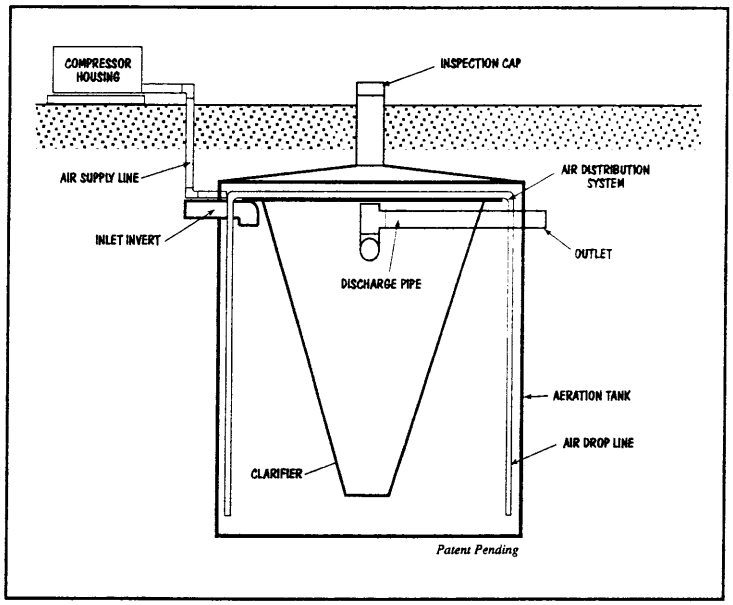
ETI
AQUA SAFE ™

INDIVIDUAL HOME SEWAGE TREATMENT SYSTEM

INSTALLATION, OPERATION, MAINTENANCE AND TROUBLESHOOTING MANUAL

For Distributors and Installers

MODELS: A.S. 500L
A.S. 600L
A.S. 750L
A.S. 1000L



BAYLOR UNIVERSITY ON SITE WASTE WATER TESTING AND CERTIFICATION DEPARTMENT OF ENVIRONMENTAL STUDIES

Mfg. by:
Ecological Tanks Inc.
2247 Hwy. 151 N
Downsville, La. 71234
(318) 644-0397
FAX (318) 644-7257

5773-0399

NOTE

All Aqua Safe sewage treatment plants come outfitted with a long turn sweep on the inlet side of the tank extending downward just below the flow line level of the treatment plant. This is done for several reasons:

1. It prevents home owners, in houses improperly vented, *especially mobile homes*, from complaining about hearing bubbling sounds in the plumbing fixture drains in their homes.

2. It prevents the air generated by the aerator blower motor from exhausting through the home owners fixture drains and automatic vents in improperly vented homes or when trap seals dry out.

3. It helps keep methane gas odors out of the treatment plant on systems installed with a pre-treatment tank, thus eliminating home owners complaints that their sewer plant is stinking.

You as the installer need to be aware of the internal makeup of the Aqua Safe plants. Most importantly you also need to be aware that the air generated by the aerator blower motor MUST ESCAPE BACK TO ATMOSPHERE.

Installers must know that where pump tanks are used the air generated in the waste water process must escape to atmosphere either through the pump tank riser or through a vented cap on the chlorination unit between the treatment plant and pump tank.

SPECIAL NOTE

Ecological Tanks Inc., Model A.S. 500L and larger, wastewater treatment plants have been tested according to requirements listed in National Sanitation Foundation Standard #40, and meets or exceeds Class 1 plant characteristic requirements.

Some states require the use of a trash trap independent of this test. Ecological Tanks, Inc. recommends strongly the use of a trash trap or pre-treatment tank, especially in all cases where a garbage disposal is being used or may be used. Additionally, Ecological Tanks, Inc. strongly recommends the use of a trash trap when using sprinklers, drip systems, or pressure dosing as a means of effluent disposal. A minimum recommended size for a trash trap is one-half the daily rated capacity of the unit. This recommendation enables enough capacity to "store" non-biodegradable materials over an extended period of time (several years) to minimize pumping requirements and overall maintenance on sprinkler, drip and dosing effluent disposal systems. This size is also small enough not to interfere substantially with the aerobic performance of the unit or to raise cost excessively. For purposes of the unit certification, a trash trap is treated as an approved "upgrade".

State and/or local regulations govern the installation and use of individual mechanical waste water treatment systems.

Please consult your local sanitarian or environmentalist prior to system installation.

HOW THE AQUA SAFE SEWAGE TREATMENT SYSTEM FUNCTIONS

The ***Aqua Safe*** sewage treatment plant in many ways is a scaled down version of larger township and municipality sewage treatment plants. It employs an extended aeration activated sludge process. This type of treatment depends primarily upon the use of air that is introduced by passing from the blower to four (4) air lines located around the perimeter of the mixing chamber.

Ecological Tanks Inc., ***Aqua Safe*** plants are made up of an outer mixing tank and a center settling chamber called a clarifier. Raw unsettled wastewater from your home enters directly into the mixing tank where simple hydraulic displacement is accomplished by the introduction of air which promotes the growth of aerobic organisms in much larger amounts than would occur naturally. These break down the organic solids in the wastewater.

From the outer mixing tank or aeration chamber, mixed liquid enters the cone shaped settling chamber, better known as the clarifier, from the bottom. No mixing occurs in this quiet zone where solids separate from the liquid and settle to the bottom of the clarifier and re-enter the mixing chamber. The liquid that separates from the solids in the clarifier continue to flow upward to the discharge pipe.

The results of the ***Aqua Safe*** process is a clear, odorless effluent discharge, which meets or exceeds state water quality standards.

AQUA SAFE SPECIFICATIONS

INDIVIDUAL HOME WASTEWATER TREATMENT PLANT

MODELS A.S. 500L, A.S. 600L, A.S. 750L & A.S. 1000L

	A.S. 500L	A.S. 600L	A.S. 750L	A.S. 1000L
Treatment Capacity	500 G.P.D.	600 G.P.D.	750 G.P.D.	1000 G.P.D.
Volumetric Capacity	1000 GAL.	1214 GAL.	1516 GAL.	2008 GAL.
Recommended $B.O.D._5$ Loading Range	.67-1.21 #/DAY	.80-1.45 #/DAY	1-1.81 #/DAY	1.44-2.42 #/DAY
Aerator-Aqua Safe Compressor	ASC 2532	ASC 3342	ASC 3352	ASC 5082

DESIGN COMPONENTS AND MATERIALS

Aeration Tank, Cover & Clarifier ..... fiberglass, concrete or steel
Compressor Housing ..... polyethylene, fiberglass or concrete

PARTS LIST

Aeration Tank ..... item #1
Clarifier 2
Air Distribution System 3
Access Cover, 6" Diameter 4
Discharge Piping Assembly 5
Compressor Housing 6
*Junction Box 7
*Weighted Float 8

**This method of detecting a high water condition is available only on systems using gravity flow overland discharge. Refer to controls and alarm section of this manual for other methods of detecting high water conditions in the system.*

DIMENSIONS		
MODEL	A (I.D.)	B (HEIGHT)
A.S. 500	5' 6"	6' 4"
A.S. 500L	5' 6"	6' 4"
A.S. 600	5' 6"	7' 6"
A.S. 750	6' 9"	6' 4"
A.S. 1000	6' 9"	8' 2"

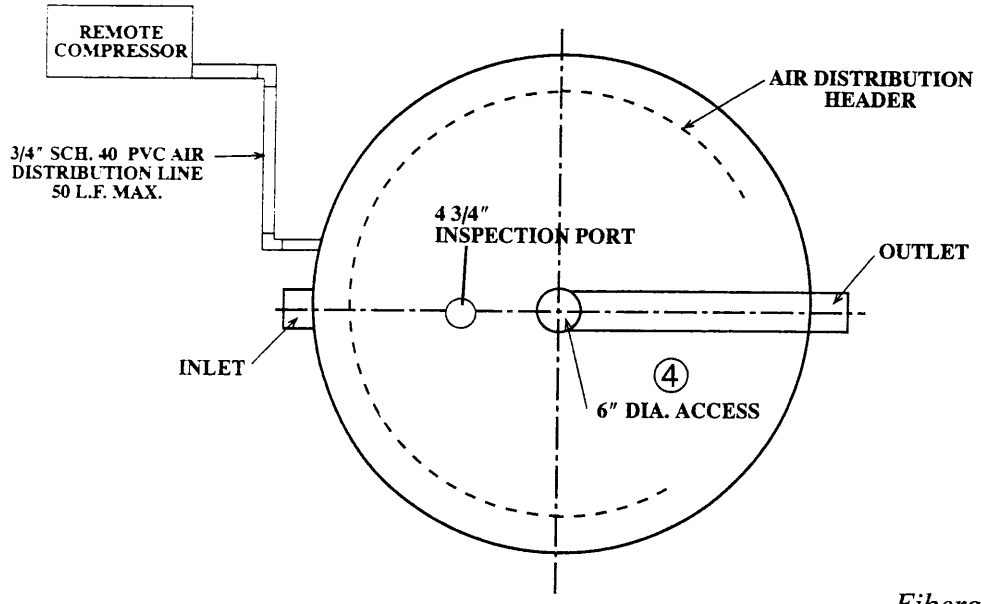
A.S. 500L, A.S. 600L, A.S.750L & A.S. 1000L

Patent Pending

Ecological Tanks, Inc.

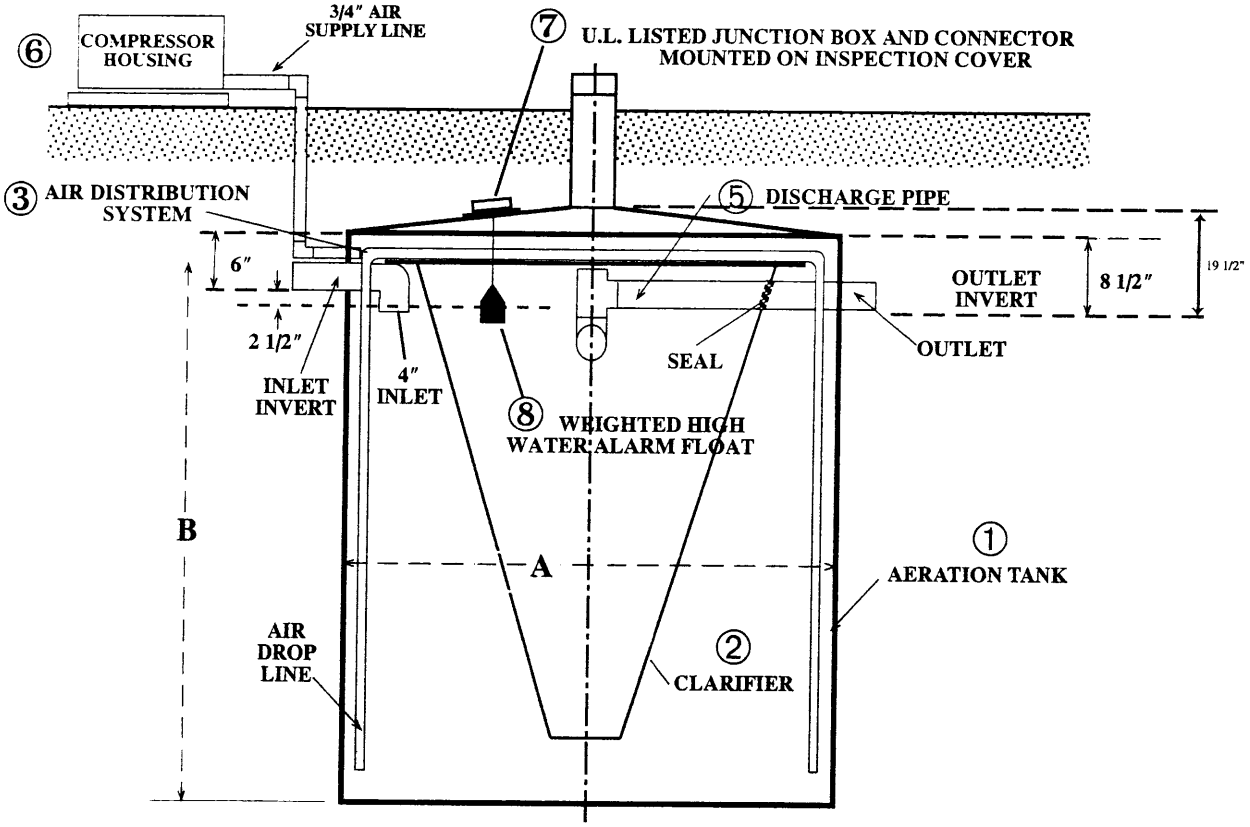
Individual Home Wastewater

Treatment Plant



PLAN

Fiberglass, Concrete or Steel Construction



SECTION

AQUA SAFE RECOMMENDED PLANT INSTALLATION INSTRUCTIONS

Prior to installation, all state and local laws and regulations must be complied with. *It is the owner's responsibility to obtain any required permits.*

1. Inspect entire treatment plant and component parts.
2. Select location of plant site which is accessible to the home sewer discharge line, at least ten (10) feet from the home foundation, in an area that will not receive vehicular traffic. Prepare an excavation site having a hole at least one (1) foot larger than the treatment plant and a depth that will allow for sufficient coverage leaving approximately three (3) inches of the inspection port to stick above normal ground level. The depth of the plant will be controlled by the depth of the building sewer outlet line plus the amount of proper fall required from building sewer outlet line to inlet invert of plant. If at all possible, use a two (2) to four (4) inch layer of either sand or pea gravel to allow a smooth, level surface for a base on which to set the plant.
3. Utilizing lifting lugs provided, carefully place the plant in the excavation. The inlet line should slope down toward the plant and the outlet line should slope down away from the plant. The plant should be level within one (1) inch, edge to edge.
4. Position inlet and outlet lines and make necessary connections. Clean outs should be installed at building sewer tie-in, any changes in direction of flow and at maximum intervals of seventy (70) feet when using four (4) inch piping. The inlet line should be inserted and glued into the inlet elbow and the discharge line should be inserted and glued into the outlet coupling. Open the six (6) inch inspection port on top of plant cover and make sure the discharge tee assembly is level and centered in the clarifier prior to connecting discharge piping. Fill the tank with water to the point of flowing discharge before backfilling. Backfill evenly around the plant, up to the bottom of the inlet and outlet piping, taking care not to damage the tank or dislodge the piping. Backfill material should be sand or sandy loam soil, void of rocks, gravel or other material which might puncture the tank
5. Install aerator compressor in a well ventilated, relatively clean and dry location no more than fifty (50) feet away from the factory installed air connection on plant. The air blower is supplied complete with all discharge fittings. Install 3/4" sch. 40 p.v.c. piping (supplied by others) between the aerator and treatment plant. A minimum of twelve (12) inches ground cover is recommended.
6. The electrical controls and timer are contained in a weather proof enclosure, therefore, it may be installed in any above ground area where the warning light is visible to the owner during the course of a normal days activities. It is recommended for corrosion control that it be at least six (6) inches above the ground and in view of the compressor housing. All wiring must comply with applicable standards. All electrical components not supplied must comply to U.L. standards.
7. Install electrical wiring (provided by others) to interconnect aerator and high water level alarm to electrical control panel. A minimum of twelve (12) inches of ground cover is recommended.
8. The linear compressors used on all models or Aqua Safe plants run continuous. They provide quite, energy efficient operation while lasting two to three times longer than rotary vane or other styles of diaphragm compressors. Once properly connected, the electrical control box is to be closed. Operate the aerator by placing the on/off switch in the "ON" position.
9. Turn on air blower and check all air piping and fittings for leaks. This can be accomplished by preparing a saturated solution of soap and water and applying to entire run of pipe and fittings. If a leak is detected, effect repairs.
10. Backfill the air blower discharge line ditch, influent and effluent line ditches and the rest of the plant excavation.
11. The Aqua Safe plant is ready to receive incoming sewage.
12. We at Ecological Tanks, Inc. strongly recommend installers to spend time with their customers. Review operations instructions with them and be sure that the customer has a manual to keep. This saves valuable time avoiding return visits and almost always results in repeat business from referrals.

AQUA SAFE PLANT START UP

Initially the Aqua Safe wastewater treatment plant is filled with clean water, usually from a owner's water supply. As stated in the installation instructions, once all proper connections have been completed and it is filled with water and the aerator turned on, the system is now in operation.

For the treatment plant to be biologically stable, it will take from four (4) to twelve (12) weeks after first using the plant to develop a population growth of microorganisms (bacteria). It is these bacteria which make the treatment system operate.

OWNER MAINTENANCE CARE AND OPERATION INSTRUCTIONS

Aqua Safe home wastewater treatment plants have been designed and built by Ecological Tanks Inc., to provide long term, reliable and cost efficient service. Our treatment plants will operate with a minimum amount of attention, however, the following procedures should be performed on routine basis to insure proper plant operation.

DAILY: Check the air blower to be sure it is operating. Check for over heating, excessive vibrations and unusual noises. Once you become accustomed to the linear compressors quiet hum it will be easy to detect. Check warning lights and audible alarm located on control panel for compressor malfunction or in system high water indication. If a visual or audible alarm is on, it is an indication of a malfunction. If on, call your installer maintenance provider or the factory number as indicated on the service plate located on control panel cover. Be sure to refer to the systems serial number (located on linear compressor) and model number when calling for service. Note: If for any reason

WEEKLY: Check the six (6) inch access cover for a "rotten egg" odor. If present call for service.

PERIODICALLY: Check and clean the air filter on aerator. Rinse with warm water to clean if necessary. Make sure filter is dry and reinstall on aerator.

RECOMMENDED: Frequency of solids removal is no more often than every two (2) to five (5) years. Determination of the need for pumping can be made only by a trained service person by testing the tank contents and/or effluent. Should indication of improper operation be observed after an extended period of service contact your local representative.

OWNER'S RESPONSIBILITY to operate the Aqua Safe home wastewater treatment plant to the best of their ability. To keep maintenance to a minimum and insure high effluent quality, the following items should <u>not</u> be permitted to enter the treatment plant:

1. Strong disinfectants or bleaches, other than small amounts used in day to day house cleaning and laundries.
2. Discharge from any type of water softeners.
3. Coffee grounds, chemical wastes, paint or paint thinners, oils or grease (such as used cooking grease), pet shampoo or pet dip disinfectant.
4. Disposable diapers, tampons, sanitary napkins, large quantities of paper products, tobacco products, or similar items.
5. Waste material from a garbage disposal is not recommended without the use of a trash trap or pretreatment tank preceding the Aqua Safe plant.

6. The Aqua Safe home units were designed to handle sewage and nothing else should go into it.
7. During extended periods of non-use the aerobic bacteria inside the plant will decrease due to no food in the form of incoming sewage. The treatment plant will become biologically stable again soon after the resumption of normal loading. Always leave the aerator compressor "on" during periods of non-use.

The proper operation of this home sewage system depends upon proper organic loading and the life of the aerobic bacteria inside the plant. Ecological Tanks Inc., is not responsible for the infield operation of our plants, other than the mechanical and structural parts of the plant. We cannot control the loading of substances in our plants that may upset its biological balance. We can only provide a complete owner's manual which outlines materials that should be kept out of the treatment plants.

WARNING! Ants are destructive to the mechanical equipment on sewage treatment plants. Care should be taken to prevent infestation of ants near the plant. Damage or destruction of mechanical equipment by ants is not covered under manufacturers warranty.

Any and all safety requirements as to the electrical wiring, blower operation or plant discharge concerning the owner, their families, friends, or guests is the sole liability of the owner (see warranty and service policy).

The electrical control panel contains a schematic for the system. However, the electrical control panel is sealed and contains no user serviceable parts. Test and alarm silence switches are located on the outside of control panel. Warning! Service to the electrical control panel by a non-qualified person may result in an electrical shock hazard resulting in serious injury or death. If service is required contact your local authorized installer representative or the manufacturer.

Many States already require the use of a chlorination unit behind all mechanical treatment plants for total effluent disinfection prior to final discharge. Ecological Tanks, Inc. recommends the use of a chlorination unit behind its mechanical plants for total effluent disinfection prior to final discharge.

INSTALLER/MAINTENANCE PROVIDER
OPERATION, REPAIR AND TROUBLE SHOOTING INSTRUCTIONS

Previous sections in this manual have covered the Ecological Tanks, Inc. Aqua Safe systems functions, specifications and design, proper installation procedure, start up, owner care and operation instructions. If at this point you are not totally familiar with the material already covered, you would do well to read it again.

Please pay particular attention to the preceding section titled "Owner Maintenance Care and Operation Instructions". This section covers information critical to the plants proper loading and function. You will find that this same information is listed in the Ecological Tanks, Inc., "Aqua Safe Homeowners Manual". Your assurance of the homeowners receipt of their manual and explanation of its contents is, in our opinion, most critical to the plants proper operation.

Find in the following sections of this manual the "Aqua Safe Initial Service Policy". It covers information required of you as a maintenance provider, in order for you to provide service in compliance with ANSI/NSF Standard 40. Additionally, most states have added to the requirements of this policy. You must know and adhere to all other regulatory agency requirements concerning mechanical plant service/maintenance standards.

Lets cover a routine maintenance service call. First check the systems control panel for any alarm or failure indication. Check panel to insure proper incoming power. Next move to aerator simply to insure it is running and then move directly to the treatment plant for an effluent quality inspection as outlined in service policy

section. At this point pay particular attention to odors you notice at the plant (or pump tank if applicable). You may notice an earthy smell which is nothing more than carbon monoxide gas emitted by the aerobic bacteria in the plant. There may be a sweet smell or no smell at all and that's good. Should you experience a foul rotten egg odor, something is wrong. While at the plant check system for bubbling noise in the plant.

Return to control panel, check for proper functions as completely outlined in this manual under sections titled "Aqua Safe Aerobic Control", note trouble shooting and repair guidelines covered in the referenced section. Before servicing control panel and alarm system disconnect power to control panel.

Clean or replace aerator air filter at this time. If you experienced a rotten egg odor when at the plant and heard little or no bubbling, now finding a clogged or extremely dirty air filter may be your problem. Turn on aerator at this time and check for any air leak between aerator and 3/4" Sch. 40 p.v.c. air piping. If a leak is detected, effect repair.

The Aqua Safe aerobic plant was designed and tested with a specific aerator for each of its plant models. Use only the specified aerator listed in this manual with the specific plant model.

Returning to the plant check again for the presence of bubbling noise inside the plant. When you first checked the system for odors if you found no obnoxious odor, and clear effluent quality it will not be necessary to further examine the plant.

Should your maintenance policy require a sampling of the final effluent on this visit, we recommend the sample be taken from a fresh flow out of the discharge pipe near or immediately following the plant. If a sample for chlorine residual is required take it directly from the chlorination tank. Remember if you've had no flow on the system for several hours, you will get little or no chlorine residual.

If this particular system uses a gravity flow overland discharge check to insure the discharge pipe or manifold is open. Should the system employ spray irrigation or some other method of pumped effluent disposal, you should check that method at this time.

Be sure and follow steps outlined in section titled "Aqua Safe Service Policy", number 3, should you observe any improper condition affecting the plants proper operation which cannot be readily repaired.

METHODS FOR EVALUATION OF EFFLUENT AND MIXED LIQUOR

Problem	Possible Cause	Corrective Action
Offensive odor from plant and effluent	Aerator or air piping defective or leaking	Check aerator, air piping and alarm system
Murky to gray mixed liquor with semi clear effluent having a sour odor	Plant starving due to infrequent loading or oversized pretreatment tanks resulting in totally anaerobic, low B.O.D. influent strength	Confer with homeowner regarding loading. Remember it may take 4 to 12 wks for a new plant to start. Properly size & baffle pretanks as referenced in this manual.

Black colored mixed liquor & effluent having a totally septic odor void of dissolved oxygen, having an approximate pH between 6.5 & 8	Plant receiving little or no aeration due to defect in aerator or air piping	Check aerator, air piping & alarm system
Black colored mixed liquor & black tinted effluent having an offensive odor & acidic pH	Plant loaded or dosed with influent that prohibits growth of aerobic bacteria	Confer with owner regarding loading. Adjust pH to between 6.5 & 7.5 dose system with approved bacterial additives to help restart microbacterial growth or pump tank for fresh start
Brown mixed liquor with a viscous, brown foam having an obnoxious odor in the mixing zone with semi-clear effluent high in T.S.S.	Developed population of filamentous microorganisms in aeration zone due to low food to microorganism ratios, the presents of toxins or improper pH level.	Confer with homeowner regarding proper plant loading. Adjust pH to 6.5 & 7.5. Dose plants mixing zone with approved bacterial additive.
Chocolate brown mixed liquor with clear effluent quality having only a slight earthy smell in mixing zone.	Plant working properly with an effluent pH between 6.5 & 7.5 and D.O. level between .5 and 2.5 mg/L. Because you took the time to do your job right!	None required

Should you feel that you need to access the plant's mixing zone to grade at plant installation follow these steps for fiberglass plants:

1. Remove any one (1) of the four (4) seven (7) inch inspection port covers located towards the outside of plant's fiberglass top.

2. Fit a four (4) inch neoprene soil gasket into the four and three-quarter (4 3/4) inch opening now exposed in plant top, which is directly over an air drop line and air transfer opening into mixing zone.

3. Insert the required length of four (4) inch S.D.R. 35 p.v.c. pipe into plant's top through four (4) inch neoprene soil gasket to grade.

4. Install a p.v.c. clean out fitting or removable cap just above grade level on four (4) inch p.v.c. pipe.

For concrete plants please refer to the following:

1. When precasting the plant top or lid cast a four (4) inch S.D.R. 35 p.v.c. coupling into any one of the four (4) inspection port plugs around outside edge of plant's lid.

2. Glue and extend the required length of four (4) inch S.D.R. 35 p.v.c. to grade into the four (4) inch p.v.c. coupling cast in inspection port plug.

3. Install p.v.c. clean out fitting or removable cap just above grade level.

SOURCES FOR OBTAINING REPLACEMENT PARTS OR COMPONENTS

Replacement parts or components may be obtained from your local installer or from:
Ecological Tanks Inc., 2247 Hwy. 151 N., Downsville, La. 71234
Office: 318-644-0397 Fax: 318-644-7257

PARTS LIST

Refer to system, aerobic control and linear aerator schematics.

NAMEPLATE INFORMATION

ECOLOGICAL TANKS, INC.

"AQUA SAFE"

1-318-644-0397

Model # AS 500L Class 1

Serial # 0000 Size 500 Gallon/day

Local Distributor _____

The weatherproof white vinyl labels are permanently affixed to the aerator compressor, front of the electrical control panel and treatment plant tank cover.

Aqua Safe Aerobic Control Compressor/High Water Alarm R1A

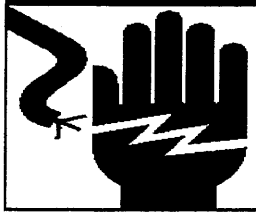
OPERATING INSTRUCTIONS

The AquaSafe™ aerobic control controls a single compressor motor and monitors air compressor failure and high water alarm conditions in aerobic wastewater treatment systems.

The unit features an audio/visual alarm consisting of a red top-mounted beacon and an internally-mounted stainless steel horn. The horn circuit has a front mounted silence/normal switch and side mounted compressor off/on switch. A push button reset circuit breaker is mounted on the side of the enclosure to protect excessive current draw from damaging the compressor motor.

The audio/visual alarm activates when the compressor circuit breaker trips or the compressor off/on switch is turned off. In a high water alarm condition, a normally open float switch activates the alarm. The compressor off/on switch also functions as an alarm test feature when switched to the "off" position.

WARNING!



ELECTRICAL SHOCK HAZARD

Disconnect all power sources before servicing. Failure to do so could result in serious injury or death.

FLOAT SWITCH INSTALLATION IN PUMP

Internally Weighted Float Switch

1. Determine desired activation level.
2. Suspend switch 7 inches below desired activation level (see Figure B). Switch remains partially submerged during the "on" tipping action. Switch can be totally submerged and still continue to operate properly.
3. Terminate cable leads directly into control device (AquaSafe© panel R1-A).
4. Check installation. Allow system to cycle to ensure proper installation.

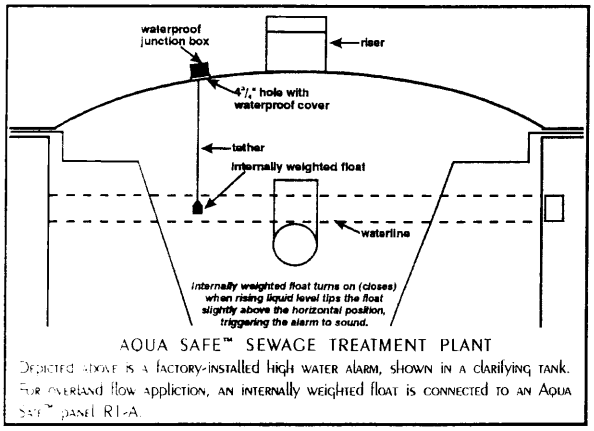
Pipe Clamp Mounted Float Switch

1. Determine desired activation level (see Figure C). To adjust activation level, move pipe clamp up or down on discharge pipe.
2. Tighten pipe clamp around the discharge pipe at desired activation level. Keep switch cable between strap and pipe to help prevent slippage (see Figure D).
3. To lock releasable tab, run remaining strap between releasable tab and head. Pull tightly.
4. To eliminate obstruction to switch, tuck strap back through clamp head (see Figure D).

INSTALLING THE ALARM

1. Mount alarm box using existing holes in back of box. To ensure water-tight seal, use screws and sealing washers included with alarm.
2. Determine "conduit-in" locations on alarm.

Figure A - Aqua Safe™ Sewage Treatment Plant



AQUA SAFE™ SEWAGE TREATMENT PLANT

Depicted above is a factory-installed high water alarm, shown in a clarifying tank. For overland flow appliction, an internally weighted float is connected to an Aqua Safe™ panel R1-A.

Figure B - Internally Weighted Float Installation

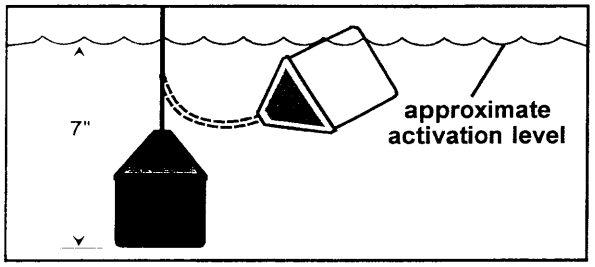


Figure C - Pipe Clamp Float Installation

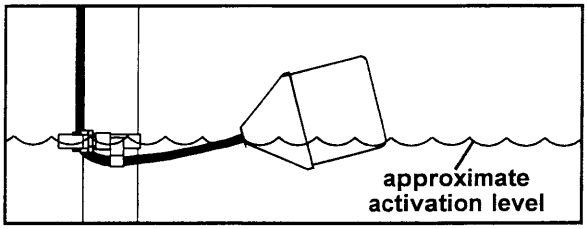
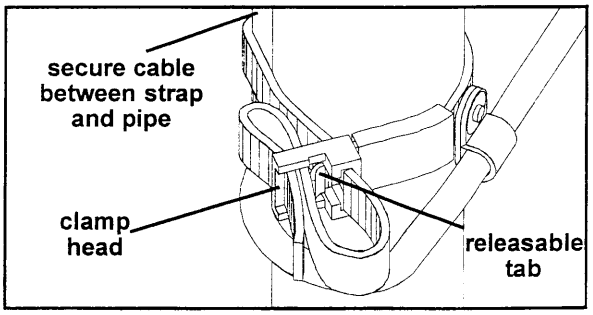


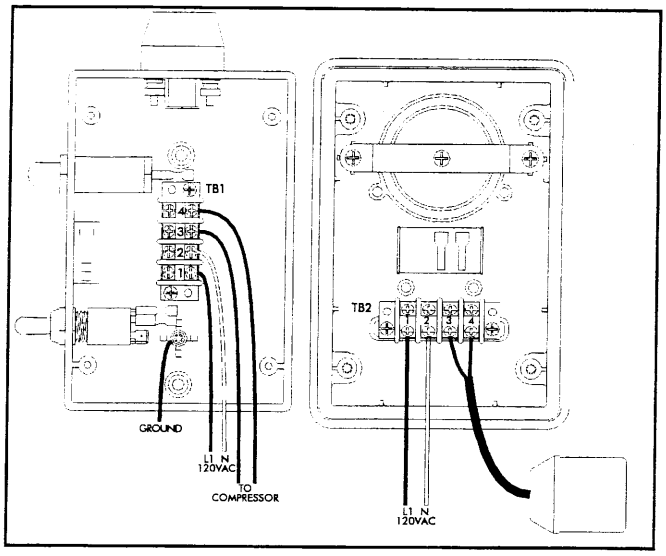
Figure D - Float Cable Installation



INSTALLING THE ALARM

3. Drill holes for conduit entry. Use caution to prevent damage to bosses inside alarm box.
4. Attach conduit.
5. Route float switch cable through conduit and attach to terminal block 2 (located on cover), positions 3 and 4 (see Figure E).
6. Attach "power-in" conductors to TB1. Connect L1 (line) to TB1:1 and N (neutral) to TB1:2. Attach ground wire to ground termination post (see Figure E). If separate alarm and compressor circuits are required, remove factory-installed jumper wires between TB1:1 and TB2:1, TB1:2 and TB2:2. Connect L1 to TB2:1 and N to TB2:2.
7. Route compressor power cable through conduit and terminate at TB1 positions 3 and 4.
8. Attach alarm box cover using the four pre-installed screws.
9. Turn on power.
10. Check installation by manually tipping float switch and toggling the compressor off/on switch. The alarm horn and beacon should indicate an alarm condition.

Figure E - Alarm Installation



11. Push front-mounted horn silence/normal switch to silence horn. The beacon should remain illuminated.
12. Return switch to the normal position.
13. Test unit periodically to ensure proper operation.

SPECIFICATIONS

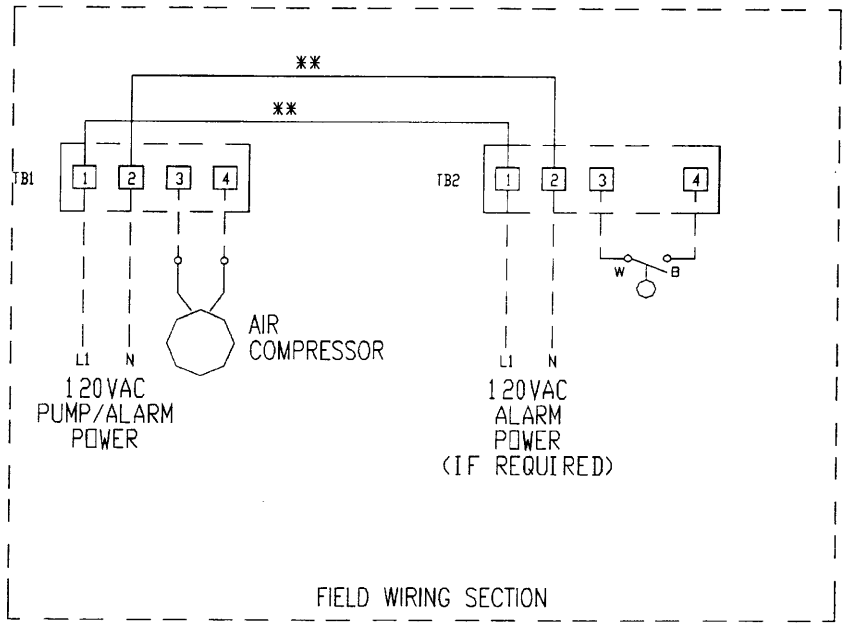
Voltage: 120 VAC, 50/60 Hz, single phase

Enclosure: 6.5 inch x 4.5 inch x 3.0 inch (16.51 cm x 11.43 cm x 7.62 cm), indoor-outdoor, weatherproof, thermoplastic enclosure meets Type 3R water-tight standards

Alarm Horn: 72 decibels at 5 feet (1.5 meters), meets Type 3R water-tight standards as installed by factory

Alarm Beacon: 3.5 watt incandescent bulb meets Type 4X standards as installed by factory

Figure F - Schematic



**NOTE - REMOVE FACTORY INSTALLED WIRES IF SEPARATE ALARM AND COMPRESSOR CIRCUITS ARE REQUIRED

MUST BE INSTALLED BY A LICENSED ELECTRICIAN IN ACCORDANCE WITH NFPA 70, NATIONAL ELECTRIC CODE

TEMPERATURE RATING OF FIELD INSTALLED CONDUCTORS MUST BE AT LEAST 140 DEG. F. (60 DEG. C.)
TERMINAL STRIPS WILL ACCEPT COPPER CONDUCTORS 12-20 AWG. TORQUE RATING OF TERMINAL STRIP CLAMPING SCREWS IS 16 IN/LBS FOR ALARM AND PUMP CONTROL SECTION.

Manufactured by SJE-Rhombus Controls • P.O. Box 1708 • County Road 6 • Detroit Lakes, MN USA 56502 • 218-847-1317 • Printed in USA • Rev 10/97 • Inst. Instr. PN1006537C

AQUA SAFE™

R2 & R4 Aerobic Control

Installation Instructions and Operation/Maintenance Manual

This control panel must be installed and serviced by a licensed electrician in accordance with the National Electric Code NFPA-70, state and local codes.

All conduit running from the tank to the control panel must be sealed with conduit sealant to prevent moisture or gases from entering the panel. **NEMA 4X enclosures are for indoor or outdoor use**, primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water and hose-directed water. **Cable connectors must be liquid-tight in NEMA 4X enclosures.**

Installation

This aerobic treatment system panel was designed to operate an air compressor and effluent pump, in addition to providing air compressor fail and high water level alarm functions.

NOTE: Options ordered may affect the number of floats and their functions. Please reference the schematic provided with the control panel.

Installation of Float Switch

CAUTION: If float switch cables are not mounted and terminated in the correct order, the pump system will not function properly.

1. Label float for specific operation (high water alarm, pump on/off, and timer override). See schematic for float options.
2. Determine your normal operating level as seen in **Figure 1** on next page.

(continued on next page)

Installation

3. Mount float switches at appropriate levels via stationary device as illustrated in **Figures 2 & 3**. Be sure that floats have free range of motion without touching each other or other equipment in the basin.

Mounting the Control Panel

1. Determine mounting location for panel. If distance exceeds the length of either the float switch cables or the pump power cables, splicing will be required. For outdoor or wet installation, we recommend the use of a junction box with liquid-tight connectors (S.J. Electro Systems' Model JB70) to make required connections. **You must use conduit sealant to prevent moisture or gases from entering the panel.**
2. Mount control panel (mounting devices are furnished with control panel).
3. Determine conduit entrance locations on control panel. Check local codes and schematic for the number of power circuits required.

   CAUTION: Be sure the power supply voltage and phase are the same as the motors being installed. If in doubt, see the identification plates for voltage/phase requirements.
4. Drill proper size holes for type of connectors being used.

   CAUTION: If using conduit, be sure that it is of adequate size to pull the pump and switch cables through.
5. Attach cable connectors and/or conduit connectors to control panel.

FOR INSTALLATION WITHOUT A SPLICE, GO TO STEP 11; FOR INSTALLATIONS REQUIRING A SPLICE, FOLLOW STEPS 6-10.

6. Determine location for mounting junction box according to local code requirements. **Do not** mount the junction box inside the sump or basin.
7. Mount junction box to proper support.
8. Run conduit to junction box. Drill proper size holes for the type of conduit used. Attach connectors to junction box.
9. Identify and label each wire before pulling through conduit into control panel. Pull motor power cables and control switch cables through connectors into junction box. Make wire splice connections at junction box.
10. Firmly tighten all fittings on junction box.
11. If a junction box is not required, pull motor cables through conduit into control panel.
12. Connect motor wires to terminals. See schematic inside control panel for terminal layouts.
13. Connect "power-in" conductors to proper locations: 120 volt AC alarm power to alarm circuit terminals labeled L1&N, 120/208/240 volt AC to pump and compressor power terminals labeled L1 & L2 /N as seen on schematic provided with control panel.

VERIFY CORRECT OPERATION OF CONTROL PANEL AFTER INSTALLATION IS COMPLETE.

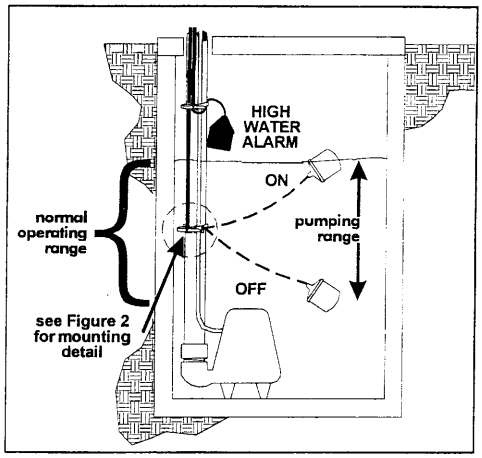


FIGURE 1-SJE wide angle* float system
*Super Single® or SJE PumpMaster® Plus
(See chart below to determine pumping range)

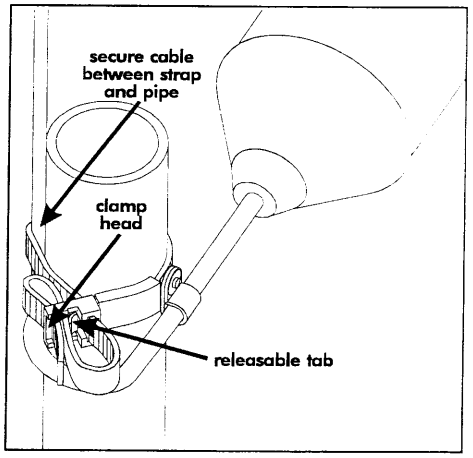


FIGURE 2 - Pipe clamp mounting detail

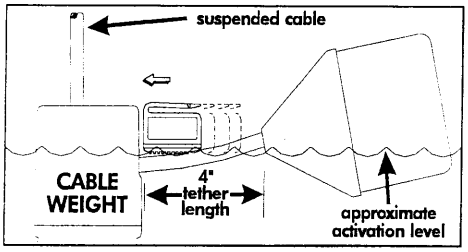


FIGURE 3 - Float with cable weight

WARNING: Turn off all power before installing floats in pump chamber. Failure to do so could result in serious or fatal electrical shock.

Determining Pumping Range (in Inches)

Use only as a guide. Pumping ranges are based on testing in non-turbulent conditions. Range may vary due to water temperature and cord shape.
Note: As the tether length increases, so does the variance of the pumping range.

Super Single® pumping range

tether length	3.5	5	7	9	11	13	15
pumping range	6.5	7.5	8.5	10	11	12.5	13.5

SJE PumpMaster Plus® pumping range

tether length	3.5	6	10	14	18	22	24
pumping range	7	10	16	22	28	33	36

Installation *(continued)*

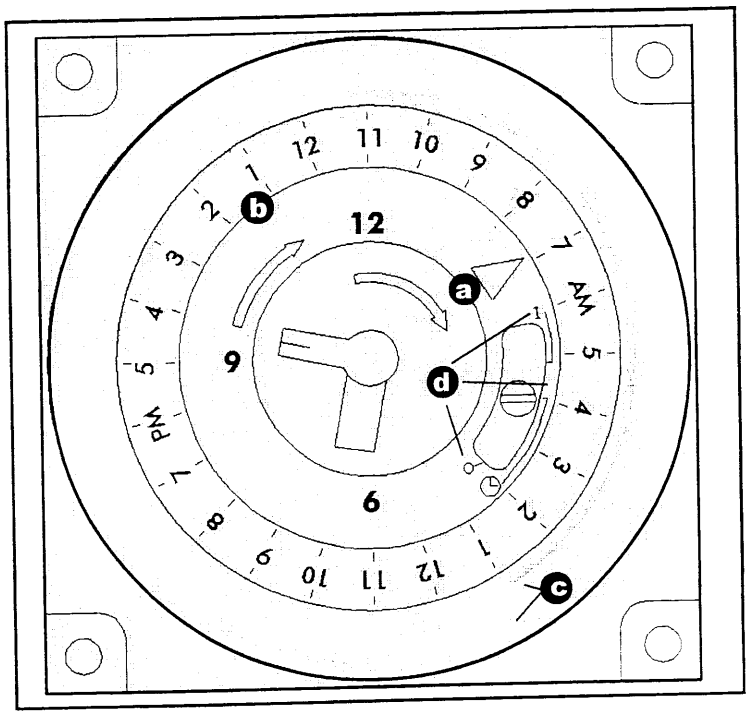


FIGURE 4 - Timer detail

Setting the timer (optional)

The timer is a 24 hour time clock with 15 minute increment settings. The captive trippers change the SPDT relay state when pushed toward the outside.

1. **Setting time of day**

   (a) Synchronize the timer by aligning arrow at the 2:00 position of inner face with the corresponding time of day printed on the outer ring. (**NOTE:** Power must be **ON** to keep time synchronization.)

2. **Setting ON time and duration**

   Locate desired activation time(s) on outer ring (b) and push trippers to the outside (c). Each tripper represents 15 minutes activation time. Push as many trippers back as desired for duration time. When the timer reaches the first tripper, the timer SPDT contacts will change state and turn ON. It will remain ON for as long as the following trippers are pushed out. When timer goes past last tripper, the timer will return to the **OFF** mode. The timer has a selector (d) for **OFF**(O), **AUTOMATIC** (blank), and **MANUAL OVERRIDE** (I) modes.

Operations

The Aqua Safe™ aerobic control was designed to operate a single-phase air compressor and effluent pump. The control incorporates an audio/visual alarm for high water conditions and air compressor fail. A test/normal/silence switch, which is located on the side of the enclosure, allows the user to test the alarm horn or silence the horn while keeping visual indication. The alarm indication will remain active until the condition is cleared. The high water alarm is activated via a normally open float switch. The air compressor fail alarm is activated either by a circuit breaker trip or turning the air compressor OFF/ON switch to the OFF position.

The effluent pump circuit contains a thermal-magnetic circuit breaker for supplementary protection and disconnect for the pump. The air compressor circuit contains an ON/OFF toggle switch for disconnect and a thermal push button reset circuit breaker for supplementary over-current protection. Over-current protection for the alarm circuit is accomplished by the use of a 2 amp fuse. The fuse is located in a bayonet-style fuse holder which is a touch-safe power disconnecting means for the alarm circuit when the top is removed.

Certain models of the aerobic control utilize a 24-hour timer to control the effluent pump. The effluent pump is controlled by a pump switch for dosing sizes and the timer for selecting periods of the day to allow dosing or spraying. A timer override float may be included as an option to allow dosing/spraying in high demand situations.

Maintenance

Alarm Horn

Pressing the test switch, turning the compressor ON/OFF switch OFF, or activating the alarm float should turn on the alarm horn. If the horn does not sound replace with horn of same type.

High Water Alarm Light

Activating the alarm float should turn on the alarm light. If the light does not activate, replace with indicator of the same type.

Compressor Fail Light

Turning the compressor ON/OFF switch OFF should turn on the fail light. If the light does not activate, replace with indicator of the same type.

Circuit Breaker

Check each pole of the circuit breaker for proper resistance reading using the following procedure.

1. With power OFF, isolate the circuit breaker by disconnecting either the line side or load side wires.
2. Place the ohmmeter leads across the corresponding line and load terminals of each pole.
3. With the ohmmeter on the R X 1 scale and the breaker in the OFF position, the reading should be infinity (very high resistance). With the breaker in the ON position, the reading should be zero ohms (very low resistance). (The push button reset breaker can not be manually turned OFF. When the plunger is pushed in, the breaker is ON and the ohm reading should be zero. If the breaker is tripped (OFF), the plunger will be sticking out and ohm reading should be infinity.) If the readings are not as stated, replace the circuit breaker with one of the same ratings.

NOTE: Readings may vary slightly depending on the length of wire and accuracy of the measuring device.

Float Controls

Check the floats throughout their entire range of operation. Clean adjust, repair or replace damaged floats.

Checking the float resistance - The float resistance can be measured to determine if the float is operating correctly or is defective. Use the following procedure to measure the float resistance.

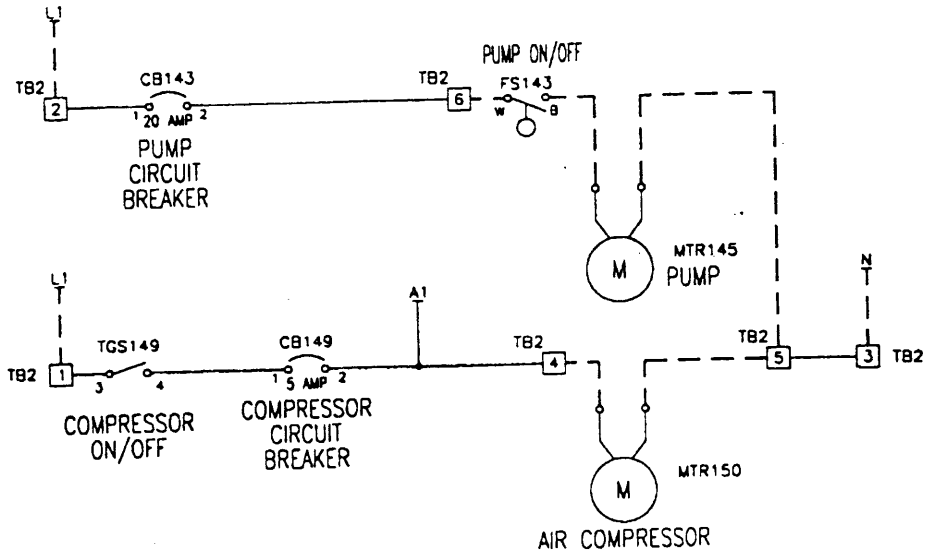
1. Isolate the float by disconnecting one or both of the float leads from the float terminals.
2. Place one ohmmeter lead on one of the float wires, and the other ohmmeter lead on the other float wire.
3. Place the ohmmeter dial to read ohms and place on the R X 1 scale. With the float in the OFF position the scale should read infinity (very high resistance). Replace the float if you do not get this reading. With the float in the ON position the scale should read zero (very low resistance). Replace the float if you do not get this reading.

NOTE: Readings may vary slightly depending on the length of wire and accuracy of the measuring device.

Fuse

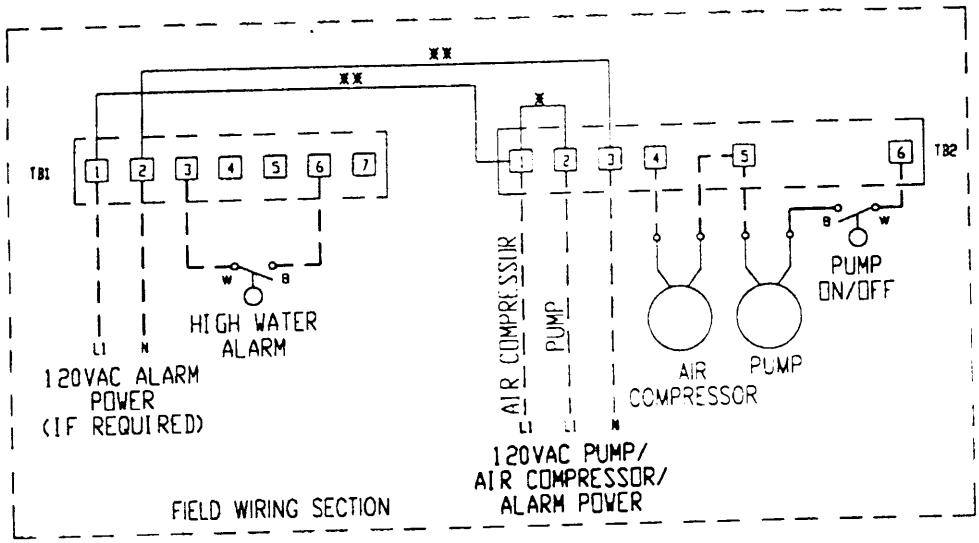
To check the continuity of the fuse, remove the fuse from the bayonnet-style fuse block. With the ohmmeter on the R X 1 scale, measure resistance. A reading of infinity indicates a blown fuse and must be replaced. Replace fuse with same type, voltage and amp rating.

R2 SCHEMATIC/FIELD WIRING DIAGRAM



NOTES

1. PANEL SPECIFICATIONS:
   NEMA 4X ENCLOSURE
   ALARM CIRCUIT: 120VAC 1 PHASE
   MOTOR CIRCUITS:
   LINE VOLTAGE: 120 VAC 1 PHASE.
2. DASHED LINES REPRESENT FIELD WIRING REQUIRED.
3. CONNECT GROUND TERMINAL IN BOX TO A GOOD GROUND.



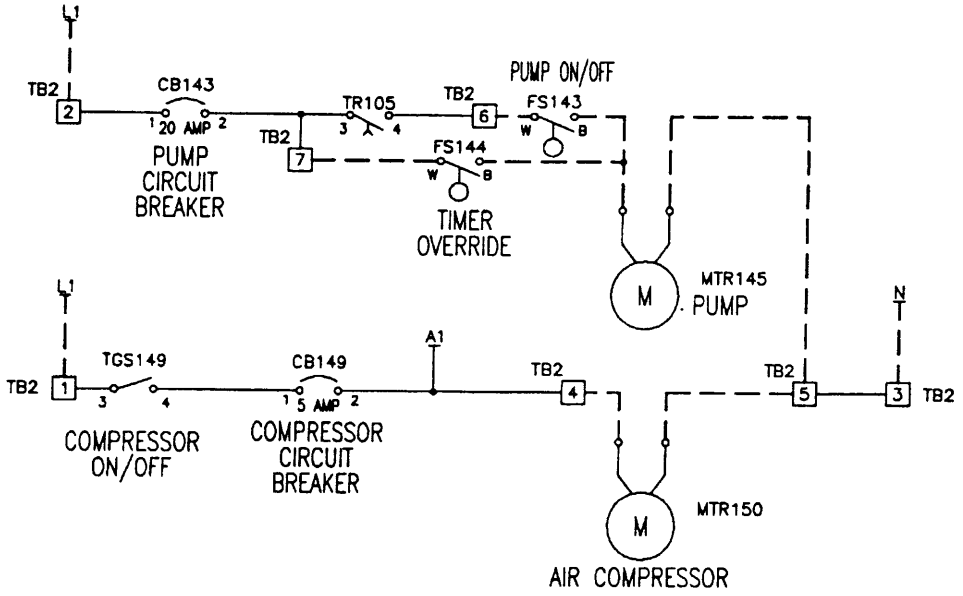
NOTE - IF ONLY ONE 120VAC INPUT POWER SOURCE IS REQUIRED CONNECT L1 TO TB2:1 AND NEUTRAL TO TB2:3.

* NOTE - REMOVE FACTORY INSTALLED WIRE IF SEPERATE PUMP AND COMPRESSOR CIRCUITS ARE REQUIRED

** NOTE - REMOVE FACTORY INSTALLED WIRES IF SEPERATE ALARM AND PUMP CIRCUITS ARE REQUIRED

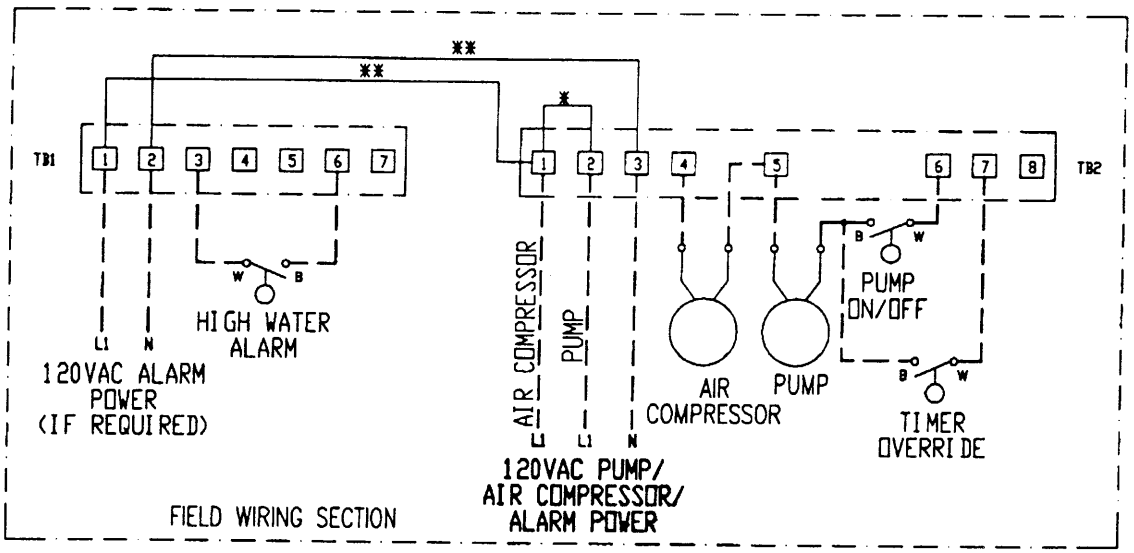
MUST BE INSTALLED BY A LICENSED ELECTRICIAN IN ACCORDANCE WITH NFPA 70, NATIONAL ELECTRIC CODE

R4 SCHEMATICS/FIELD WIRING DIAGRAM



NOTES

1. PANEL SPECIFICATIONS:
   NEMA 4X ENCLOSURE
   ALARM CIRCUIT: 120VAC 1 PHASE
   MOTOR CIRCUITS:
   LINE VOLTAGE: 120 VAC 1 PHASE
2. DASHED LINES REPRESENT FIELD WIRING REQUIRED.
3. CONNECT GROUND TERMINAL IN BOX TO A GOOD GROUND.



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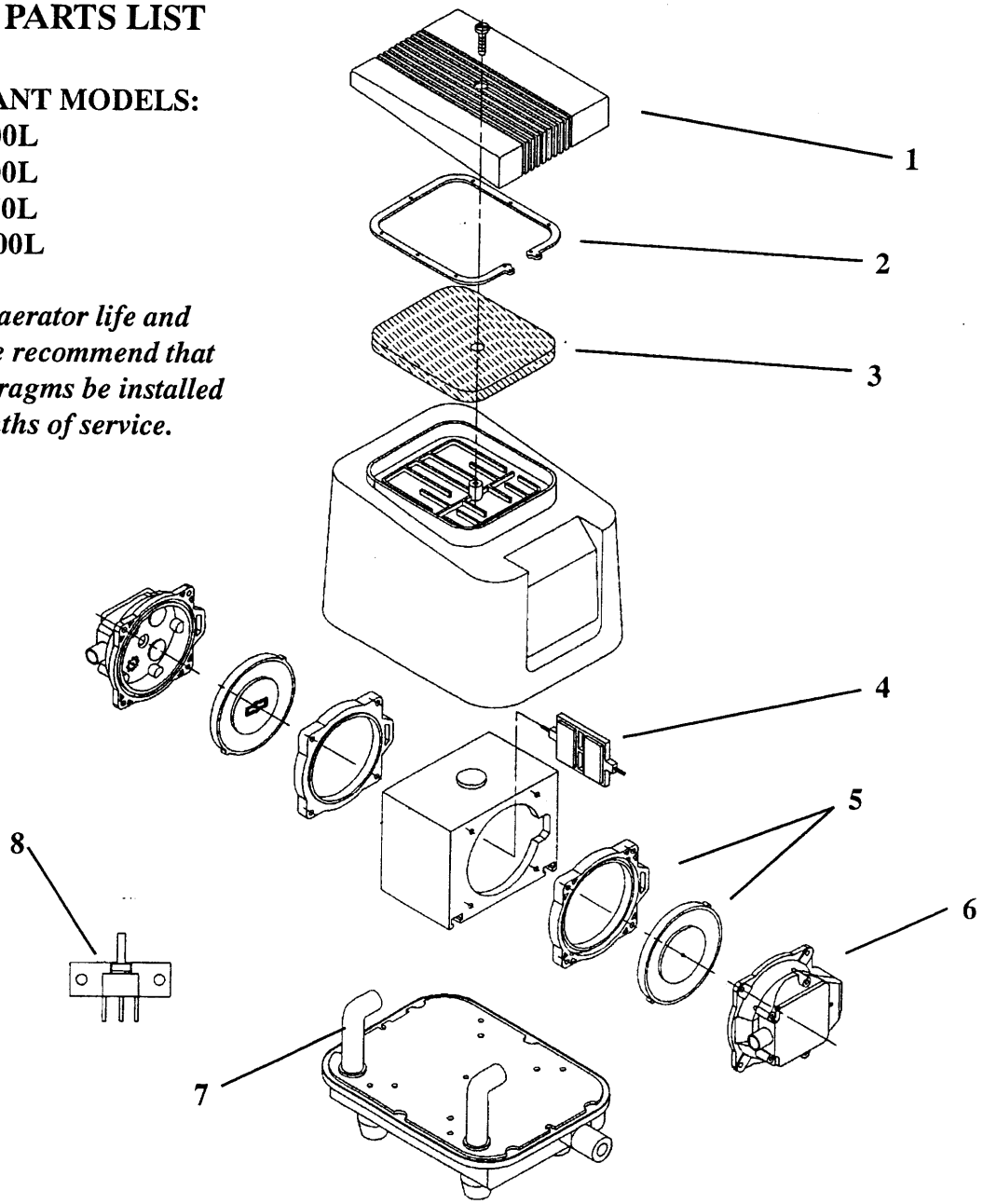
** NOTE - REMOVE FACTORY INSTALLED WIRES IF SEPERATE ALARM AND PUMP CIRCUITS ARE REQUIRED

MUST BE INSTALLED BY A LICENSED ELECTRICIAN IN ACCORDANCE WITH NFPA 70, NATIONAL ELECTRIC CODE

LINEAR AERATOR COMPRESSOR PARTS LIST

TREATMENT PLANT MODELS:
A.S. 500L
A.S. 600L
A.S. 750L
A.S. 1000L

To insure extended aerator life and maximum air flow, we recommend that new compressor diaphragms be installed every 42 to 60 months of service.



REF NO.	DESCRIPTION	PART NO. BY PLANT MODEL (AERATOR MODEL AS SHOWN)			
		A.S. 500L ASC2532	A.S. 600L ASC3342	A.S. 750L ASC3352	A.S. 1000L ASC5082
1	FILTER COVER	A530082	B530082	C530082	D530092
2	COVER GASKET	A560022	B560022	C560022	D560052
3	AIR CLEANER	A563012	B563012	C563012	D563022
4	SHUTTLE ASSY	A516002	B516012	C516022	D514002
5	DIAPHRAGM BLOCK	A518002	B518002	C518002	D518022
6	HEAD & VALVE ASSY	A520002	B520002	C520002	D527002
7	L-TUBE	A539002	B539002	C539002	D539032
8	PROTECTIVE SWITCH (UNDER CAP)	A502322	B502322	C502322	D502322

AQUA SAFE SERVICE POLICY INITIAL SERVICE POLICY

(The installer is responsible for the service contract)

The total purchase price of an ***Aqua Safe*** treatment plant includes an initial service policy of twenty four (24) months. This policy includes all service calls required due to equipment failures, defects or manufacturers defects of ***Aqua Safe*** aerator or controls only.

The plant is to be inspected by the dealer, installer or his representative at no cost to the owner. These service calls shall include four inspection/service calls over the two year period and shall include the following:

1. Adjustment of the timer control, if applicable, and servicing of the aerator, including replacement or cleaning of the intake filter if necessary.
2. An effluent quality inspection consisting of a visual check for color, turbidity, scum overflow, and an examination for odors.
3. Immediate notification to the owner/warrantee in writing of any improper observation which cannot readily be repaired. This notification shall advise said owner of the problem, if it is covered by the warranty and estimated date for correction of said problem.

There shall be no charge to the owner for service calls, repairs, or replacements of component parts covered by the warranty.

CONTINUING SERVICE POLICY

An annually renewable service policy affording the same coverage as the initial service policy is available. Consult your local dealer for pricing information.

MANUFACTURERS LIMITED WARRANTY

Ecological Tanks Inc., ***Aqua Safe*** (hereinafter referred to as manufacturer) warrants each wastewater treatment system to be free from defects in workmanship and materials from the date of installation for a period of no more than twenty-four (24) months. When properly installed and registered with the manufacturer, the manufacturer's sole obligation under this warranty shall be as follows:

To repair or exchange any components, F.O.B. factory, that in the manufacturers judgment is defective, provided that said component part has been paid for and is returned through an authorized dealer, prepaid. The warrantee must specify the nature of the problem or defect to the manufacturer.

This warranty does not cover any system that has not been properly installed, been flooded by any external means, disassembled by any unauthorized person, filled with anything other than normal household wastewater, or damaged by an act of nature. This warranty applies only to the treatment system itself and does not include any of the purchasers plumbing, drainage and/or disposal system or house wiring. This warranty does not cover fire ant or insect damage.

The manufacturer claims no responsibility for any delays or damages caused by defective components or materials which cause losses incurred by interruption of service or for repairs or replacements of component parts covered by the warranty.

MANUFACTURERS WARRANTY REGISTRATION CERTIFICATE

It is the installers responsibility to fill out the registration certificate and mail it within 30 days of installation to the address below. The owner/purchaser should verify that this is done to insure proper registration for warranty purposes.

Ecological Tanks Inc.,
2247 Hwy. 151 North • Downsville, LA 71234
Office: 318-644-0397 Fax: 318-644-7257

Please Print

PURCHASERS RECORD

Serial # ______________________ Installation Date ______________

Installer's Name ______________________________

Mailing Address ______________________________

______________________ Phone ______________

- - ✂ -

INSTALLERS RECORD

Serial # ______________________ Installation Date ______________

Owner's Name ______________________________

Physical Address/City ______________________________

______________________ Phone ______________

- - ✂ -

REGISTRATION CERTIFICATION

(Must be returned to manufacturer)

Serial # ______________________ Installation Date ______________

Owner's Name ______________________________

Physical Address/City ______________________________

______________________ Phone ______________

Dealer's Name ______________________________

Mailing Address ______________________________

______________________ Phone ______________

Installer's Name ______________________________

Mailing Address ______________________________

______________________ Phone ______________