Calculate the percent of current unbalance:

- A. Add the three line amp values together.**
- B. Divide the sum by three, yielding current average.**
- C. Pick the amp value that is furthest from the average current (either high or low).**
- D. Determine the difference between this amp value (line C) and the average (line B).**
- E. Divide this difference (line D) by the average (line B).**
- F. Multiply the result (line E) by 100 to determine percent of unbalance.**

5. Current unbalance should not exceed 5% at the service factor load. If unbalance cannot be corrected by rolling leads, locate source of unbalance & correct it. IF Leg furthest from average stays on the same power lead, THEN the primary cause of unbalance is the power source. IF leg furthest from average moves on each of the hookups with a particular motor lead, THEN the primary cause of unbalance is the "motor side" of starter. Consider: damaged cable, leaking splice, poor connection, or faulty motor as possible causes.

6. Record running voltage & running amperage, power control center serial #, and cable length and size on the sticker inside the power control panel. Proceed to step N.

N. If GFCI or EPD is installed, have the electrician test the device for proper operation.

O. Lock your enclosure with a padlock to prevent any type of vandalism. Set the "hand-off-auto" switch located on the outside of your Power Control Center to the HAND or AUTO position. The HAND position on the switch will let your aerator run continuously. The AUTO position on the switch will allow the timer inside your aerator to operate the unit. See **page 5** for timer operating instructions. Your aerator should be running at this point and installation is complete.

CAUTION: The aerator should be allowed to run continuously for 12 hours after installation. This will allow the aerator to properly "break in."

ATTENTION: l'aérateur doit être permis de fonctionner continuellement pendant 12 heures après l'installation. Cel permettra a l'aérateur d'être proprement rode.

General Assembly Instructions

NOTE: If your aerator was received unassembled, proceed with the following instructions. Failure to complete assembly as directed could result in damage to the unit.

A. Check that all of the materials have been received. Verify that you have all the materials shown in Figure 6, plus the desired pumping system.

B. Proceed to the proper assembly section depending on the model of your aerator.

Assembly for Sunburst Units

A. Installing the Sunburst throat - see Figure 7.

1. Lay the aerator float down as shown in Figure 7. Insert the Sunburst throat into the float, aligning the notches of the throat with the pockets of the float. Press the throat firmly into place.

B. Attaching support arms - see Figure 8.

1. Insert the top of the adjustable support arms into one of the pockets of the float. Repeat for the (2) standard arms.
2. Holding the power unit securely, insert the motor shaft through the bottom of the throat and bring the support arms up to the power unit.
3. Insert the studs of the brass ring into the second set of holes down from the top of the support arm (float end).
4. Apply (2) 1/4" flange nuts to each of the support arms and "snug" down the nuts to hold the arms to the brass ring. (Do not over tighten, adjustment may be required later.)
5. Attach the bottom of the support arms to the support arm brace with (1) 5/16" lock nut, (1) 5/16" flat washer, and (1) 5/16" hex bolt for each of the three arms.

NOTE: When the support arms are assembled correctly, a perfect triangle should form where they come together at the support arm brace. Torque the 5/16" bolts to 15-17 ft/lbs.

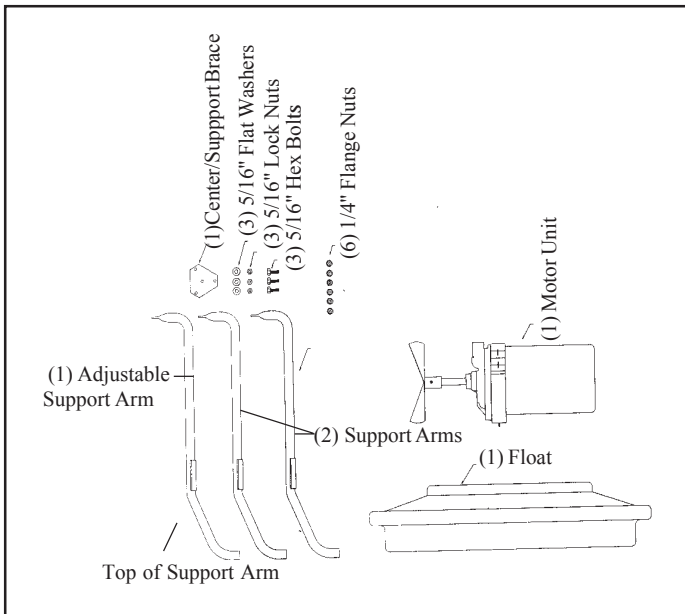


Figure 6

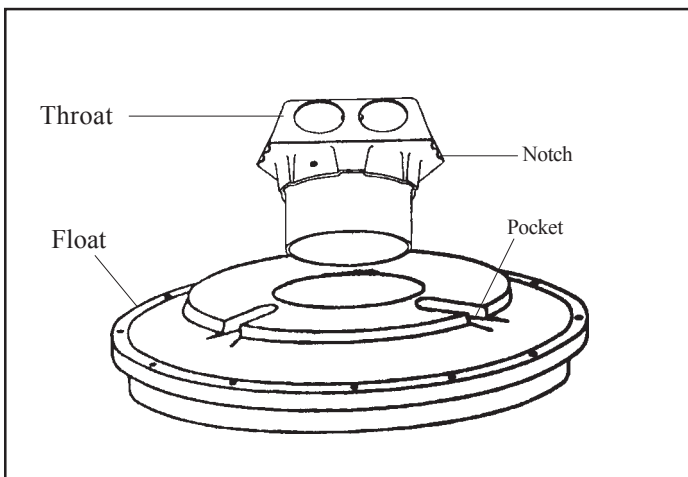


Figure 7

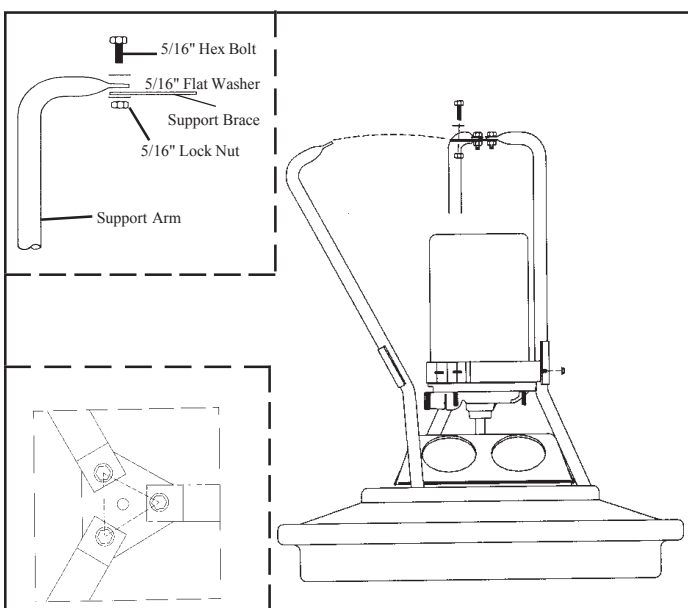


Figure 8

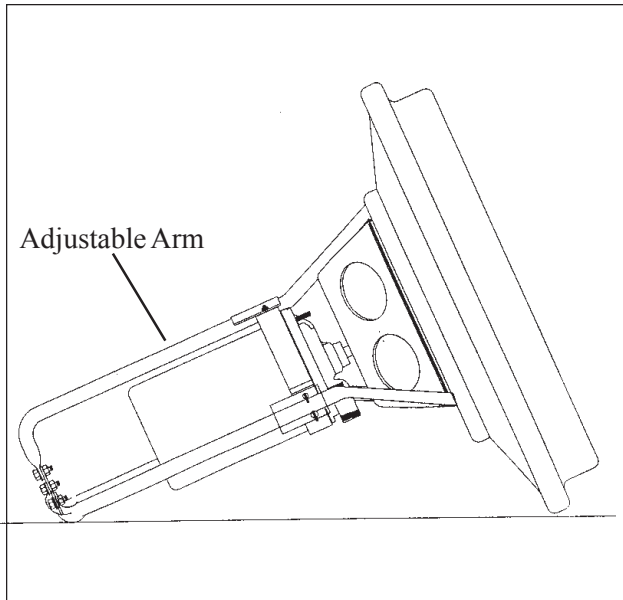


Figure 9

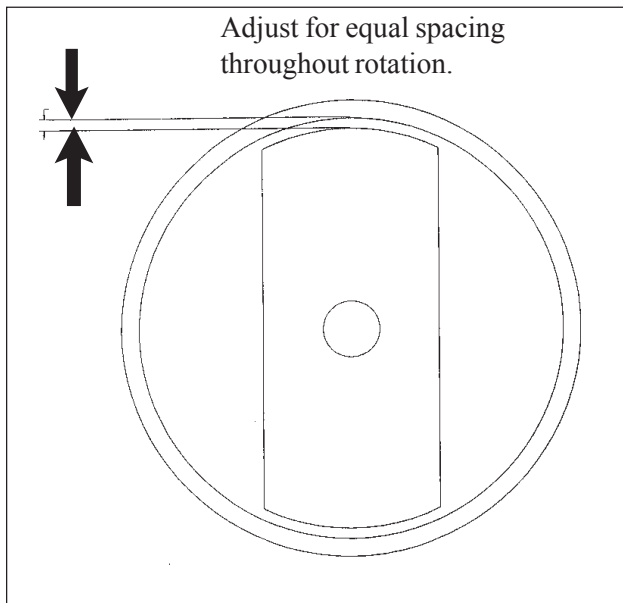


Figure 10

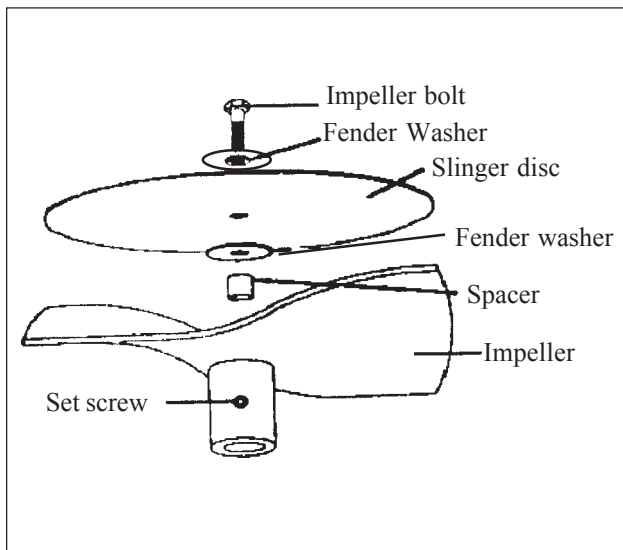


Figure 11

C. Aligning impeller in throat assembly - see Figure 9&10

1. Turn the unit on it's side so that the adjustable arm is up. See Figure 9. Place the impeller on the shaft and rotate the impeller one complete turn. Verify equal distance between the end of the impeller and the inner wall of the throat throughout rotation. See Figure 10.

2. If adjustment is required, loosen flange nuts on adjustable arm and slide power unit up or down to center impeller.

NOTE: If required move the adjustable arm to an alternate position in the float and repeat steps 1 and 2.

NOTE: If the impeller strikes the throat in any area, damage will result.

3. Tighten all nuts on mounting ring, starting with flange nuts on adjustable arm. Torque to 10-12 ft/lbs.

D. Attaching impeller. - see Figure 11

1. Install the impeller onto the motor shaft.

2. Turn the impeller until the set screw is flush against the middle of the flat part of the motor shaft. Using a hex key driver, tighten the set screw.

NOTE: Use a drop of removable locktight on the impeller bolt.

3. Place a fender washer, slinger disc, fender washer, and spacer on the impeller bolt. Install the bolt/slinger assembly on the impeller and torque the bolt to 35 ft/lbs.

NOTE: The impeller assembly must be installed as illustrated. Placing components in the improper order will affect spray pattern.

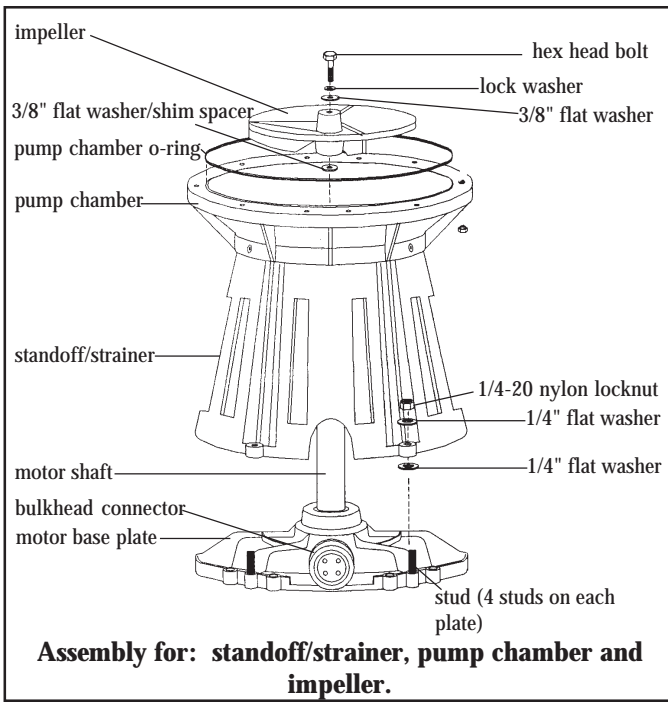


Figure 12

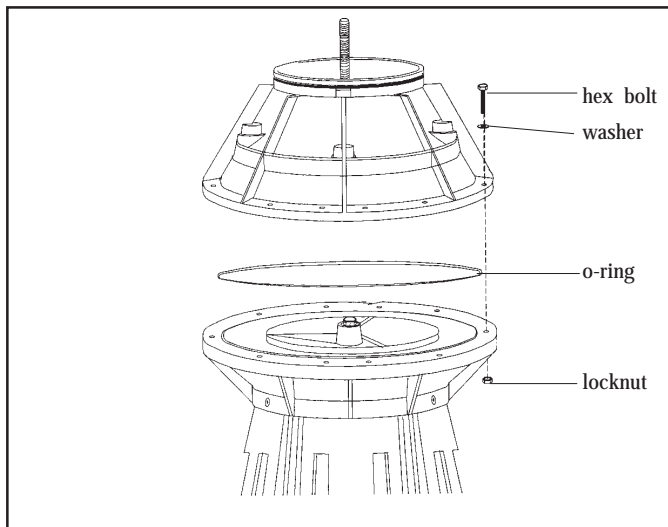


Figure 13

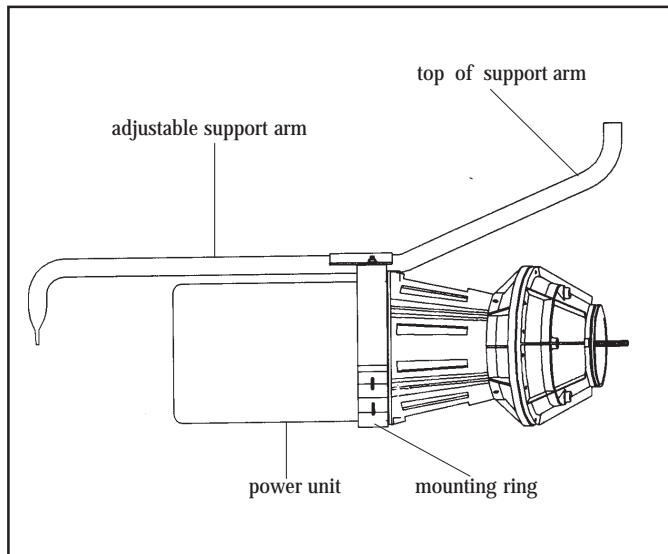


Figure 14

Assembly for Rocket, Phoenix and Tri-Star

A. Installing standoff/strainer, pump chamber and impeller - see Figure 12

1. Place a 1/4" flat washer over each of (4) studs on the motor base plate.

2. Install the pump chamber/standoff strainer assembly onto the motor base plate with (4) additional 1/4" flat washers and (4) 1/4" nylon locknuts.

CAUTION: Do not over tighten.

3. Install the impeller onto the motor shaft and secure using the hex head bolt, lock washer, and 3/8" flat washer.

4. Turn the impeller by hand. If the impeller rubs or hits bottom, remove the impeller and place a shim spacer on the end of the motor shaft and re-attach the impeller. Turn the impeller by hand again. If the impeller rubs, remove the impeller and add another shim. Reattach impeller. If there is still a clearance problem, please contact your Otterbine distributor.

B. Installing diffuser housing and manifold assembly - see Figure 13

1. Insert the "o" ring into the groove on the pump chamber.

2. Install the manifold assembly onto the pump chamber and secure using (8) #10 flat washers, (8) hex bolts, and (8) nylon locknuts.

NOTE: The manifold has been pre-assembled at the factory with a volute located inside the manifold.

C. Installing adjustable support arm. - see Figure 14

1. Attach the adjustable support arm to the mounting ring using (2) 1/4" flange nuts. Torque nuts to 10-12 ft/lbs.

NOTE: Use the second set of holes down from the top of the support arm when assembling the support arms to the motor unit. Center the mounting ring's bolts in the middle of the slots.

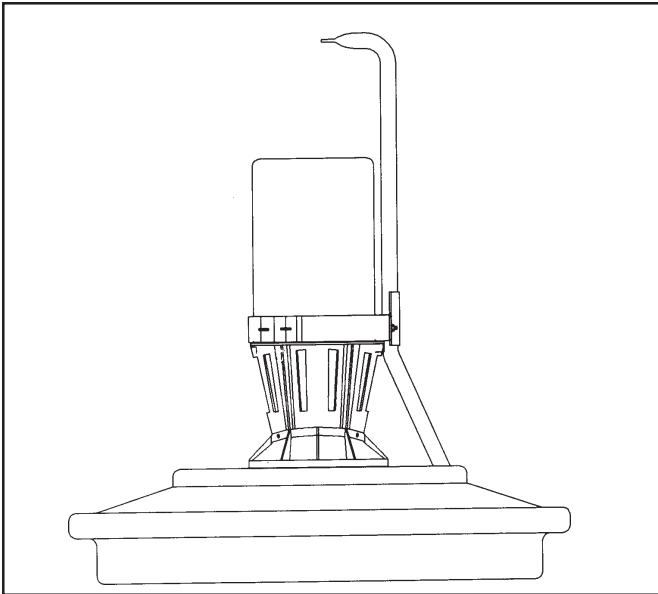


Figure 15

D. Placing motor unit in float. - see Figure 15

1. Place the float on a flat surface with the top side down.
2. Insert the top of the support arm, which is attached to the motor unit into one of the pockets in the float. At this point, the support arm/motor assembly should be able to stand upright in the float without being held.

E. Installing remaining support arms - see Figure 16

1. Insert the top of the second and third support arms into the pockets of the float.
2. Attach each of these arms to the mounting ring with (2) 1/4" flange nuts. Use the second set of holes down from the top of the support arm. Torque nuts to 10-12 ft/lbs.
3. Connect the bottom of the support arms to the support arm brace with (1) 5/16" lock nut, (1) 5/16" flat washer, and (1) 5/16" hex bolt for each of the three arms.

NOTE: When the support arms are assembled correctly, a perfect triangle should form where they come together at the support arm brace. Torque the 5/16" bolts to 15-17 ft/lbs.

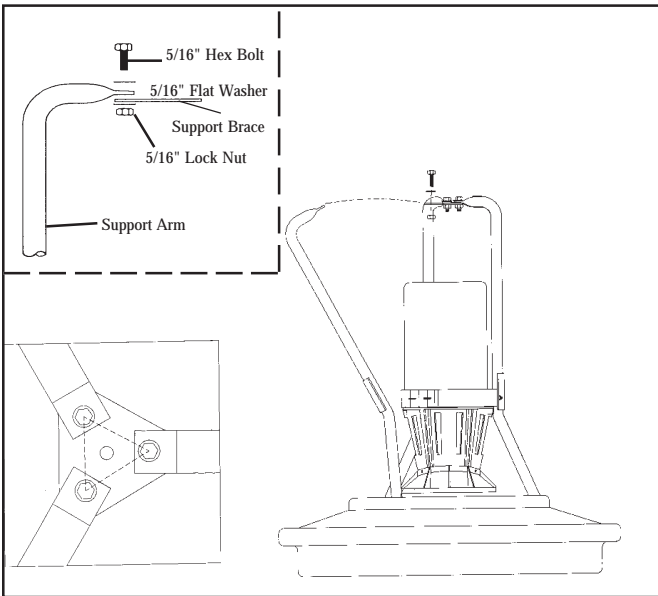


Figure 16

F. Installing diffuser housing - see Figure 17

1. Turn the unit right side up or on it's side.
- NOTE:** If installing a Rocket diffuser plate, verify a "o" ring is pressed onto the plate before installing. If not, install one at this time.

2. Position the diffuser housing on top of the manifold, aligning the notch of the diffuser housing with the slot in the manifold.

NOTE: The diffuser housing is secured by the diffuser plate.

3. Line the diffuser plate up with the center stud of the manifold and secure it using (1) 5/16" flat washer and (1) 5/16" nylon locknut.

CAUTION: Do not over tighten. The plate must be flat, not bowed.

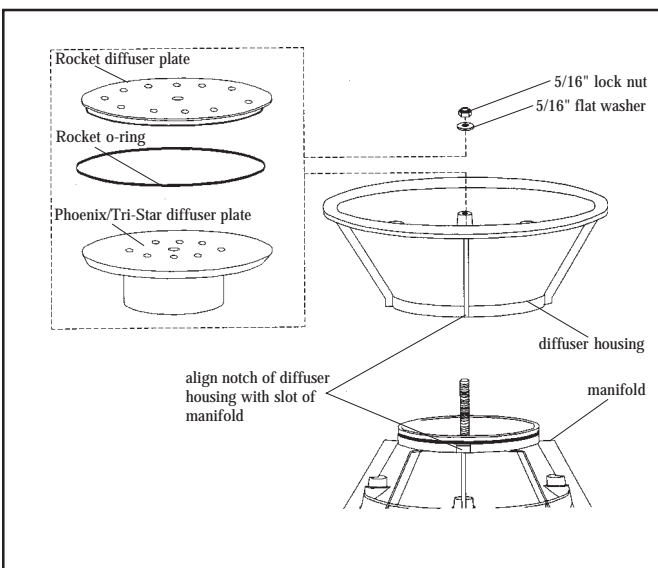


Figure 17

Assembly - High Volume Units

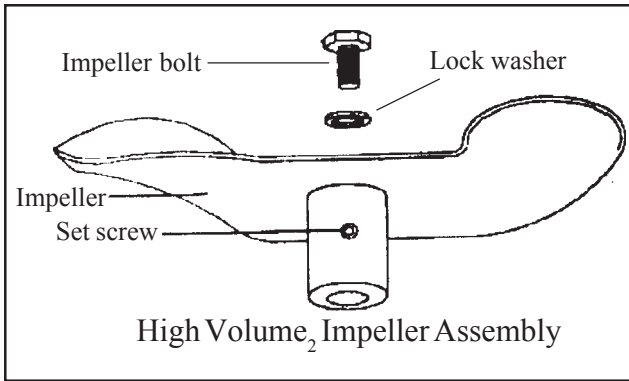


Figure 18

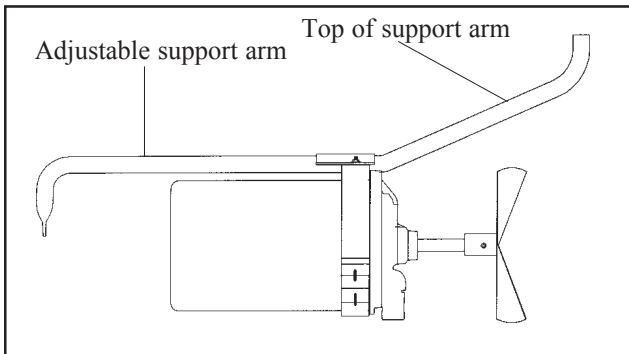


Figure 19

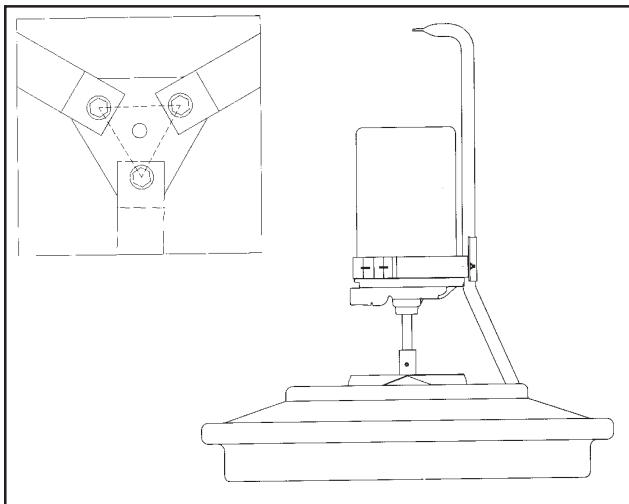


Figure 20

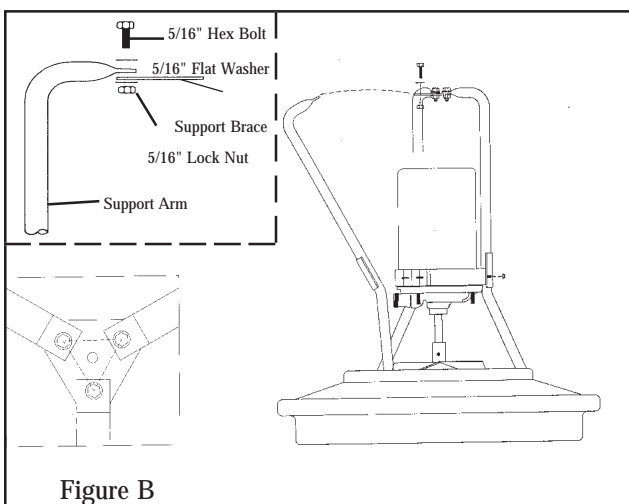


Figure 21

A. Install the High Volume impeller - see Figure 18

1. Install the impeller onto the motor shaft.
2. Turn the impeller until the set screw is flush against the middle of the flat part of the motor shaft. Using a hex key driver, tighten the set screw.

NOTE: Use a drop of removable lock-tight on the impeller bolt to 35 ft/lbs.

3. Secure the impeller to the motor shaft with the impeller bolt and split lock washer. Torque the bolt to 35 ft/lbs.

B. Installing adjustable support arm. - see Figure 19

1. Attach the adjustable support arm to the mounting ring using (2) 1/4" flange nuts. Torque the bolts to 10-12 ft/lbs.

NOTE: Use the second set of holes down from the top of the support arm when assembling the support arms to the motor unit. Center the mounting ring's bolts in the middle of the slots.

C. Placing power unit in float. - see Figure 20

1. Place the float on a flat surface with the top side down.
2. Insert the top of the support arm, which is attached to the power unit into one of the pockets in the float. At this point, the support arm./motor assembly should be able to stand upright in the float without being held.

D. Installing remaining support arms - see Figure 21

1. Insert the top of the second and third support arms into the pockets of the float.
2. Attach each of these arms to the mounting ring with (2) 1/4" flange nuts. Use the second set of holes down from the top of the support arm. torque the bolts to 10-12 ft/lbs.
3. Attach the bottom of the support arms to the support arm brace with (1) 5/16" lock nut, (1) 5/16" flat washer, and (1) 5/16" hex bolt for each of the three arms. Torque the bolts to 15-17 ft/lbs.

NOTE: When the support arms are assembled correctly, a perfect triangle should form where they come together at the support arm brace.

Concept₂ Low Voltage Light Mounting Instructions - see Figure 22

NOTE: For installation of Fountain Glo₂ High Voltage Lights or MR16 Low Voltage Lights, refer to the manual supplied with the light set.

All Otterbine aerators are available with an optional; 2, 4 or 6 light set.

Colored lenses come in red, green, yellow and blue. Clear lenses come as part of the standard light package.

Otterbine also offers an optional light sequencer. See the Otterbine distributor closest to you for details on how you can turn your aerator into a dramatic night-scape.

A. To mount lights onto a CONCEPT₂ float, place one of the large fender washers on one of the 1/4" bolts.

B. Evenly place the lights around the outer edge of the float at the holes provided.

C. Mount the L - Bracket on the bottom side of the float and tighten the bolts using the self locking nuts provided.

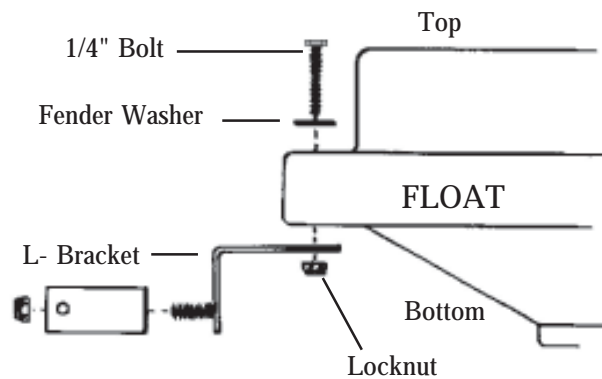


Figure 22

Concept₂ Transformer Installation

Otterbine Hi-Intensity light sets require underwater transformers located at the unit. The following directions will instruct you on how to install your Hi-Intensity light transformer onto your Otterbine aerator.

- A. Remove one of the support arms from your aerator by taking off (2) 1/4" nuts at the brass mounting ring (see Figure 23) and (1) 5/16" bolt and nut from the Support Arm Brace (see Figure 23). Tip arm outward.**
- B. Slide the Transformer Enclosure under the two remaining Support Arms and place it on the motor housing.**
- C. Place one of the Support Arms in the center of the anti-rotational point on the Transformer Enclosure --see Figure 24. Figure 24 is located on page 21.**
- D. Place the 5/16" bolt and washer provided through the center hole of the Support Arm Brace and tighten it into the center hub of the Transformer Enclosure.**
- E. Replace the Support Arm back to its original position by refastening the (2) 1/4" nuts to the Brass Mounting Ring and the (1) 5/16" bolt and nut to the Support Arm Brace.**
- F. Install the lights onto the float.** See page 19 for light mounting instructions.
- G. Attach power cable to Transformer Enclosure.** At this point, if installing a sequencing light set, attach two cables to the Transformer Enclosure. **NOTE:** You will notice a small amount of silicon compound on the female end of the aerator connector. This compound has been applied during assembly and is needed in order to make proper seal between the two connectors. **DO NOT REMOVE COMPOUND!** When servicing the aerator make sure to re-apply compound (Otterbine part# 48-0001).

(2) Support Arm Brace - Remove one of the 5/16" bolts that mounts one of the Support Arms to the Support Arm Brace.

(1) Brass Mounting Ring - remove the 2 - 1/4" nuts that hold the Support Arm onto the Brass Mounting Ring.

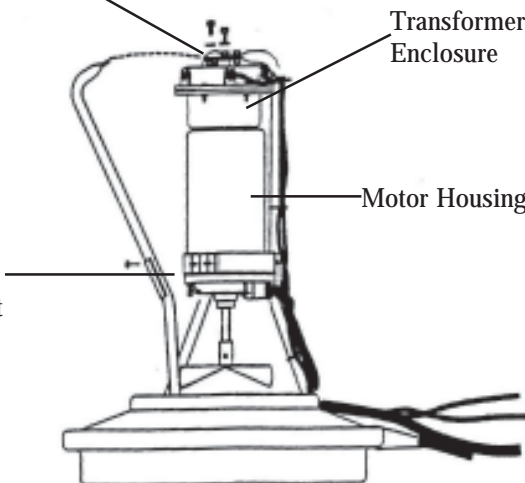


Figure 23

(1) Anti Rotational Point - Place one of the Support Arms in the center of the anti-rotational point on the Brass Transformer Enclosure. This will keep the unit from rotating.

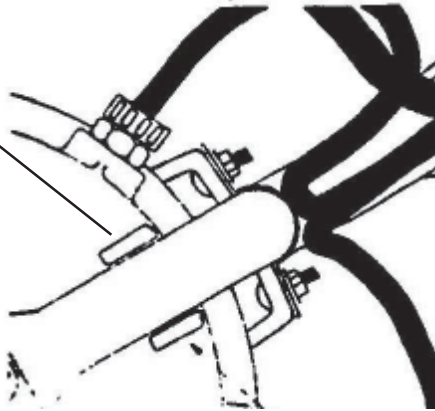


Figure 24

H. Attach all power cables to one of the Support Arms with the Ty-Raps provided --see Figure 25

I. The Light Jumper Cords will also have to be attached to an empty outer float hole with the Ty-Raps provided --see Figure 25

(1) Attach each Light Jumper Cord to an empty hole on the outer edge of the float as close as possible to where each individual light is mounted. This must be done for each Light Jumper Cord.

(2) Attach Power Cables to one of the support arms with the Ty-Raps provided.

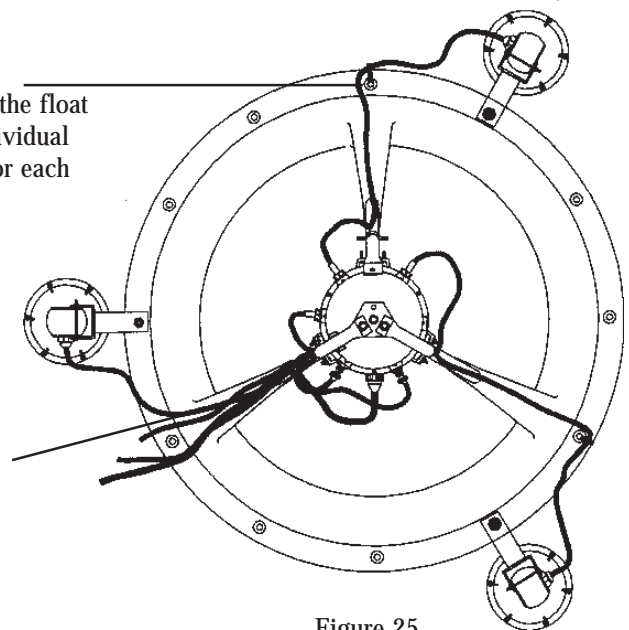


Figure 25

Screen Installation

All Otterbine aerators can be made available with either a 1/4" or 1/2" screen which helps to keep debris away from the aerator intakes and, therefore, decreases the probability of your Otterbine aerator clogging.

1/4" Screen Kit #F-900-002F:

QTY	DESCRIPTION	PART #
9	1" Fender Washers	800-011
9	S/S Sheet Metal Screws	BP2803B
1	C2 1/4" Screen	15-0001

1/2" Screen Kit #F-800-001B:

QTY	DESCRIPTION	PART #
9	1" Fender Washers	800-011
9	S/S Sheet Metal Screws	BP2803B
1	C2 1/2" Screen	15-0002

A. Pull screen over motor unit and support arms until it reaches the first ridge on the float - see Figure 26

B. Make sure the cord/cords are running through the cord trough where the float arms fit into the float (choose one cord trough for all of your cables - see Figure 26). Pull approximately two inches of the screen past the Mounting Ring. This is to insure that all of the cord troughs are adequately covered.

C. Fasten the screen to the float with the washers and screws provided. Fasten one screw and one washer on both sides of each cord trough - see Figure 26.

D. Screw the remaining screws and washers through the screen into float between the cord troughs - three places --see Figure 26.

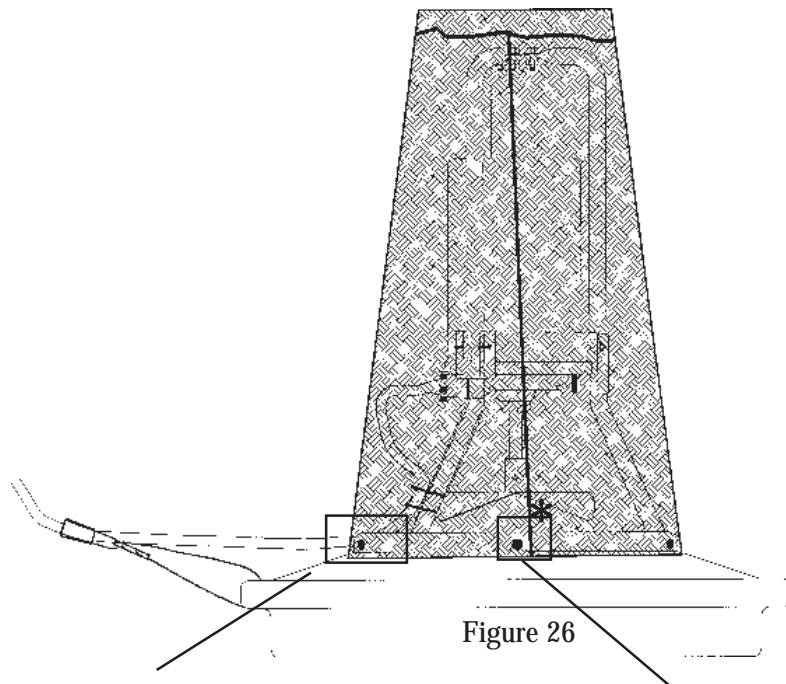


Figure 26

(1) Cord troughs are located on the float where the support arm meets the float. Fasten one screw and one washer on both sides of each cord trough (use six screws and six washers).

(2) Place a washer and screw between each cord trough (three screws and three washers).

Otter Rock Installation

Otterbine offers optional rock float covers for all aerators. These covers can be ordered from any Otterbine distributor (see list at back of owner's manual).

QTY	DESCRIPTION	PART #
2	Otter Rock tie down bolt	BP2803B
1	Otter Rock decorative float cover	C2-ROCK

- A. Place Otter-rock float cover on the float and push down.**
- B. Locate the two holes on the inner circle of the rock cover.**
- C. Insert the two Otter Rock tie down bolts into the holes in the rock cover and attach the cover to the float**

Trouble Shooting Guide

SYMPTOM	POSSIBLE CAUSE	CORRECTION
1) Small spray pattern (Spray drops gradually , i.e. minutes or hours).	Clogged intake Clogged screen Loose impeller	Remove debris Remove debris Tighten impeller bolt
2) Cavitation or low spray pattern. (Spray drops suddenly , less than one second.)	Low line voltage Check for air bubbles surfacing around float Debris between slinger and impeller	Check voltage at power control center & at aerator. Make sure the unit is within the specified voltage range. Make sure mooring and anchoring lines are securely tightened Remove debris
3) Motor will not start	Breaker/fuse has tripped Loose or broken terminals Low voltage Defective power cable GFCI device has tripped	Check circuit breaker or fuse, reset and/or replace, if necessary. Check voltage Look for loose or broken terminals. Measure power to starter. Check acceptable maximum cable length (see table of contents) Check cable. If defective, call distributor. Reset and test GFCI device. If device trips again call elec./dist.
4) High Volume model aerators where spray pattern drops suddenly and then comes back to full pattern after restart our after several hours of operation.	This unit is designed to pump a tremendous amount of water. When the unit is put into a pond that is shallow the current that can be created will cause this phenomenon. The unit is designed to perform like this.	A High Volume unit can easily be changed into a Sunburst spray pattern if a more aesthetically pleasing spray pattern is desired. Please see a local Otterbine distributor or call Otterbine direct at 1-800-AER8TER or (215) 965-6018.

To insure proper operation of the Otterbine aerator it **MUST** have the **FULL PROPER VOLTAGE**. If actual voltage does not fall within the chart listed below, consult the factory before installing the aerator.

RATED	MINIMUM	MAXIMUM
115V	109V	127V
208-230V	197V	250V
460V	437V	495V

Concept₂ Technical Data 60Hz English Measure

Model	HP	Volts	Ph	Motor (RPM)	Full load amps	Spray Height (feet)	Spray Width (Feet)	Pumping Rate (GPM) **	Induced Circ. Rate (GPM)	Min. Operating Depth	Shipping Weight (Lbs) *
High Volume											
100	1	115	1	1725	13.4	2	4	775	7,750	40	200
		230	1	1725	6.8	2	4	775	7,750	40"	200
200	2	230	1	1725	11.5	3	8	1470	14,700	40"	200
300	3	230	1	1725	12.9	4	10	1,900	19,000	40"	205
		230	3	1725	8.2	4	10	1,900	19,000	40"	205
		380	3	1680	4.7	3	9	1,850	18,500	40"	205
		460	3	1725	4.1	4	10	1,900	19,000	40"	205
Sunburst											
100	1	115	1	1725	13.4	4	15	625	6,250	40"	205
		230	1	1725	6.8	4	15	625	6,250	40"	205
200	2	230	1	1725	11	6	25	1,180	11,800	40"	205
300	3	230	1	1725	12.8	7	30	1,500	15,000	40"	210
		230	3	1725	7.9	7	30	1,500	15,000	40"	210
		380	3	1680	4.7	7	28	1,460	14,600	40"	210
		460	3	1725	4	7	30	1,500	15,000	40"	210
500	5	230	3	1725	14	8	35	2,000	20,000	40"	215
		380	3	1680	7.6	7	30	1,950	19,500	40"	215
		460	3	1725	7.2	8	35	2,000	20,000	40"	215
Rocket											
100	1	115	1	1725	13.4	10-12	4	300	3,000	40"	205
		230	1	1725	6.8	10-12	4	300	3,000	40"	205
200	2	230	1	1725	12	16-18	4	500	5,000	40"	205
300	3	230	1	1725	13.7	20-21	4	700	7,000	40"	210
		230	3	1725	8	20-21	4	700	7,000	40"	210
		380	3	1680	4.7	17-19	4	680	6,800	40"	210
		460	3	1725	4	20-21	4	700	7,000	40"	210
500	5	230	3	1725	14.4	23-24	4	1,000	10,000	40"	215
		380	3	1680	7.5	20-22	4	970	9,700	40"	215
		460	3	1725	7.2	23-24	4	1,000	10,000	40"	215

Concept₂ Specifications - 60Hz English measure (Continued)

						Spray Dimensions (feet)						
Model	HP	Volts	Ph	Motor (RPM)	Full Load Amps	Height\Width			Pumping Rate (GPM)	Induced Circ. Rate (GPM)	Min. Operating Depth	Shipping Weight (Lbs.)
Tri-Star						Lower	Middle	Upper				
100	1	115	1	1725	13.4	3\11	5\7	8\1.5	600	6,000	40"	205
		230	1	1725	6.8	3\11	5\7	8\1.5	600	6,000	40"	205
200	2	230	1	1725	12.3	4\15	7\10	12\1.5	800	8,000	40"	210
300	3	230	1	1725	14	6\18	8\11	15\1.5	1,200	12,000	40"	210
		230	3	1725	8.2	6\18	8\11	15\1.5	1,200	12,000	40"	210
		380	3	1680	4.7	5\17	7\10	14\1.5	1,150	11,500	40"	210
		460	3	1725	4.1	6\18	8\11	15\1.5	1,200	12,000	40"	210
500	5	230	3	1725	14	7\24	10\12	16\1.5	2,000	20,000	40"	215
		380	3	1680	7.6	6\22	9\11	15\1.5	1,950	19,500	40"	215
		460	3	1725	7	7\24	10\12	16\1.5	2,000	20,000	40"	215
Phoenix						Lower	Upper					
100	1	115	1	1725	13.4	4\12	8\3		600	6,000	40"	205
		230	1	1725	6.8	4\12	8\3		600	6,000	40"	205
200	2	230	1	1725	12.5	6\19	12\3		800	8,000	40"	205
300	3	230	1	1725	14.3	8\23	16\3		1,200	12,000	40"	210
		230	3	1725	8.5	8\23	16\3		1,200	12,000	40"	210
		380	3	1680	4.9	7\21	15\3		1,150	11,500	40"	210
		460	3	1725	4.3	8\23	16\3		1,200	12,000	40"	210
500	5	230	3	1725	14.8	9\26	18\3		2,000	20,000	40"	215
		380	3	1680	7.9	9\26	18\3		1,950	19,500	40"	215
		460	3	1725	7.4	9\26	18\3		2,000	20,000	40"	215

*Shipping weight includes unit, 50' cable, and power control center.

Actual pumping rates, all other pumping rates based on empirical data and may vary due to voltage, elevation, and relative humidity. **NOTE: Deduct 15% from the pumping rate and spray pattern when operating on 50Hz power.

RPM - Revolutions Per Minute

GPM - Gallons Per Minute

Lbs. - Pounds

HP - Horsepower

Ph - Phase

Maximum Cable Lengths

60Hz - 1 & 3 ph. units

Hertz / Phase	Horespower	Voltage	#12 Cable meters	#10 Cable meters	#12 Cable feet	#10 Cable feet
60Hz / 1Ph	1 HP	115	35m	55m	110'	175'
	1 HP	230	130m	205m	430'	680'
	2 HP	230	75m	120m	250'	395'
	3 HP	230	70m	110m	225'	355'
60Hz / 3Ph	3 HP	230	128m	205m	420'	670'
	3 HP	460	515m	790m	1700'	2600'
	5 HP	230	75m	115m	240'	380'
	5 HP	460	290m	465m	960'	1525'

Maintenance

Your Otterbine aerator requires periodic maintenance:

- A. **Once a year**, disconnect the unit from the power source and physically inspect the aerator and underwater cable for any cuts, cracks or breaks in the power cable and connector. These may cause oil leaks and/or electrical shorts. Inspect and clean the pumping chamber components.
- B. **After every three running seasons**, a simple oil change is necessary to keep your unit running smoothly. Please contact your local Otterbine distributor to order a maintenance kit, p/n C2-MKIT.

When a unit is properly cared for, it will give you years of trouble free service. If a problem does arise, please contact your Otterbine distributor or the factory directly at 1-800-AE8TER.

Winterization

If you live in a region of the country that experiences long periods of cold weather you may want to take your aerator out of the water. Otterbine strongly suggests that you take the following three units out of the water unless you have installed an Otterbine circulator assembly (see below):

- ROCKET₂
- PHOENIX₂
- TRI-STAR₂

These models are especially prone to freezing in. If an aerator becomes frozen-in, there is a possibility of motor damage. **Damage caused to the motor due to freezing will not be covered under warranty.**

The **High Volume**₂ and the **Sunburst**₂ pump higher volumes of water and the spray pattern will not freeze as easily. These units will freeze in if the weather stays severe for a long enough period of time. You can decrease the chance of freezing in if you run these units 24 hours a day during long periods of extremely cold weather. Circulator Assembly can be attached to these units (see below).

OPTIONAL CIRCULATOR ASSEMBLY: is available through your local distributor (see list in back of manual). The circulator assembly attachment will allow any unit to run during cold weather. When the assembly is attached the unit will only circulate, thus eliminating the unit's spray pattern and in effect acting as a de-icer keeping the water open for animals and fowl.

WARNING:

- **Aerators located in or near swimming pools, garden ponds and similar locations must be equipped with Ground Fault Circuit Interrupter. Please see your local Otterbine distributor for price and availability.**
- **The permissible temperature range for this equipment is -12° to 40° C/10° to 104° F.**
- **It is possible for the water to become slightly polluted in the rare case that an oil leakage occurs.**
- **If the power cord is damaged, it must be replaced by a special cord or assembly available from Otterbine/ Barebo, Inc. or an authorized Otterbine/Barebo, Inc. sales and service center.**
- **Les aerateurs situes a courte distance ou proche de piscines, etangs de jardin et semblable endriots doivent etrê équipés avec un interupteur avec control de defaut. S'il vous plait voyez votre d'istributeur d'Otterbine local pour priz et desponibilitee.**
- **La gamme de température permit pour cet équipement est de -12 a 40C/10 a 104F.**
- **Si la corde électrique est abimeé, elle doit etre remplacé par une corde special ou assemblage disponible d'Otterbine®/Barebo, Inc. ou par un centre de service de vente autorise pár Otterbine®/Barebo, Inc.**
- **L'eau pourrait devenir legèrement pollue dans le tres rûre cas oul'huile fuirait.**

Otterbine Distributor List

UNITED STATES		WATERWORKS INDUSTRIES		GEORGIA	
ALABAMA		GRANITE BAY	916-989-9600	AQUASCAPE ENVIRONMENTAL	
ENTERPRISE AQUATICS		WINDSOR	707-526-0426	WOODSTOCK	678-445-0077
ENTERPRISE	334-393-6386	COLORADO		ATLANTIC FOUNTAINS	
JERRY PATE TURF SUPPLY		L.L. JOHNSON DIST. CO.		FLOWERY BRANCH*	770-967-9535
PENSECOLA, FL	850-968-0731	BROOMFIELD	303-465-2677	ESTATE MANAGEMENT	
TIECO, INC.		COLORADO SPRINGS	719-531-7600	BRUNSWICK	912-466-9800
BIRMINGHAM	205-942-4800	DENVER*	303-320-1270	HAWAII	
HUNTSVILLE*	256-533-9387	FORT COLLINS	970-223-3316	KONA IRRIGATION	
MOBILE	334-639-1565	GREENWOOD VILLGE	303-790-4646	HALEIWA	808-638-8835
MONTGOMERY*	334-834-3705	CONNECTICUT		KAILUA-KONA	808-329-1167
ARIZONA		BARLOW PUMP & SUPPLY		IDAHO	
HORIZON		PROSPECT*	203-758-3988	SILVER CREEK IRRIGATION	
CHANDLER	480-961-3311	TURF PRODUCTS CORP.		BOISE	208-327-0519
MESA*	480-964-1616	ENFIELD*	860-763-3581	HAILEY	208-788-3115
PEORIA	623-876-9200	DELAWARE		NAMPA	208-463-0519
PHOENIX	602-276-7700	PHILADELPHIA TURF		PICABO	208-788-3539
SCOTTSDALE	480-596-8711	DOYLESTOWN, PA*	215-345-7200	POCATELLO	208-232-7535
TUCSON	520-408-1000	TURF EQUIPMENT & SUPPLY		ILLINOIS	
SIMPSON NORTON		FRANKFORD	302-732-9290	CHICAGO TURF & IRRIGATION	
GOODYEAR	623-932-5116	FLORIDA		ITASCA*	630-773-5457
N. LAS VEGAS	702-644-4066	AQUATIC VEGETATION CONTROL		ERB EQUIPMENT	
ARKANSAS		RIVIERA BEACH*	561-845-5525	BELLEVILLE*	618-233-0088
JERRY PATE TURF SUPPLY		CENTRAL PUMP & SUPPLY		EFFINGHAM	217-857-3016
MEMPHIS, TN	901-765-2126	COCOA	321-636-1075	OUTDOOR EQUIPMENT COMPANY	
LITTLE ROCK	501-663-7716	LEESBURG	352-315-1085	CHESTERFIELD, MO	314-532-6622
CALIFORNIA		PALM BAY	321-724-1075	SPRINKLER IRRIGATION	
FOUNTAIN SUPPLY COMPANY		PORT ORANGE	904-760-7875	EAST PEORIA*	309-699-4120
CARLSBAD	619-431-8530	VERO BEACH	561-778-7875	INDIANA	
SANTA CLARITA	661-251-4505	EAST SIDE PUMP		AQUATIC CONTROL	
HIGH TECH IRRIGATION		SARASOTA	941-371-5383	SEYMOUR*	812-497-2410
INDIO*	760-347-4116	ENTERPRISE AQUATICS		AQUATIC WEED CONTROL	
PALM DESERT	760-773-9224	ENTERPRISE, AL	334-393-6386	SYRACUSE*	219-533-2597
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WARRANTY: Barebo, Inc 3840 Main Road East, Emmaus Pennsylvania 18049,U.S.A. hereby warrants, subject to the conditions hereinbelow set forth, that should the **OTTERBINE** product prove defective by reason of improper workmanship or materials at any time during the warranty period the Purchaser at retail will be guaranteed that **BAREBO** will repair or replace the said **OTTERBINE** product as may be necessary to restore it to satisfactory operating condition, without any charge for materials or labor necessarily incident to such repair or replacement, provided that:

- a) The enclosed Warranty Registration Card should be mailed to **BAREBO** within fifteen (15) days of the original receipt by the Purchaser at retail in order to avoid delays;
- b) The **OTTERBINE** product must be delivered or shipped, prepaid, in its original container or a container offering an equal degree of protection, to **BAREBO** or a facility authorized by **BAREBO** to render the said repair or replacement services or, if purchased from an authorized **OTTERBINE** dealer, to such dealer;
- c) The **OTTERBINE** product must not have been altered, repaired or serviced by anyone other than **BAREBO**, a service facility authorized by **BAREBO** to render such service, or by an authorized **BAREBO** dealer, and the serial number of the **OTTERBINE** product must not have been removed or altered: and
- d) The **OTTERBINE** product must not have been subjected to lightning strikes and other Acts of God, vandalism, freezing-in, accident, misuse or abuse, and must have been installed in conformance with applicable electrical codes (including proper electrical protection), and also installed, operated and maintained in accordance with guidelines in the Owner's Manual shipped with the Otterbine product.

No implied warranties of any kind are made by **BAREBO** in connection with this **OTTERBINE** product, and no other warranties, whether expressed or implied, including implied warranties of merchantability and fitness for a particular purpose, shall apply to this **OTTERBINE** product. Should this **OTTERBINE** product prove defective in workmanship or material, the retail Purchaser's sole remedy shall be repair or replacement as is hereinabove expressly provided and, under no circumstances, shall **BAREBO** be liable for any loss, damage or injury, direct or consequential, arising out of the use of, or inability to use, the **OTTERBINE** product, including but not limited to retail Purchaser's cost, loss of profits, goodwill, damages due to loss of product or interruption of service, or personal injuries to Purchaser or any person.

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