



# Owners Manual

## Robust-Aire®

### Aquatic Aeration System

#### Contents

|   |           |
|---|-----------|
| Important Safety Instructions               | .....pg2  |
| Unit Specs                                  | .....pg2  |
| Parts Included                              | .....pg2  |
| Installation Tools & Materials              | .....pg2  |
| On Shore Preparation                        | .....pg3  |
| Diffuser Assembly Installation              | .....pg3  |
| Compressor Connections                      | .....pg4  |
| No Cabinet System Installation Requirements | .....pg6  |
| Base Mount Cabinet Installation             | .....pg7  |
| Post Mount Cabinet Installation             | .....pg7  |
| Remote Manifold Accessory Installation      | .....pg7  |
| Startup Procedure                           | .....pg9  |
| Winter Warning                              | .....pg9  |
| Maintenance                                 | .....pg9  |
| Troubleshooting                             | .....pg10 |
| Warranty                                    | .....pg10 |

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## Important Safety Instructions



### CAUTION

- Caution should be used when dealing with any electrical equipment with moving parts.
- Extreme caution should be used around water, especially cold water, such as in Spring, Fall, and Winter, which poses a hazard in and of itself.
- Running the system in freezing conditions may create open areas of water in the ice at the diffuser locations and also thin ice around the area.
- Check your local laws and ordinances as some areas require warning signs to be posted. The owner will assume all risks with operating the Robust-Aire System during winter months.
- Do not use waders in deep ponds/lakes or ponds/lakes with drop-offs, drastic slopes, or soft bottom material.
- Do not use boats that tip easily for installation, such as a canoe, and follow all boating safety rules and regulations, including wearing a PFD. (Personal Flotation Device)
- Means for disconnection must be incorporated in the fixed wiring in accordance with local and national wiring rules.
- Consult a qualified electrician for electrical installation.

### Unit Specs

| Model* | Voltage | # diffusers | # compressors | Total amps |
|--------|---------|-------------|---------------|------------|
| RA1    | 120     | 1           | 1             | 3.6        |
| RAH1   | 240     | 1           | 1             | 1.8        |
| RA2    | 120     | 2           | 1             | 5.4        |
| RAH2   | 240     | 2           | 1             | 3.0        |
| RA3    | 120     | 3           | 1             | 5.4        |
| RAH3   | 240     | 3           | 1             | 3.0        |
| RA4    | 120     | 4           | 2             | 10.8       |
| RAH4   | 240     | 4           | 2             | 6.0        |
| RA5    | 120     | 5           | 2             | 10.8       |
| RAH5   | 240     | 5           | 2             | 6.0        |
| RA6    | 120     | 6           | 2             | 10.8       |
| RAH6   | 240     | 6           | 2             | 6.0        |

\*you may have a suffix at the end of your model. "NC" stands for "no cabinet". "PM" stands for "post-mount cabinet". No suffix denotes the standard base-mount cabinet.

The specs should be used by your qualified electrician to ensure properly sized circuits are installed. For all RAH systems and systems RA1 - RA3, a dedicated 15 amp circuit is sufficient to supply power to the system. For RA4 – RA6 systems, a dedicated 20 amp circuit is recommended. For RA(H)4 – RA(H)6 systems (two compressors and two fans), it may be useful to have two dedicated 15 amps circuits available. This will allow for one compressor/fan combination to continue operating if the other compressor were to fail, be down temporarily for maintenance or to allow sets to be run intermittently during start-up to prevent a turn-over (see start-up procedure for more info). Always consult with a qualified electrician.

## ROBUST-AIRE® DIFFUSER ASSEMBLY

### Parts Included

- (1) Robust-Aire® Diffuser Assembly
- (1) Vent Plug
- (1) 3/8" Tubing Clamp
- (1) 5/8" Tubing Clamp
- (1) 1/2" NPT x 3/8" Barb Elbow
- (1) 1/2" NPT x 5/8" Barb Elbow
- (1) 3/8" Tubing Strain Relief
- (1) 5/8" Tubing Strain Relief
- (1) 1/4"-20 x 1-3/4" Lg Hex Head Capscrew
- (2) 1/4" Flat Washer
- (1) 1/4"-20 Lock Nut

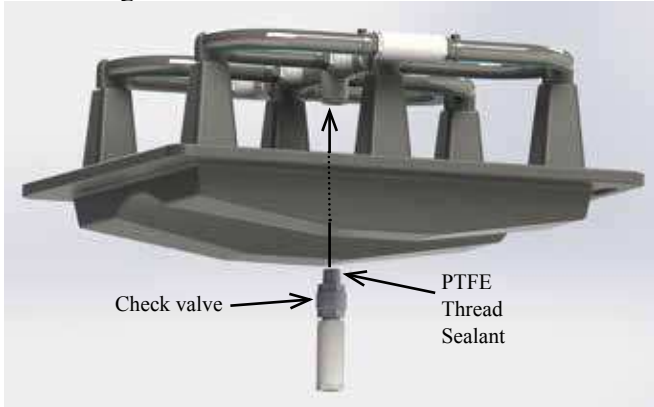
\*Not all fittings will be used. Use 3/8" fittings with 3/8" SureSink™ Aeration Tubing and 5/8" fittings with 5/8" SureSink™ Aeration Tubing.

### Installation Tools & Materials

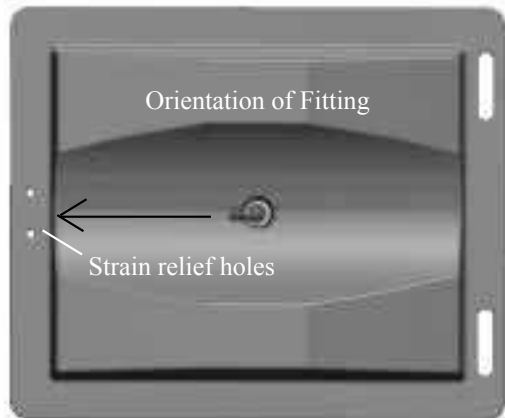
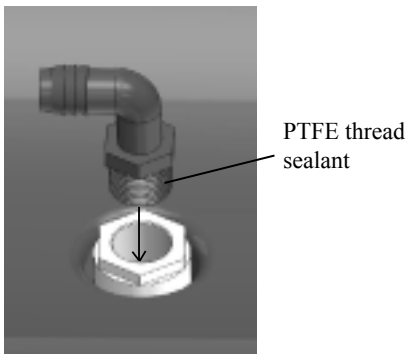
- 7/8" Open End Wrench or Pliers
- 20-30 lbs (.25-.375 cu.ft.) of pea gravel
- Length of 1/4" – 3/8" nylon rope (or equivalent). Rope length to be at least twice the water depth
- 7/16" socket wrench
- 7/16" box or open end wrench
- 5/16" Socket/nut driver
- 1/4" Socket/nut driver
- 9/32" Socket/nut driver
- Flat Head screwdriver
- PTFE thread sealant (teflon tape)

## On Shore Preparation

1. Apply PTFE Thread Sealant to male threads on check valve. Slide check valve inlet assembly through diffuser base and into threaded port of the diffuser air distribution assembly. Install hand tight only. Do not overtighten.



2. Install appropriate elbow fitting into inlet port located on the bottom side center of the diffuser assembly. Install until hand tight. Continue turning using 7/8" open end wrench until barbed portion of the fitting is pointing towards the edge of the diffuser assembly with the strain relief holes.



3. Fill diffuser base with **pea gravel** to allow it to flow easily into the base.



4. Install vent plug once base is completely full.



**CAUTION:** Once the diffuser base has been filled with gravel, do not lift assembly by diffuser hose or PVC structure. Use outer edges of base to pick up assembly.

If a boat is being used for diffuser placement, load the boat with weighted diffuser assembly and remaining parts kit. Do not use boats that tip easily for installation, such as a canoe.

## Diffuser Assembly Installation

The effectiveness of the Robust-Aire® Diffuser is greatly dependant on where the diffusers are located in the pond. Therefore, proper placement is key. Space the Robust-Aire® Diffusers equally from each other in a depth that embodies the majority of the pond. Please contact Kasco Marine if there are any questions on placement.

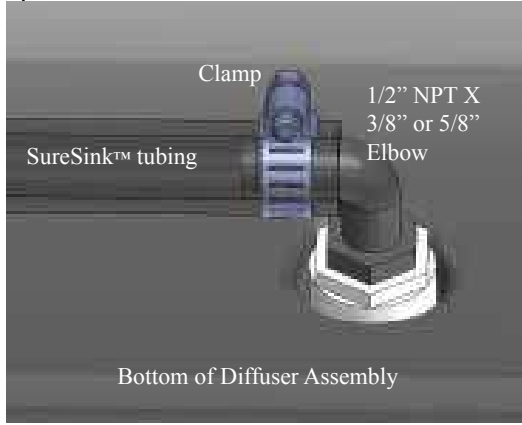


**CAUTION:** Do not use boats that tip easily for installation, such as a canoe, and follow all boating safety rules and regulations, including wearing a PFD. (Personal Flotation Device)

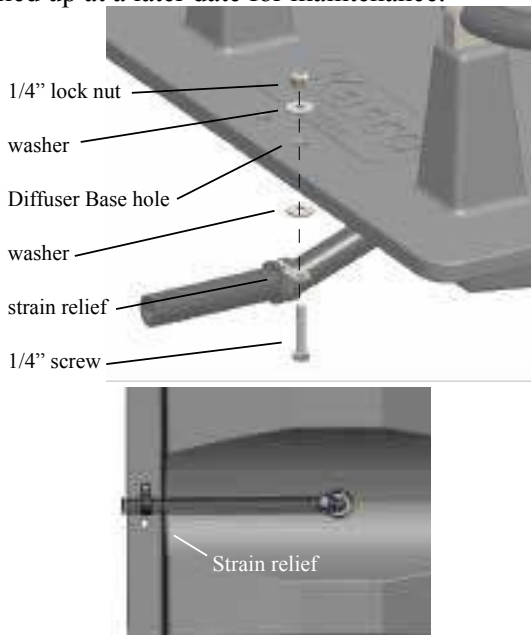
5. It is recommended to place a buoy for each diffuser to mark the area that it is to be placed.
6. Unroll the SureSink™ Aeration Tubing on shore to remove any twists or knots. The performance will

decrease if the tube is not properly uncoiled.

- On the end of the SureSink™ Tube that will be connected to the diffuser assembly, slide a clamp over the tubing and connect the end of the tubing to the barbed fitting on the diffuser assembly. Position clamp over tubing and barbed fitting and tighten using a socket/nut driver or flat head screwdriver. Do not over tighten clamp.



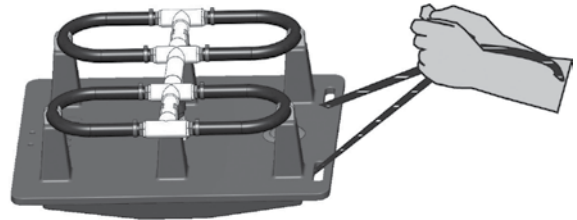
- Install strain relief over tubing and secure to diffuser base as shown using 7/16 inch socket and wrench. A properly installed strain relief will prevent any damage to the diffuser assembly when it is lowered in the water or pulled up at a later date for maintenance.



- If you anticipate running out of tubing (each tube is 100') before reaching the buoy, connect any additional tubes according to the SureSink™ Tube instructions. Make sure to unroll these tubes as you did with the first tube. If you are unsure how many rolls of tubes will be needed to reach the diffuser location, you can load the unconnected diffuser assemblies and tubing kits into the boat and connect as needed while making your way to the marked buoy. You can also connect an ample number of 100' lengths together and have someone assist feeding it from shore. The excess tubing can be cut

off at shore before connecting to the compressor lead.

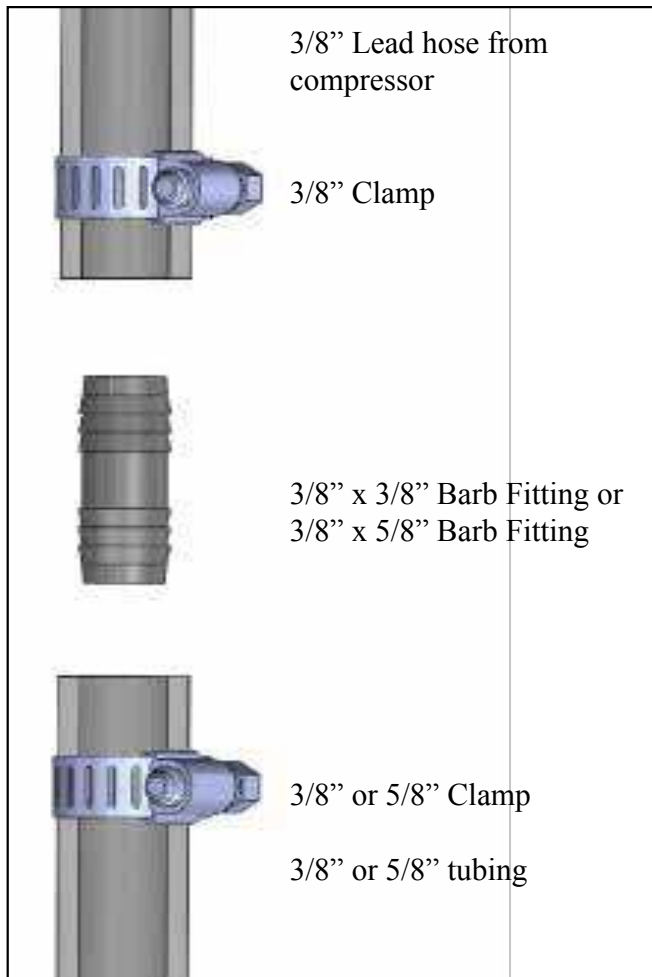
- Tie off shore end of the SureSink™ Tubing by the compressor cabinet. Make sure you have a few extra feet of tubing to work with so that the tube will reach the cabinet after trenching the tube between the shore and the compressor.
- Assembled Diffuser(s) can be loaded onto the boat. Possible additional tubing kits and assembly tools should be loaded on the boat if not already connected.
- Make sure the boat is in reverse to avoid damaging the boat prop and slowly make your way to the marking buoy pulling the tubing as you go.
- Once you reach the marked buoy, thread a rope through the two slots of the diffuser base. Pull through until the rope is at the midway point by the diffuser base.



- While holding the two ends of the rope, gently lower the diffuser assembly into the water. Submerge the assembly and allow the air to escape from the vent plug as the base fills with water.
- When the air has been removed from the base, continue lowering the assembly slowly until it reaches the bottom of the pond. Using this method, the diffuser should not invert while lowering.
- Pull up on only one side of the rope to bring it back. The Robust-Aire® Diffuser should now be seated properly on the bottom of the pond. (Optional: For ease of future maintenance, it is recommended to leave rope looped through diffuser base and tie both ends to marker-buoy or duck decoy. This will allow diffusers to be located easily and pulled up for maintenance.)
- Repeat the process for additional Robust-Aire® Diffuser locations.

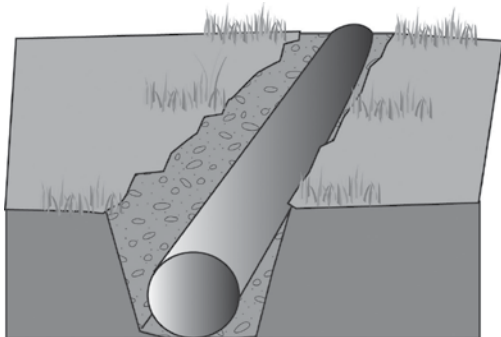
## Compressor Connections

- When back on shore, finish connecting the tubing to the lead hose from the compressor with the supplied barb fitting from the tubing kit. Secure and tighten clamps to both supply tubing and compressor hose.



Caution: Do not over tighten clamps.

19. Trench and bury tubing from the compressor to the shore.



#### -NC Systems

Parts included in RA(H)1-NC Systems:

- (1) Robust-Aire Diffuser Assembly
- (1) 3/8" x 100' SureSink Tubing w/fitting kit
- (1) Single Head Compressor
- (1) 1/4" NPT x 3/8" barb brass elbow
- (4) Compressor Vibration Isolation Feet
- (4) 1/4" Flat Washer
- (4) 1/4" Lock Nut
- (1) Cooling fan assembly (either 115V with plug or 230V without plug)
- (4) #10 x 3/4" bolt

- (4) #10 split washer
- (4) #10 Nut
- (1) 3' length of 3/8" hose
- (1) Hose clamp

Parts included in RA(H)2-NC and RA(H)3-NC Systems:

- (2) or (3) Robust-Aire Diffuser Assembly
- (2) or (3) 3/8" x 100' SureSink Tubing w/fitting kit
- (1) Double Head Compressor
- (1) 1/4" NPT x 3/8" barb brass elbow
- (4) Compressor Vibration Isolation Feet
- (4) 1/4" Flat Washer
- (4) 1/4" Lock Nut
- (1) Cooling fan assembly (either 115V with plug or 230V without plug)
- (4) #10 x 3/4" bolt
- (4) #10 split washer
- (4) #10 Nut
- (2) Hose clamp
- (1) Two or Three Station Manifold Assembly
- (2) Manifold Mounting Screw

Parts included in RA(H)4-NC, RA(H)5-NC and RA(H)6-NC Systems:

- (4 - 6) Robust-Aire Diffuser Assembly
- (4 - 6) 3/8" x 100' SureSink Tubing w/fitting kit
- (2) Double Head Compressor
- (2) 1/4" NPT x 3/8" barb brass elbow
- (8) Compressor Vibration Isolation Feet
- (8) 1/4" Flat Washer
- (8) 1/4" Lock Nut
- (2) Cooling fan assembly (either 115V with plug or 230V without plug)
- (8) #10 x 3/4" bolt
- (8) #10 split washer
- (8) #10 Nut
- (4) Hose clamp
- (2) Two or Three Station Manifold Assembly
- (4) Manifold Mounting Screw

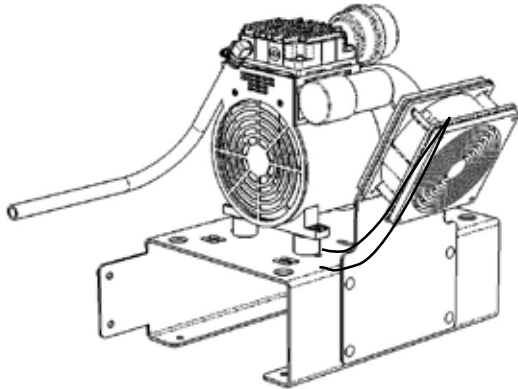
Installation Tools & Materials

- Phillips Screwdriver
- 5/16" socket/nut driver
- 1/4" socket/nut driver
- 9/32" socket/nut driver
- 3/8" driver for #10 nuts
- 7/16" driver for 1/4" nuts
- Flat head screwdriver
- PTFE thread sealant (Teflon tape)

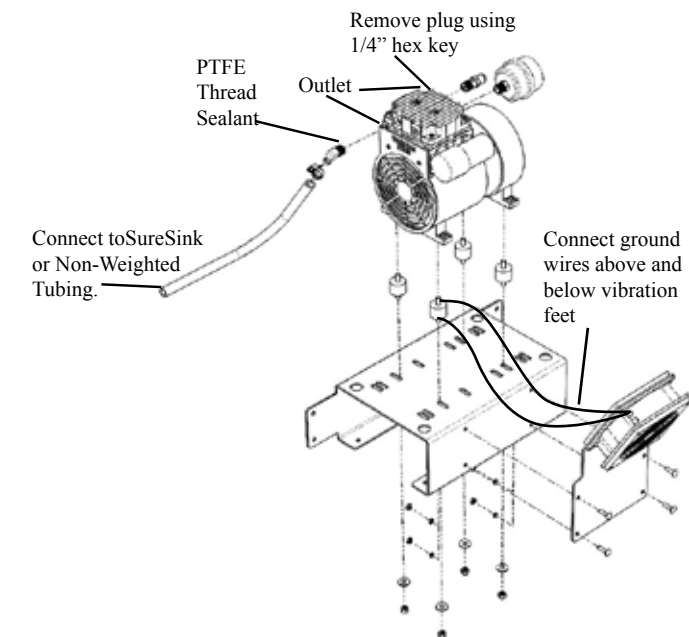
## No Cabinet System Installation Requirements

Correct installation is your responsibility. Make sure you have the proper installation conditions and that installation clearances do not block air flow.

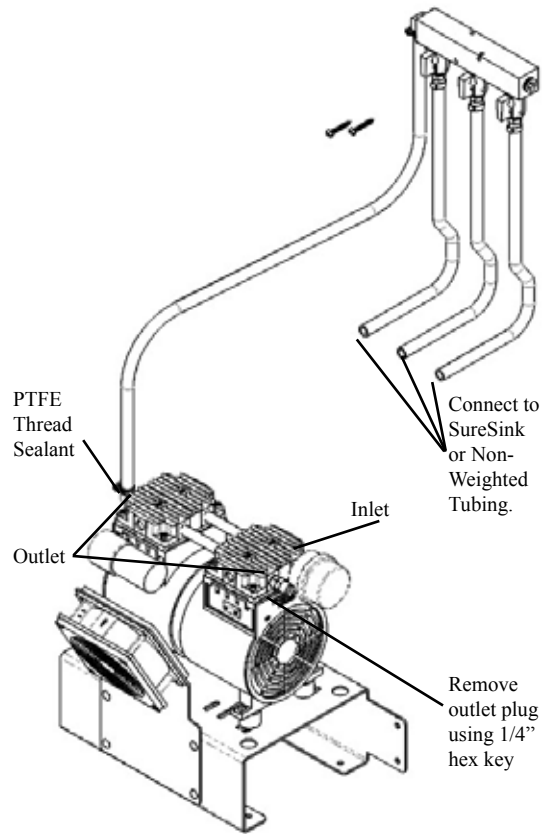
- Compressor needs to be installed in a clean, dry location.
- Compressor needs to be protected from dirt and moisture and from the outdoor environment such as rain, snow, flooding.
- Ambient air temperature (temperature readings taken 4" away from any surface of the compressor) must not exceed 104° F (40°C).
- Adequate ventilation and cooling air (air flow across the compressor) must be provided to keep the compressor from overheating and causing premature damage. The included fan has been provided for this purpose.
- Kasco Marine includes with no cabinet systems a simple, durable bracket accessory that will allow you to easily mount the compressor to a wall, floor or bench.



After the proper location has been determined, use the following diagram to complete the installation.



RA(H)1-NC Shown



RA(H)3-NC Shown

120V compressors are supplied with a NEMA 5-15 Plug which can be plugged into a 120V receptacle. 240V compressors are supplied with flying leads. The leads can be hard-wired into 240V service or a plug can be installed on the cord if plugging into a receptacle.

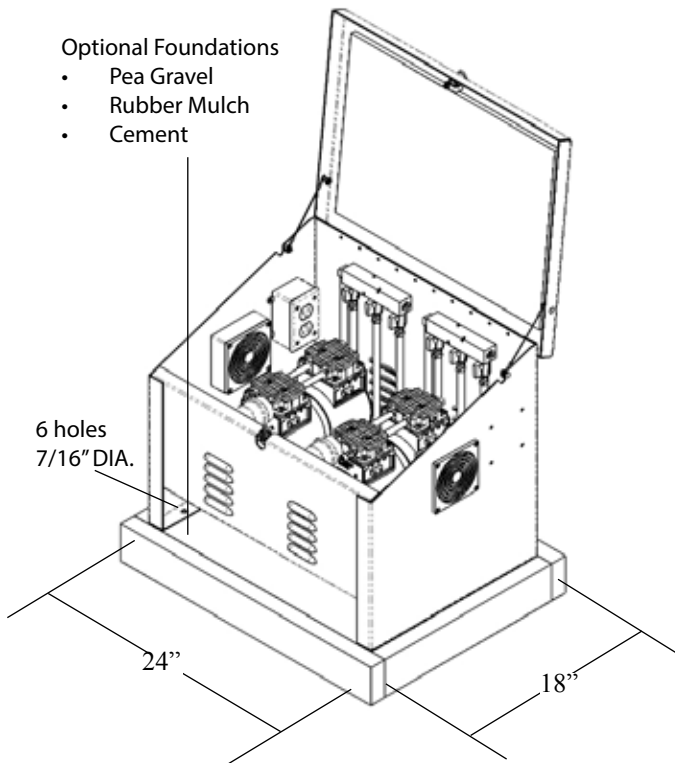
Kasco Marine highly recommends that the site service providing the system have a human-rated Ground Fault Circuit Interrupter outlet (120V) or human-rated Ground Fault breaker (240V) for your protection. Contact a licensed electrician to bring 120 or 240 volt (depending on which model is purchased), single phase electrical supply to the compressor location and to install appropriate human-rated ground fault protection.

## Base Mount Cabinet Installation

Choose a location for placing your base mount cabinet assembly. The location should be placed far enough from shore to avoid the potential of flooding. Plantings can be used to help hide the cabinet from sight, however be sure that both the inlet and outlet vents will not be blocked as fresh air is needed to keep the compressor from over-heating.

The cabinet can be placed directly on the ground or can be permanently attached to a concrete pad. The bottom feet of the cabinet have holes which can be used to anchor the cabinet in place.

The cabinet should be placed adjacent to the electrical service which will provide power to the system. The cabinet will have 6 foot power cord(s) with plugs. **DO NOT USE EXTENSION CORDS.**

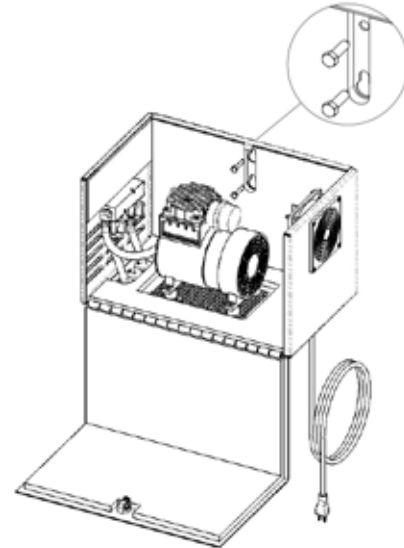


## Post Mount Cabinet Installation

The post mount cabinet can be attached to a 4x4 post or to a vertical wall (shed) with electrical service.

(2) lag screws are provided to mount the post mount cabinet. Pre-drill (2) 3/16" holes vertically spaced 2 3/8" apart. Install (1) lag screw into the wall or post, leaving the hex head out about 1/4" using a standard

7/16" socket wrench. Hang the cabinet from this screw using the bottom key-hole slot in the cabinet (a second person may be needed to help hold the cabinet in place). Install the second lag screw in the top mounting hole. Tighten the bottom lag screw.



## Remote Manifold Accessory Installation

Robust-Aire systems that were ordered with the optional remote manifold accessory were factory built with a single air line exiting each compressor. Follow the instructions below to assemble and install the remote manifolds.

Materials required:

- 3/4" Sch. 40 PVC Pipe (amount to be determined by user)
- 3/4" Sch. 40 PVC Pipe Couplings (as needed)
- PVC Primer and Glue
- PVC Pipe Cutter
- Shovel or other tools to dig a trench
- Pliers (hose clamp installation)
- Thread sealant

A trench will need to be excavated to bury the PVC air line. Start by determining the path of the trench from the Robust-Aire system to an area by shore. The path should be in as straight of a line as possible with a gentle downward slope from the Robust-Aire system down towards the shore. Excavate the trench 6" to 8" deep.

For two or three station valve manifolds, excavate

an area by shore to bury the included valve box. An area at least 18" wide by 25" long x 13" deep will be needed. Dig the area deeper and add crushed rock to allow for drainage.

**CAUTION:** In northern climates where the ground may freeze during the winter, be sure there are no peaks and valleys in the PVC air line. Condensation in the air line may freeze and can block the flow of air to your diffuser and can cause damage to your compressor.

For RA1 – RA3 systems, a single trench is all that is required.

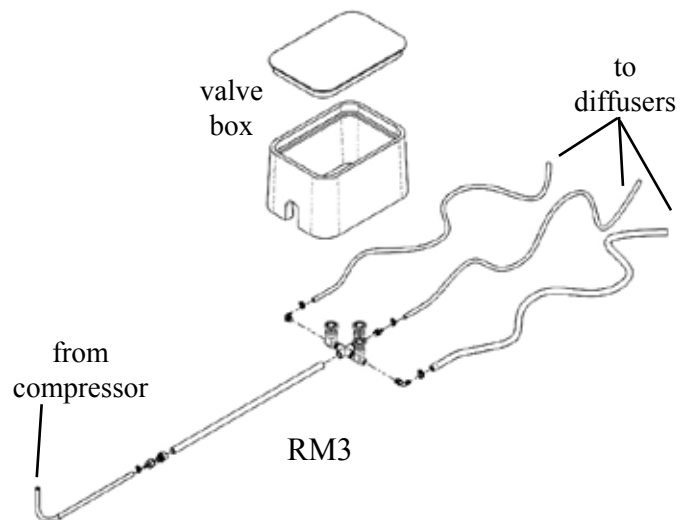
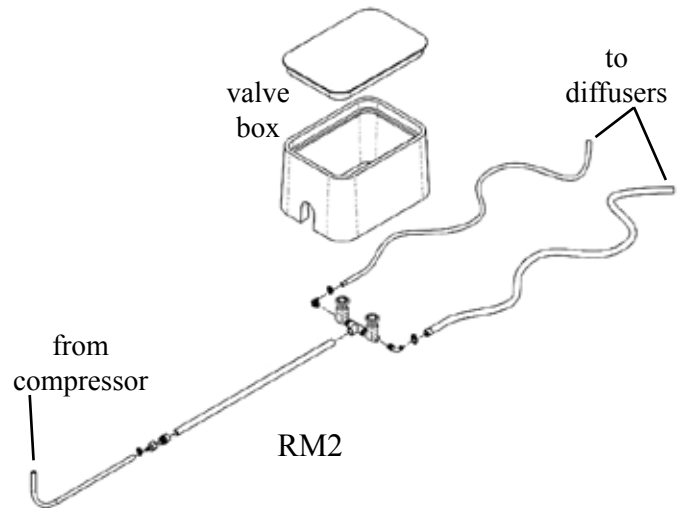
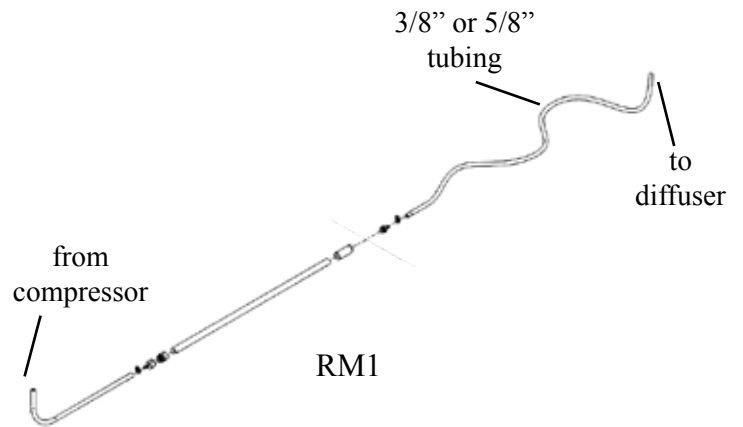
For RA4 – RA6 systems, either a single trench or two separate trenches may be required depending on pond size and diffuser placement locations.

Connect brass barb fitting to PVC adapter, applying thread sealant to male threads on PVC adapter. Connect barb fitting to rubber hose lead from compressor and secure with hose clamp.

Connect PVC adapter and PVC pipe with primer and glue. Add PVC pipe sections as needed to reach the location of the remote manifold.

Prime and glue supplied manifold assembly to the end of the PVC pipe run. Install 3/8" barb fittings or 5/8" barb fittings depending on size of SureSink™ tubing being run from the manifold to each diffuser. Apply thread sealant to male threads of barb fittings. Attach SureSink™ tubing to barb fittings and secure with hose clamp.

When applicable, place valve box over manifold assembly and fill in around box and entire length of trench with the excavated dirt. The lid of the valve box should be flush with the top of the ground surface. When system has been completely installed, use the valves (not provided on single diffuser systems) to balance the flow to each diffuser.





## **Startup Procedure**

### **Important Installation Warning**

Thermal stratification refers to the layering that can occur in some lakes which allows warmer (less dense) water to sit on the top of colder denser water on the lake bottom. The Robust-Aire™ Diffuser system has been designed to keep thermal stratification from occurring in the first place.

In the event that you install your unit into a body of water that is extremely stratified, caution should be used as you start up the unit. In some cases the colder water sitting on the bottom could be holding gases that if totally mixed within the water column could be harmful to fish. There could also be concern that the colder water has little or no dissolved oxygen.

I suppose you are asking yourself “what does this mean by extremely stratified and how do I measure it?” A simple method of testing for thermal stratification is to drop a thermometer into the body of water and slowly check for temperature change from the surface to the depths of the lakes. Our suggestion would be to measure temperature every two feet. Be sure to keep the thermometer at a given depth long enough for the correct temperature to be measured and then bring it to the surface fast and read it immediately.

If the colder water (4 degrees F colder than the surface water) represents more than 30% of the overall water volume, it is suggested to allow the water to mix at a slower pace by not running the system continuously but for only short time intervals. Suggested start up on time for the unit for a stratified lake might be initially running for 1 hour per day during daylight hours for the first week and gradually increase until running continuously. Each lake will react slightly different to our unit so a precise timeframe is difficult to predict. Sunny days are preferable to cloudy days to start the system because the photosynthesis will supplement oxygen levels as the water is mixed.

If you are at all uncertain about this procedure, contact the distributor you purchased the unit from or e-mail us at [sales@kascomarine.com](mailto:sales@kascomarine.com)

## **Winter Warning**

Check your local laws and ordinances as some areas require warning signs to be posted. The owner will assume all risks with operating the Robust-Aire System during winter months.

Operating the Robust-Aire® system during the winter or freezing temperatures may create open areas of ice at the diffuser locations. Also, ice will be thin surrounding those areas. Extreme caution should be used in these areas to avoid injury or fatality from falling through the ice. It is highly recommended to use warning signs to indicate the danger to others.

In the spring, refer back to the Startup procedure to avoid a fish kill.

### **Winter Operating Tip:**

In climates where temperatures are likely to fall below freezing, it is recommended that you insulate the air lines from the compressor cabinet to a minimum of 3 feet into the water. Using closed cell polyurethane foam to insulate your air lines will prevent ice buildup in the lines which can occur due to condensation. Ice buildup in the line can block the flow of air to your diffuser and can cause damage to your compressor. If your body of water fluctuates greatly, run the insulation further in the water to account for low water level. You want the air line to be insulated through any ice thickness and into an area of water that will be below the ice level.

If only desiring to keep a small area open to prevent winterkill, it is recommended to move the diffusers closer to shore to allow shoreline to be in direct contact with the ice-free opening.

## **Maintenance**

**Warning!** Product surfaces become very hot during operation, allow product surfaces to cool before handling.

**Warning!** Disconnect electrical power supply cord before performing maintenance.

This compressor is oil-less and requires NO lubrication

Check intake filter after the first 500 hours of operation. Clean filter and determine how frequently filters should be checked during future operation.

Kasco recommends checking the filter every month. Clean or replace as necessary. This one procedure will help assure the product's performance and service life. Failure to maintain clean air filter elements will lead to clogging which will cause excessive heat and premature failure of the compressor.

- Remove filter cover
- Remove felt and replace filter element
- Replacement filter elements are readily available. Please contact your local Kasco distributor and ask for the Replacement Air Filter Element Model 771010 (felt, used with plastic filter assembly) or Model 771014 (Paper, used with metal filter assembly).
- Reinstall filter element and cover.

### Troubleshooting

Here are some helpful troubleshooting tips. If a problem occurs, please double check the assembly and installation instructions. Please contact Kasco or your distributor if problems persist after reviewing these instructions.

*"Compressor and fan are not running."*

Check to make sure the power cord is connected. Check if the user supplied GFCI circuit is tripped and if it is, push the reset button.

*"The fan is running but the compressor is not"*

Check the compressor and capacitor wiring. If no damage is seen, a bad capacitor or compressor may be the issue.

*"The compressor and fan are running, but there are no bubbles coming out of any of our diffusers"*

Check for any leaks in the line connections and in the cabinet. Retighten any loose connections. The compressor air filter may need to be cleaned or replaced.

*"The compressor and fan are running. There are bubbles coming out of some diffusers, but not all of them."*

The valves in the cabinet may need to be balanced correctly. There may be a clog on a diffuser that needs to be removed. The compressor may be faulty and need a rebuild kit.

*"The compressor stops and restarts"*

Possibly a heat issue. Check to see if the fan is working properly.

## Warranty

Warranty Period: 2 year

Kasco® Marine, Inc. warrants this Robust-Aire® System to be free from defects in material or workmanship under normal use and service. The Kasco Marine, Inc. obligation under this warranty is limited to replacing or repairing free of charge any defective part within the warranty period. Customer shall pay shipping charges for returning the unit to Kasco or an Authorized Repair Center.

THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND ANY OTHER OBLIGATION OR LIABILITY WHATEVER ON THE PART OF KASCO MARINE, INC. AND IN NO EVENT SHALL KASCO MARINE, INC. BE LIABLE FOR ANY SPECIAL OR CONSEQUENTIAL DAMAGES.

Warranty is void if:

- The System is not maintained properly according to the Maintenance Recommendations supplied in this Owners Manual.
- The System is damaged by unauthorized tampering.

Warranty Claim Procedure:

The best method for establishing warranty period is by the original receipt. Also, register the System online at: [www.kascomarine.com](http://www.kascomarine.com).

Once the warranty coverage has been established, the unit may be sent to any Kasco Authorized Repair Center for evaluation and repair. Please call Kasco Marine at 715-262-4488 prior to shipping to receive any updated information and/or Repair Form, then ship to:

Kasco Marine, Inc.

800 Deere Rd.

Prescott, WI 54021

Attn: Repairs

Or call Kasco Marine at 715-262-4488 to locate your nearest Authorized Repair Center. You can also email Kasco at [returns@kascomarine.com](mailto:returns@kascomarine.com).

Please include the Repair Form received from Kasco Marine or your local distributor with the shipment. If no Repair Form is available, include your name and physical address for return delivery of the repaired

unit and a daytime phone number and/or e-mail address for correspondence regarding the warranty claim.

Any expedited shipping method for the return of the unit is at the customer's expense. Kasco Marine will return units repaired under warranty at our expense via ground freight within the continental United States.

#### Other Repairs:

Most failed equipment can be repaired at substantially lower costs than replacement with new. Please ship according to the instructions in the previous section. Again, it is best to call ahead for updated information and/or Repair Form.

Kasco Marine does estimates on repairs at the request of the customer. The request for estimate should be included in the letter that accompanies the returned unit and must include a daytime phone number and/or e-mail address. Estimate options are as follows:

We will contact the customer with a total after the unit has been evaluated, but before the work is performed. We will repair the unit only if repair costs are under a stated dollar amount. Example: "Please repair if total is under \$150.00 before shipping charges."

All estimates that are rejected for repair will be destroyed unless otherwise directed by the customer. If the customer would like the unit returned, the unit will be restored as closely as possible to the condition in which it was received and shipped at the customer's expense for shipping and handling charges.

#### Billing:

All non-warranty repairs will be returned to the customer and billed C.O.D. unless otherwise directed. Kasco Marine also accepts Visa and MasterCard credit card payments. Kasco Marine will call for credit card information upon completion of the repair at the customer's request.

All other warranty and repair inquiries should be directed to Kasco Marine, Inc. at 715-262-4488 or [returns@kascomarine.com](mailto:returns@kascomarine.com)



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