

**OPERATIONS AND MAINTENANCE
FOR
INDIVIDUAL HOMEOWNERS**

**ROCKY BLUFFS
Sewage Disposal System**

**ENGINEERS
NORTHSTAR ENGINEERING
WERT & ASSOCIATES**

**EQUIPMENT
ORENCO SYSTEMS, INC
814 AIRWAY AVENUE
SUTHERLIN, OR 97479-9012
541-459-4449**

INSTALLER

SYSTEM OPERATOR

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (RWQCB)
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RECORD KEEPING

It is absolutely necessary that a written diary be maintained describing all activities relating to your wastewater system and recording measurements from all inspections. This information is very valuable for analysis and trouble shooting if problems should occur. An inspection form is included in the Effluent Filter Maintenance Instructions found in the appendix. Each homeowner should establish a maintenance contract with a local provider.

PROHIBITIONS

You are advised that the following prohibitions apply to all wastewater systems, including yours:

1. Law prohibits the direct discharge of wastewater to any surface waters (creeks, ditches, storm drains, etc.).
2. Law prohibits the by-pass or overflow of untreated or partially treated waste.
3. The discharge of waste classified as "hazardous" (insecticides, toxic chemicals, paint, thinner, motor oil, etc.), even to a septic system, is prohibited by law.

PREVENTING PROBLEMS

The less wastewater you produce the less your system will have to process and the less the soil will have to absorb. Water conservation is a cheap and easy way to help protect your system. Additionally, the operating permit for this system restricts the amount of wastewater ultimately discharged to the disposal field. ***YOU MUST CONSERVE WATER.*** Therefore, instruct the individual homeowners of the following requirements:

- Repair leaky plumbing fixtures immediately. A leaky toilet can put out a gallon a minute or over a thousand gallons per day. To check for toilet leaks, drop food coloring into the toilet tank and watch for color seeping into the toilet bowl.
- Use sinks sparingly and never let the faucet run continuously. Do not let faucets run while washing hands, equipment, etc. You should advise your employees and customers accordingly.
- Use water saving devices in toilets and showers.

In addition to conserving water, there are other requirements that will protect and extend the life of your system:

- Do not use your septic system for anything that can be disposed of by some other method. We recommend only three things are allowed into the septic tank; human wastes, toilet paper, and water from the bathrooms, sinks and dishwasher.

PREVENTING PROBLEMS, Cont'd

- Never flush solids, including food, down the drain or toilet. The biological action of your system can't keep up with this type and volume of waste. Solids will cause the septic tanks to be pumped more frequently, at considerable expense, and can lead to failure of the filter.
- With the exception of toilet paper, eliminate the flushing of paper products. Non-biodegradable items, such as disposable diapers, sanitary napkins, cigarette butts, paper tissues or paper towels are especially harmful. Post signs to this effect in your restrooms.
- It should not harm your system to use normal amounts of detergent, soaps, cleansers, etc. Biodegradable, low phosphorous types are recommended. **LARGE VOLUMES OF COMMERCIAL CLEANERS AND/OR DISINFECTANTS SHALL NOT BE USED, ESPECIALLY THOSE CONTAINING EMULSIFIERS. ADVISE YOUR CLEANING PERSONNEL ACCORDINGLY.**
- Do not use toilet "bowl fresheners". They often contain chlorine or other substances that are toxic to the beneficial organisms that live in your system.
- Do not use septic system additives or enhancers, such as enzymes, unless approved by the Engineer, Butte County, and the RWQCB.

DESCRIPTION OF THE SYSTEM

Each residential lot will have installed a 1500 gallon septic tank equipped with an effluent pump system. Septic tank effluent will pump from each individual home to a common collection line that will feed a dosing tank. The effluent from the dosing tank will be dosed with a siphon to a sand/soil filter.

Each septic tank should be located to provide easy access for inspection and maintenance for the future years without a major disruption to the homeowner. Landscaping should be planned to avoid it becoming a hindrance to the inspection and maintenance operations in the future and access risers will be brought up to finish ground grade.

The quiet detention time in these tanks is important as it allows as much solids to separate as possible. This is the initial step in the treatment process. Many of the solids found in wastewater settle to the bottom of these tanks to form a sludge layer while floatable materials, such as grease, form a scum layer on top. Some solids are changed to liquid and gas by bacterial action or "digestion". The gases vent back through the plumbing vents in the buildings. A liquid zone is formed through the middle of the tank. This liquid is partially clarified sewage that still contains harmful bacteria or viruses. It is anaerobic, which means it has very little oxygen held in suspension. This causes the strong "septic" odor.

It is essential that effluent quality entering the absorption field is domestic strength: 300 mg/l BOD5, 150 mg/l TSS, 40 mg/l TKN, and 25 mg/l fats, oils, and greases. Higher strengths will cause more frequent clogging of the filters and may cause premature failure of the trenches.

OPERATION AND MAINTENANCE

The primary responsibility of the homeowner is to monitor the condition of their septic tank, keep and submit complete records, and be able to identify changes in the system operation that may signal a problem. The monitoring consists mostly of checking tank liquid levels and eliminating abuse to the system. If problems occur they should be referred immediately to a qualified professional.

Always be sure that all lids are securely bolted to the risers after completing your monitoring and maintenance. An unlocked lid is a safety hazard.

SEPTIC TANKS

Each individual septic tank should be inspected a minimum of once per year. Every septic tank will be pumped at a maximum of ten year intervals, unless monitoring proves otherwise.

The inspection of the tanks does not imply that they will need to be pumped. The type of use of the home will determine on an individual basis when the tanks need pumping. However, it is imperative that all tanks are operating properly. A poorly maintained tank could damage the operability of the pumping stations, the dosing pumps and the disposal field.

- | | |
|----------------|---|
| Every Year | Open all lids to the tanks, being sure not to allow any debris or dirt to fall into the tanks. Check riser lid seal, pump operation, float operation, leaks in tank or discharge assembly, and clogging of screen vault filter. |
| Every 3rd Year | Check the scum and sludge depths in all tanks to ensure adequate liquid volume. Record these depths in your diary. Solids volumes, sludge and scum combined, exceeding one third of the tank volume indicates the tank may need to be pumped. If sludge and scum build up at a high rate, or if the grease and oil rates are too high, it may be necessary to further review your practices. Experience is the only guide in making determinations regarding excessive buildup. |
| Every 3rd Year | Inspect house plumbing for leaking fixtures, toilet, etc. Repair if necessary. Review homeowner operation "Do's" and "Don'ts" and adjust habits if necessary. |

See equipment manufactures literature, enclosed, for additional requirements for operation and maintenance.

TROUBLESHOOTING

If the sewer line begins to backup or alarm sounds check to see if the screened vault is clogged. Also verify proper operation of all floats and the pump. See appropriate maintenance instructions in the appendix.

POWER OUTAGE PROCEDURE

During periods of power outage homeowners should pay attention to conserving water (limited laundry, showers, dishes, etc.). For power outages longer than 12 hours or when a tank alarm sounds during an outage, generators may be installed at individual septic tanks to lower liquid levels prior to tank overflow or backing up into the house.

SAFETY

Never enter an empty or partially filled septic tank. Poisonous gases and/or lack of oxygen can cause death.

The wastewater in this system may contain bacteria and viruses that can be hazardous to your health. Always wear gloves when working on the system and wash thoroughly after completion. Safety glasses are advisable when you are near the pump as some splashing may occur.

If you are not comfortable with the service that you are receiving from the designer, the installer, the equipment manufacturer, the pumper or the maintenance contractor, do not hesitate to contact your local health official for advise.



H O M E O W N E R ' S M A N U A L

*Preventive Maintenance for
Homes with Onsite Wastewater
Treatment Systems*



Orengo Systems[®]
Incorporated

*Changing the Way the
World Does Wastewater[®]*

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Congratulations!

Your home includes reliable, carefully engineered equipment—manufactured by Orenco Systems®, Inc.—for the collection and/or treatment of household wastewater.

When properly designed and installed, onsite wastewater treatment does a terrific job of decomposing household waste and recycling precious water resources. Our systems frequently outperform municipal sewage treatment plants. And the treated effluent is returned harmlessly to the soil, where it receives final polishing and filtration for groundwater recharge. There's no degrading of our nation's rivers and oceans . . . which is so often the case with municipal sewage.

As with any engineered system, such as your car or your heat pump, your onsite wastewater system will work better and last longer if it is regularly maintained by a qualified service provider.

Your system will also work better and last longer if you learn what can go into it—and what can not. Little effort is required. Just read and practice the "dos and don'ts" that follow. Every member of your household should be familiar with these. And if you have guests who want to "help out in the kitchen," be sure to tell them, too. With this preventive maintenance, along with periodic inspections, your onsite wastewater system should function for decades. And you'll save water and energy, too!

There's a place on the back of this Homeowner's Manual to record "Important System Facts." Please record those now, before you file this Manual away. And give a copy to your service provider, especially if your service provider changes. You'll be glad you did.

H O M E O W N E R DOS AND DON'TS

Preventive Maintenance for Homes with Onsite Wastewater Treatment Systems

There are a number of dos and don'ts that will help ensure a long life and minimal maintenance for onsite systems. As a general rule, nothing should be disposed into any wastewater system that hasn't first been ingested, other than toilet tissue, mild detergents, and wash water. Here are some additional guidelines:

DOS AND DON'TS FOR INSIDE THE HOUSE



DON'T flush dangerous and damaging substances into your wastewater treatment system. (Please refer to the "Substitutes for Household Hazardous Waste," on page 5) Specifically, do not flush . . .

- Flammable or toxic products
- Household cleaners, especially floor wax and rug cleaners
- Chlorine bleach, chlorides, and pool or spa products
- Pesticides, herbicides, or agricultural chemicals or fertilizers
- Water softener backwash
- Excessive amounts of bath or body oils



DON'T use special additives that are touted to enhance the performance of your tank or system. Additives can cause major damage to your drainfield and other areas in the collection system. The natural microorganisms that grow in your system generate their own enzymes that are sufficient for breaking down and digesting nutrients in the wastewater.



DO use your trash can to dispose of substances that cause maintenance problems and/or increase the need for seepage pumping. Dispose of the following with your trash:

- Egg shells, kitty litter, coffee grounds, tea bags, cigarette butts
- Paper towels, newspapers, sanitary napkins, diapers
- Cooking grease
- Rags, large amounts of hair



DO collect grease in a container and dispose with your trash. And avoid using garbage disposals excessively. Compost scraps or dispose with your trash, also. Food byproducts accelerate the need for seepage pumping and increase maintenance.

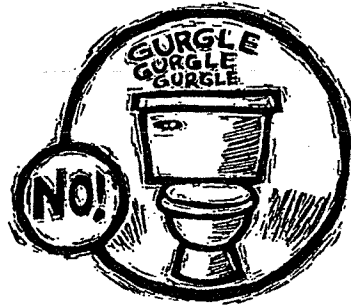
H O M E O W N E R DOS AND DON'TS

DOS AND DON'TS FOR INSIDE THE HOUSE



DON'T leave interior faucets on to protect water lines during cold spells. A running faucet can easily increase your wastewater flow by 1,000 to 3,000 gallons per day and hydraulically overload your system. Instead, properly insulate or heat your faucets and plumbing.

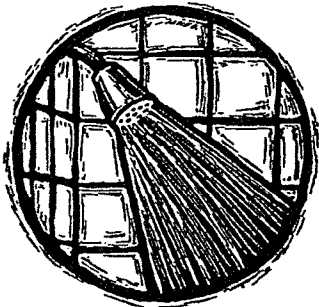
DON'T use excessive amounts of water. (50 gallons per person per day is typical. If your household does not practice any of the "water conserving tips" below, you may be using too much water.)



DON'T ignore leaky plumbing fixtures; repair them. A leaky toilet can waste up to 2,000 gallons of water in a single day. That's 10-20 times more water than a household's typical daily usage. Leaky plumbing fixtures increase your water bill, waste natural resources, and overload your onsite system.



DO keep lint out of your wastewater treatment system by cleaning the lint filters on your washing machine and dryer before every load. Installing a supplemental lint filter on your washing machine would be a good precautionary measure. (This normally takes just a few minutes. Lint and other such materials can make an extreme difference in the frequency and cost of pumping out your primary treatment tank.)

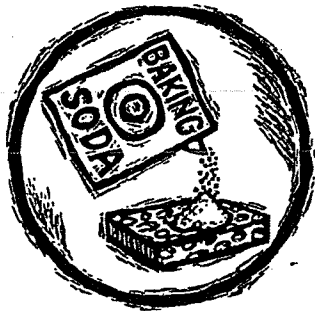


DO conserve water:

- Take shorter showers or baths with a partially filled tub.
- Don't let water run unnecessarily while washing hands, food, teeth, dishes, etc.
- Wash dishes and clothes when you have a full load.
- When possible, avoid doing several loads in one day.
- Use water saving devices on faucets and showerheads.
- When replacing old toilets, buy low-flush models.

H O M E O W N E R DOS AND DON'TS

DOS AND DON'TS FOR INSIDE THE HOUSE



DO use substitutes for household hazardous waste. Replace the following hazardous products with one that is less environmentally harmful. The hazardous cleaners are listed below, followed by the suggested substitute.

Ammonia-based cleaners: Sprinkle baking soda on a damp sponge. For windows, use a solution of 2 tbs. white vinegar to 1 qt. water. Place the mixture into a spray bottle.

Disinfectants: Use borax: 1/2 cup in a gallon of water; deodorizes also.

Drain decloggers: Use a plunger or metal snake, or remove and clean trap.

Scouring cleaners & powders: Sprinkle baking soda on a damp sponge or add 4 tbs. baking soda to 1 qt. warm water or use Bon Ami. It's cheaper and won't scratch.

Carpet/upholstery cleaners: Sprinkle dry cornstarch or baking soda on, then vacuum. For tougher stains, blot with white vinegar in soapy water.

Toilet cleaners: Sprinkle on baking soda or Bon Ami, then scrub with a toilet brush.

Furniture/floor polishes: To clean, use oil soap and warm water. Dry with soft cloth. Polish with 1 part lemon juice and 2 parts oil (any kind), or use natural products with lemon oil or beeswax in mineral oil.

Metal cleaners: Brass and copper: scrub with a used half of lemon dipped in salt. Stainless steel: use scouring pad and soapy water. Silver: rub gently with toothpaste and soft wet cloth.

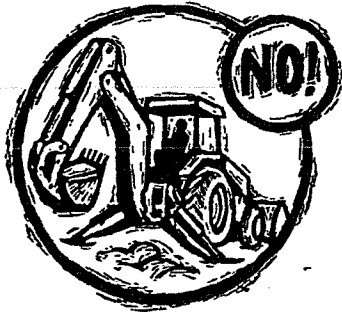
Oven cleaners: Quickly sprinkle salt on drips, then scrub. Use baking soda and scouring pads on older spills.



Laundry Detergents: Choose one with a zero phosphate content or use soap flakes with 1/3 cup of washing soda. (Before switching, wash clothes in pure washing soda to remove residues.)

H O M E O W N E R D O S A N D D O N ' T S

D O S A N D D O N ' T S F O R O U T S I D E T H E H O U S E



DON'T dig without knowing the location of your wastewater treatment system. As much as possible, plan landscaping and permanent outdoor structures before installation. But easily removable items, such as bird baths and picnic tables, are OK to place on top of your system.



DON'T dump RV waste into your wastewater treatment system and tanks. It will increase the frequency of required septage pumping. When dumped directly into the pumping vault, RV waste clogs or fouls equipment, causing undue maintenance and repair costs. (Some RV waste may contain chemicals that are toxic or that may retard the biological digestion occurring within the tank.)



DON'T drive over your tank or any buried components in your system, unless it's been equipped with a special traffic lid. If the system is subject to possible traffic, put up a barricade or a row of shrubs.

DON'T ever connect rain gutters or storm drains to the sewer or allow surface water to drain into it. The additional water will increase costs, reduce the capacity of the collection and treatment systems, and flood the drainfield.

DO keep the tank access lid secure to the riser at all times. If bolts are lost or damaged, call Orenco Systems immediately for replacement: 1-800-348-9843.



DON'T enter your tank. Any work to the tank should be done from the outside. Gases that can be generated in the tank and/or oxygen depletion can be fatal.



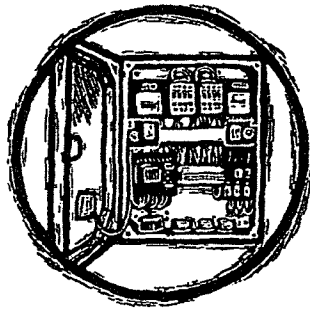
DO make arrangements with a reliable service person to provide regular monitoring and maintenance.

DO keep an "as built" system diagram in a safe place for reference.

H O M E O W N E R DOS AND DON'TS

IF YOU HAVE A CONTROL PANEL

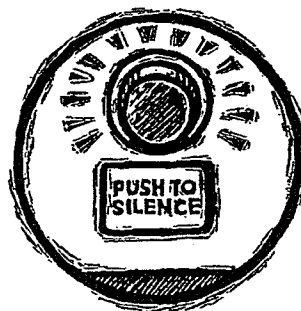
Important! Caution! Only a qualified electrician or authorized installer/operator should work on your control panel. Before doing any work on either the wiring to the level control floats and pumps in the vault or on the control panel itself, it is imperative to first switch the isolation fuse/breaker and the circuit breakers in the panel to the "Off" positions, then switch "Off" the power to the system at the main breaker!



DO familiarize yourself with the location of your wastewater treatment system and electrical control panel, and record the model number of the panel in this booklet, under "Important System Facts." Refer to this number when reporting a malfunction in the system.

DO locate your electrical control panel where it will be protected from potential vandalism.

DO take immediate action to correct the problem in the event of an alarm condition. Call your system operator or maintenance company whenever an alarm comes on; it sounds like a smoke alarm. (It's wise to make the call immediately to avoid the tendency to forget.)



DO remember that the audible alarm can be silenced by pushing the lighted button located directly above the "Push to Silence" label on the front of the electrical control panel. With normal use, the tank has a reserve storage capacity good for 24-48 hours.

DON'T turn off the main circuit breaker to the wastewater pumps when going on vacation. If there is any infiltration or inflow into the system, the pumps will need to handle it.



DO

IMPORTANT SYSTEM FACTS

Property Address _____

Property Owner Name(s) _____

Control Panel Model # _____

Treatment System Model # (if applicable) _____

Location of Control Panel _____

Start-Up Date _____

Starting Timer Reading/Date _____

Service Provider Name _____

Service Provider Phone _____

Seller Name _____

Seller Phone _____

Engineer Name _____

Engineer Phone _____

Installer Name _____

Installer Phone _____

Regulatory Authority _____

Permit # (if applicable) _____

Contact Name _____

Contact Phone _____



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Installation, Operation and Maintenance

Models RR__, FL__, ADH__, MA__, G__

Access Riser Installation

An access riser allows inspection and maintenance of a tank without digging. It is important that the riser be sized correctly and installed properly to create a watertight seal. Without a watertight seal, groundwater can leak into the tank, interfering with its performance. The top grommet in the access riser is for the electrical splice box, the lower for the plumbing discharge. When setting a riser, aim the grommets in the appropriate directions before bonding to the tank and ensure bolt catches are oriented upward.

Riser Sizing

The installed riser should extend about 3 inches above the original ground level (approximately 2 inches for tank settlement and 1 inch to ensure drainage away from the riser).

If the riser is too long, it may be cut to the appropriate height using a hand saw or skill saw, or spun on a table saw. Use masking tape to mark the riser, and cut excess length from the bottom of the riser to preserve the bolt catches (attached to the top end of the riser). To ensure a good fit and watertight joint, a square cut is absolutely necessary.

If the riser is too short, a grade ring may be used as an extension. If a grade ring is attached to the top of the riser, be sure it has bolt catches attached. See instructions for grade ring installation (document EIN-RLA-GR-1).

Use of Adhesives

Adhesive cure times are temperature dependent. In cold weather, allow plenty of time (approximately 3-4 hours); in warm weather, work quickly (approximately 20 minutes).

If you are using IPS810 adhesive, roughen, clean, and dry the surfaces to be bonded. IPS810 has the consistency of honey and will run down vertical surfaces.

If you are using MA320 adhesive, surface roughening is not necessary. MA320 has the consistency of peanut butter and will not run. MA320 is preferable for bonding PVC or fiberglass. **NOTE: MA320 does not bond to concrete.**

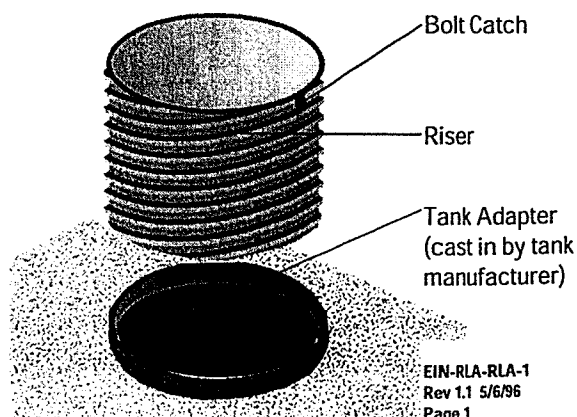
Attachment Methods (1-4)

1. For a tank with a cast-in tank adapter
(Model PRTA24)

1a. Apply a portion of the adhesive package to the outside top of the riser tank adapter.

1b. Carefully slide the riser over the adapter.

1c. Apply excess adhesive with a putty knife to gaps, forming a continuous fillet between the tank adapter and the inside of the riser.



EIN-RLA-RLA-1
Rev 1.1 5/6/96
Page 1

Installation Instructions cont

1d. Wait for adhesive to harden before backfilling.

2. *For a tank with a round access hole, without a cast-in adapter*

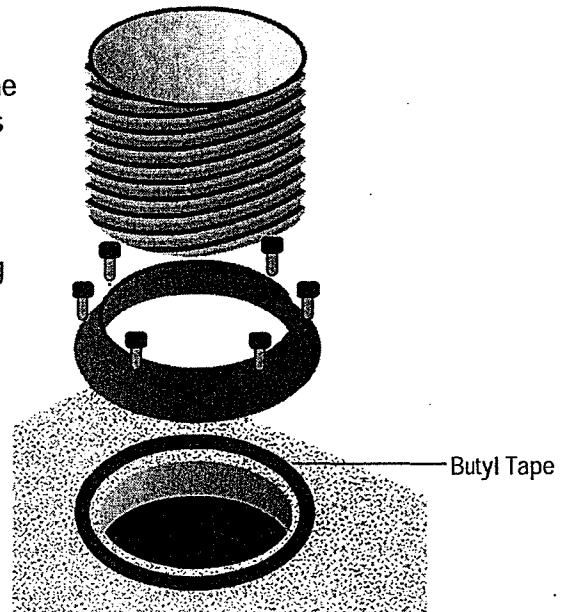
2a. A tank adapter (model PRTA24) may be bolted to the top of the tank.

2b. Mark the points where the bolts will be placed. With a 5/16" masonry drill bit, drill the holes for the bolts and place the blue inserts into the holes. The blue inserts should be flush with the top of the tank.

2c. Apply Butyl tape (two-sided soft sealing tape) inside the bolt pattern to the top of the tank.

2d. Bolt the tank adapter to the tank by tightening bolts evenly. The Butyl tape should form a watertight seal.

2e. After the riser tank adapter has been bolted securely, the riser may be installed in the same way as with a cast-in tank adapter. (Refer to Method I)

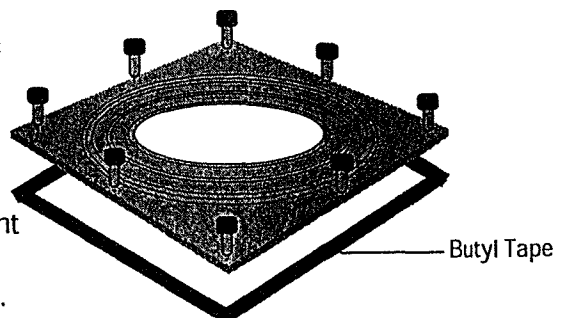


3. *For a tank with a square or oversized access hole*

3a. A square tank adapter (model RRFTA) may be bolted over the access hole.

3b. When bolting a square tank adapter to the tank, Butyl tape should be used between the adapter and the tank to form a watertight seal, the same as with a bolted-on PRTA24. (Refer to Method 2)

3c. Fill the groove with approximately one pint of adhesive for 21" or 24" diameter risers or one quart of adhesive for 30" diameter risers.



Installation Instructions cont

3d. Set the riser in place by twisting gently while working it into the groove. If necessary, use a putty knife to shape the bead of displaced adhesive into a continuous, watertight fillet.

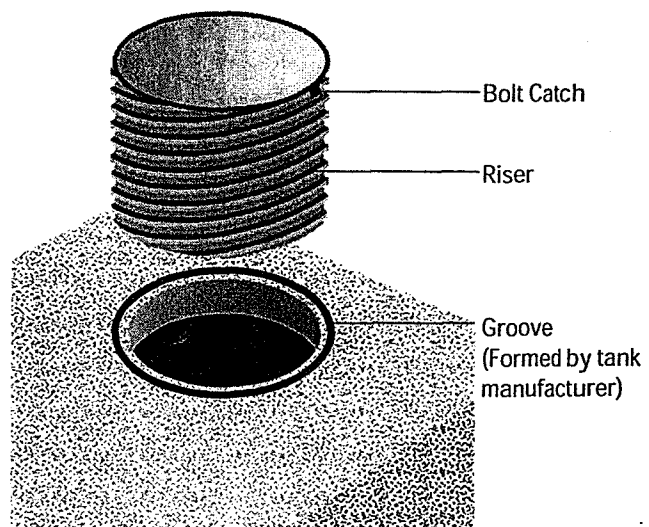
4. For a tank with a groove

4a. Roughen, clean, and dry the surfaces of the riser and tank where they are to be joined.

4b. If the groove is wet, sponge up as much water as possible, then dry thoroughly with a propane torch. Overheating the rock in the concrete may cause excessive pressure and exploding; wear safety glasses and apply heat slowly and evenly.

4c. Fill the groove with approximately one pint of adhesive for 21" or 24" diameter grooves or one quart of adhesive for 30" diameter grooves.

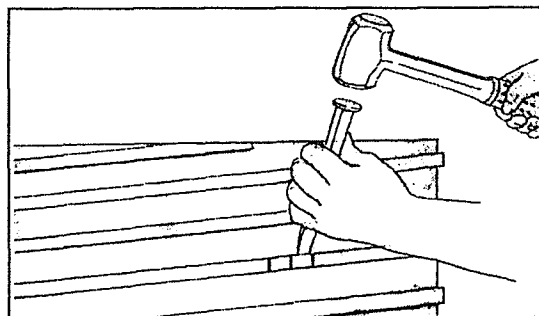
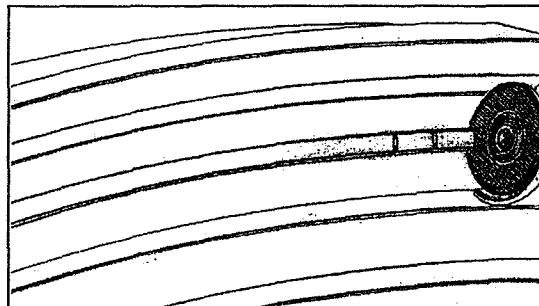
4d. Set the riser in place by twisting gently while working it into the groove. Use a putty knife to shape the bead of displaced adhesive into a continuous, watertight fillet.



Installing Grommets

Grommets are typically installed at the factory. However, it is sometimes necessary to install grommets in the field.

1. To install a grommet in the field, first mark the riser for location of the grommet. To ensure a watertight seal, it is important to avoid cutting through the pipe seam (extra thick rib).
2. Using a 4" grinder or other cutting tool, notch through the PVC ribs to the wall of the PVC riser.
3. Using a hammer, break the ribs from riser.
4. Using the Hole Saw Sizing Chart on page 4, select a hole saw for the grommet installation and drill out the opening.

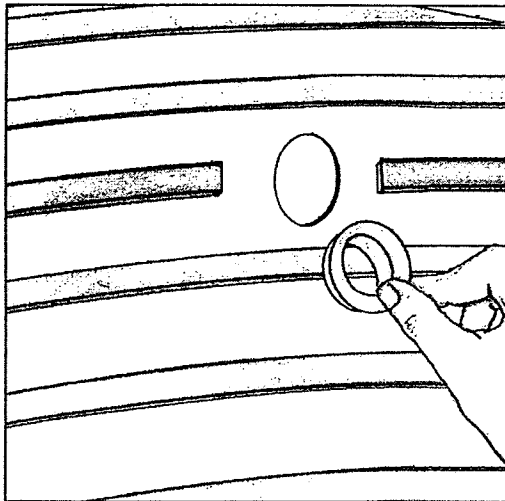
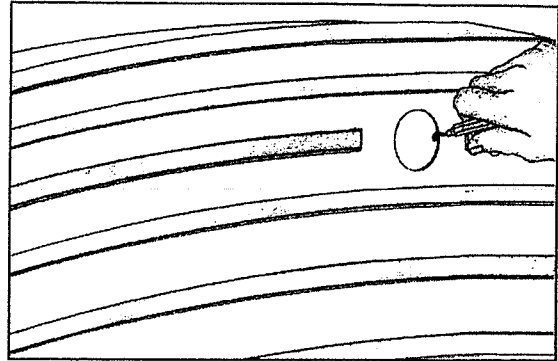


Installation Instructions cont

5. Using a deburring tool or knife, deburr the edges of the opening, being careful not to enlarge the opening.

6. If there are any rib segments left at the edge of the opening, it may be necessary to grind them smooth with the 4" grinder.

7. Install the grommet in the riser.



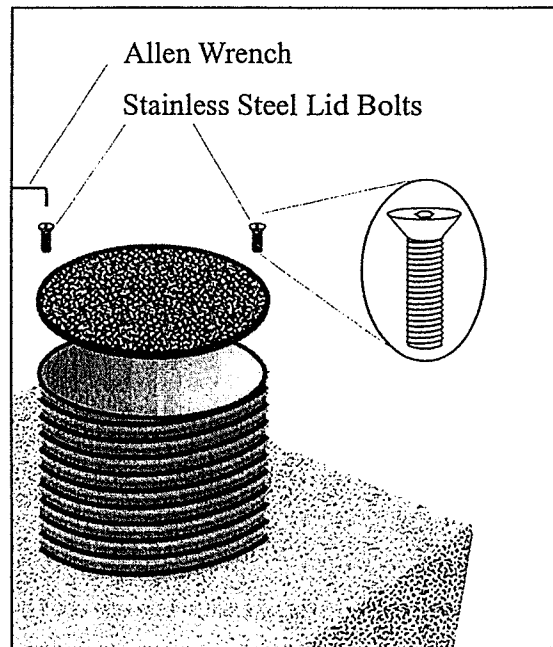
Grommet Hole Saw Sizing Chart

Grommet Size (in.)	Pipe Diameter (in.)	Hole Saw Size (in.)
1/2	0.84	1
3/4	1.05	1 1/4
1	1.315	1 5/8
1 1/4	1.66	1 3/4
1 1/2	1.9	2 1/8
2	2.375	2 3/4
3	3.5	3 7/8
4	4.5	5

Attaching Fiberglass Lid

The fiberglass lid is provided with two stainless steel lid bolts and a lid wrench. The risers are provided with bolt catches, drilled and tapped for the bolts.

1. Place the lid on the riser, matching the openings in the lid with the bolt catches.
2. Place the stainless steel lid bolts into the bolt catches and tighten with the hex head wrench provided.
3. **An unlocked lid or open tank access is a safety hazard! Make sure the lid is fastened securely whenever the system is not being inspected or worked on. Never leave an open access unattended!**



External Biotube[®] Pump Vault



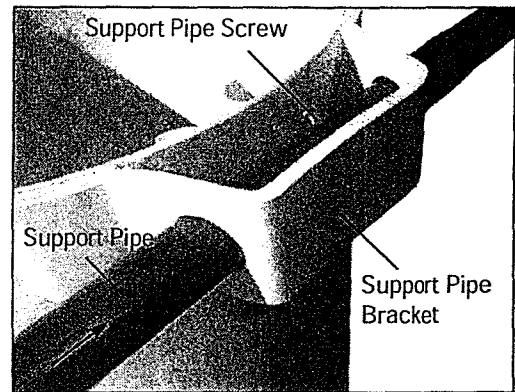
Installation Instructions

Model X4S ____, X5S ____, X4D ____, X5D ____

The External Biotube Pump Vault* is suspended in the septic tank by the schedule 80 support pipes. The screened vault assembly is composed of a rigid PVC vault, a Biotube cartridge with a PVC float bracket, and an external flow inducer.

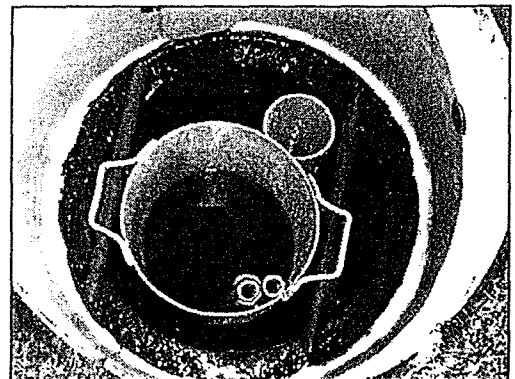
1. Detach the sch. 80 support pipes. Remove the screw in each of the support pipes. Slide the support pipes through the holes in the support brackets at the top of the PVC vault.

Position the support pipes so that the pre-drilled holes are inside the brackets. Screw down the stainless steel screws until 1/4" of thread is showing, to lock the support pipes into place.



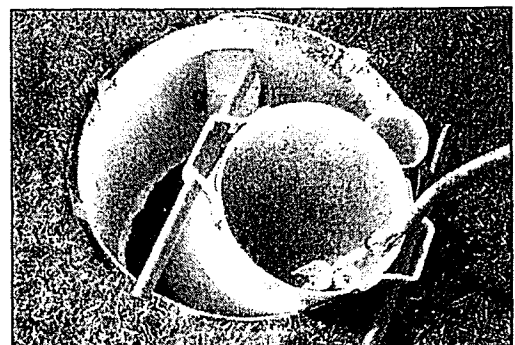
Step 1: Preparing the support pipes

2. Gently lower the vault into position in the access riser. The support pipes should rest on the top of the tank (unless the vault was designed specifically to rest on the bottom of the tank).



Step 2: Lowering vault into riser

Important: If the tank is full of liquid, rest the vault on top of the liquid surface and lower it by filling the vault with water (from a hose) to counteract the buoyancy of the empty vault.

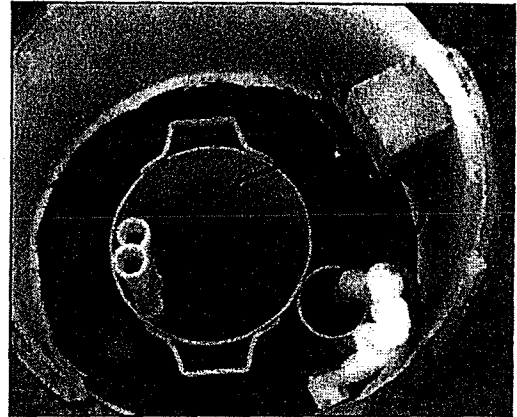


Important: Sinking the vault

* U.S. Patent Nos. 4,439,323 and 5,294,635

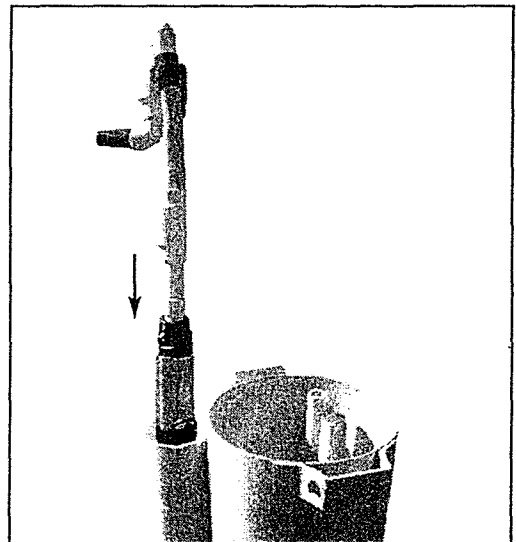
Installation Instructions, cont.

3. Position vault in the riser so that the support pipes do not interfere with plumbing or wiring. When placed correctly, the vault should clear the splice box and the discharge valve assembly.



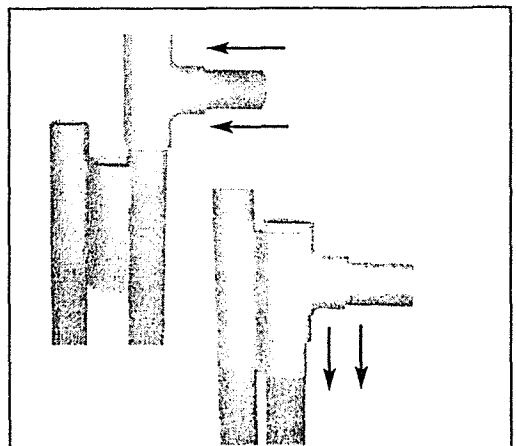
Step 3: Maintaining adequate clearance

4. Lower the pump and discharge assembly into the flow inducer. Be careful not to cut the pump cable on the top edge of the flow inducer.



Step 4: Lowering pump and discharge assembly

5. Install float stem assembly into bracket provided in pump vault.



Step 5: Installing float stem assembly

6. Connect pump and floats as described in the appropriate instruction sets (see "Discharge Plumbing Assemblies" and "Float Switch Assemblies").

Discharge Plumbing Assemblies



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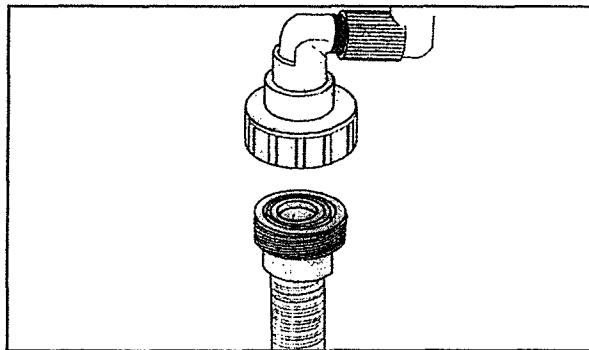
Installation, Operation and Maintenance

Models HV100 __, HV125 __, HV150 __, HV200 __

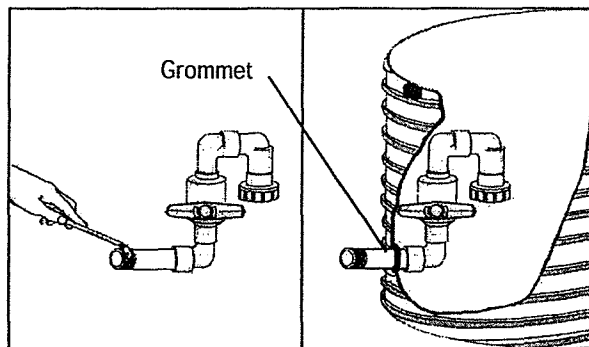
Installation Instructions:

The Discharge Plumbing Assembly (a.k.a. "Hose & Valve" Assembly) is the route by which the effluent travels from the effluent pump to the transport pipe. It is composed of rigid PVC pipe, a flexible PVC hose, a union, and a series of threaded elbows. Options include ball valves, check valves, gate valves, external flex hose assemblies, and anti-siphon assemblies.

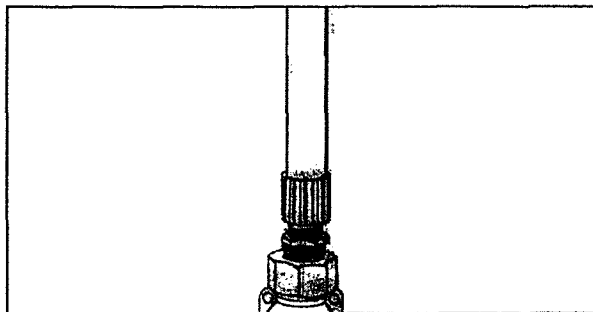
1. Unscrew the union in the discharge plumbing assembly. Set the section including the stem aside.



2. Lubricate the pipe grommet in the access riser and the grey sch. 80 nipple with vaseline or an equivalent product. Push the nipple through the pipe grommet, leaving as much of the grey PVC on the outside of the riser as possible to minimize obstruction within the riser.

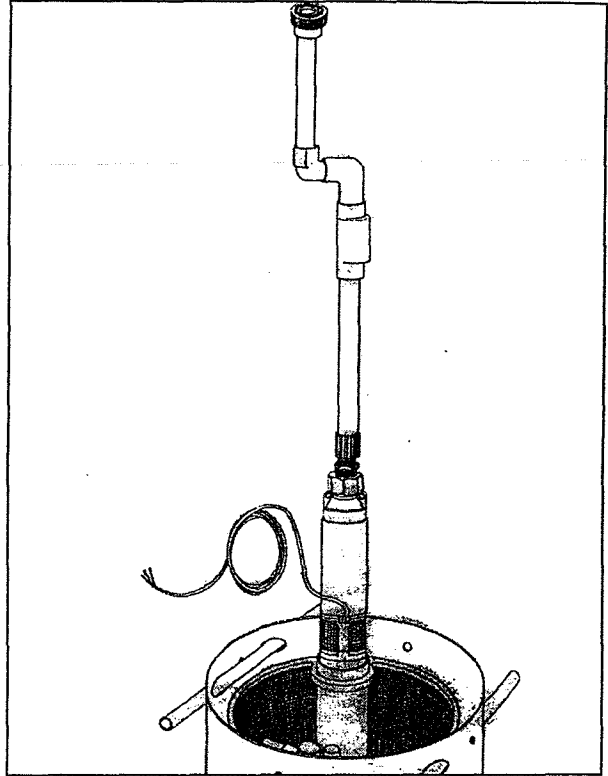


3. Screw the male adapter at the bottom of the discharge plumbing assembly stem into the pump discharge.



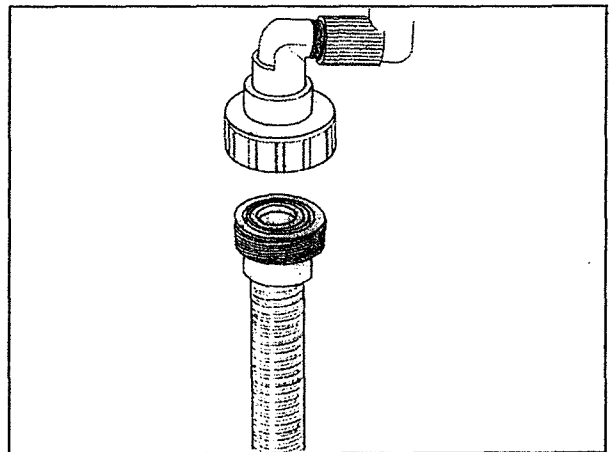
Installation Instructions cont

4. Lower the pump into the screened pump vault. If the pump is a 4" diameter turbine-style pump, make sure to lower the pump into the 4" PVC housing attached to the screen (the flow inducer).



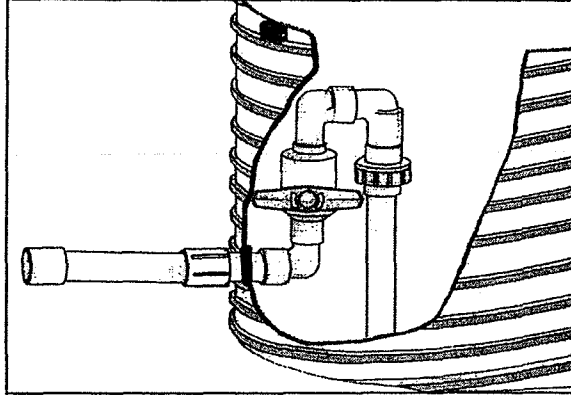
5. Assemble the union.

Exercise the (optional) ball valve or gate valve by rotating the handle back and forth to assure that there is enough operating room for the handle.



Installation Instructions cont

6. If an external flex is included, apply teflon paste or tape to the threads of the sch. 80 nipple extending from the access riser and screw the female threaded end of the flex connection onto the nipple.
7. Glue the transport pipe to the coupling on the end of the flex connection.



Adjusting the Height of the Assembly

If the stem of the discharge plumbing assembly is too short, it can easily be extended. Simply cut a piece of PVC pipe to length as needed, and glue adapters (one male and one female) on each end. Insert this piece between the pump discharge and the bottom of the discharge plumbing assembly stem.

If the stem of the discharge plumbing assembly is too long, cut length out of the stem and reattach with a slip coupling.

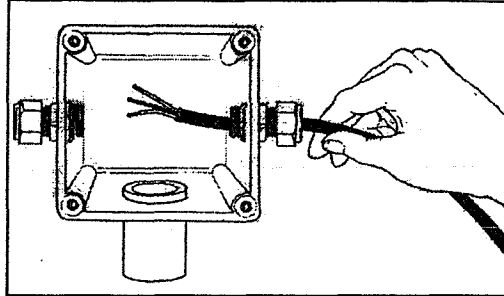
Maintenance Instructions cont.

from the splice box with a syringe, sponge, or other appropriate method. Loosen the cord grip at the splice box and verify the appropriate splice for the float. Cut out the splice and, if using a watertight wire nut for the common wires, unscrew the wire nut and remove the appropriate common wire.

3. Remove the inoperative float and replace it with a new one. Push the float cable through the watertight cord grip into the electrical splice box. Leave an adequate length of electrical cord coiled inside the riser to allow for easy removal of the float assembly. Do not remove the colored markers or the paper tags from the float cords, and do not try to thread the markers and tag through the cord grip. Tighten the cord grip *by hand, not by tool*, then test the tightness of the cord grip by tugging on the cord. A cord is secure when the cord grip is tight enough to prevent slippage. An adequate length of cord should be left within the splice box to allow for easy removal for future disconnecting and re-splicing.
4. Refer to document EIN-SB-SB-1 for instructions to splice the float wire to the wire from the control panel. Attach the common wire with the other commons using the waterproof wire nut. It may be necessary to replace this wire nut with a new watertight wire nut. Always use watertight wire nuts or heat shrink splice kits for all connections!
5. Replace the float in the collar and return the assembly to the pump vault.
6. Reconnect power and test the unit per the instructions provided in the Operation section of this manual.

Installation & Maintenance

7. When used with an OSI electrical splice box:
- Push the level control wires through the watertight cord grips into the electrical splice box. Leave an adequate length of electrical cable coiled inside the riser to allow for easy removal of the pump and float assembly. **Do not remove the colored markers or the paper tags from the float cables, and do not try to thread the markers and tag through the cord grip.** Tighten the cord grips *by hand, not by tool*, then test the tightness of the cord grips by tugging on each cable. A cable is secure when the cord grip is tight enough to prevent slippage. Adequate lengths of cable should be left within the splice box to allow easy removal for future disconnecting and re-splicing.



See the splice box instructions, document EIN-SB-SB-1 and corresponding splice box diagram for connection instructions.

Maintenance

During the annual inspection, follow the testing procedures provided to ensure that the system is operating properly.

If a float is found to be faulty, either during the annual inspection or during troubleshooting after an alarm condition, see the section below titled Repairing and Replacing Inoperative Floats.

Removing and Replacing Inoperative Floats

Important: Before doing any work on either the wiring to the level control floats and pump in the vault or in the pump control panel, pull the isolation fuse and the circuit breaker in the panel to their "OFF" positions, then switch off the power to the system at the service entrance panel.

1. Remove the float assembly from the vault. Using a pair of pliers, grip the black float bushing and snap the float out of the holding collar.
2. Using a phillips screwdriver, remove the stainless steel screws from the splice box lid, being careful not to drop the screws into the tank. If the splice box was submerged, or if there is a crack in the conduit, there may be water in the splice box. If this is the case, remove water

Float Switch Assemblies



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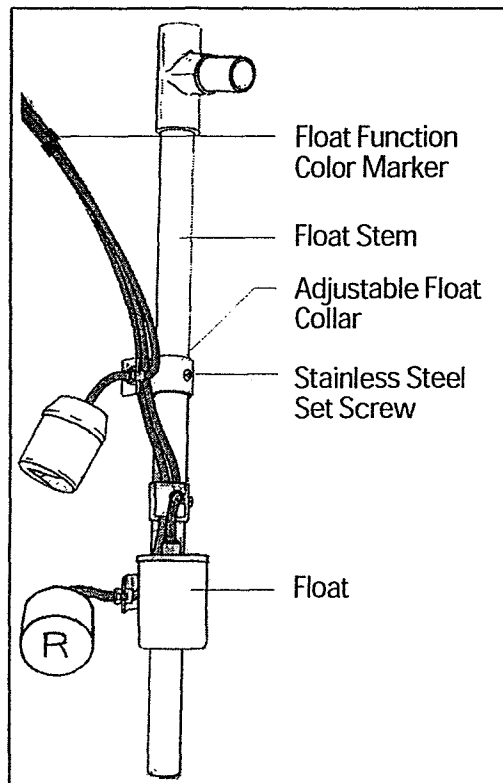
Installation, Operation and Maintenance

Model MF__

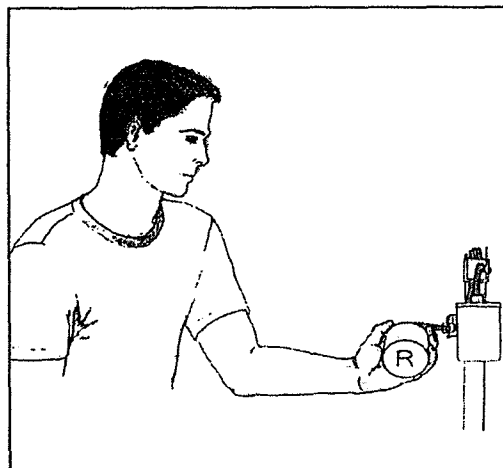
Installation Instructions:

The float switch assembly is typically mounted in the screened pump vault or effluent screen inside of a septic or dosing tank. The assembly is detachable without removal of the screened pump vault or effluent screen. A typical float switch assembly is shown below.

1. Each float cable is provided with a color marker. This marker indicates the function of the float. Make sure that your float cable color markers correspond with the testing instructions and splice box wiring diagrams provided. If the testing instructions or splice box wiring diagram do not match your float cable marker colors, contact OSI or your local OSI dealer for assistance.



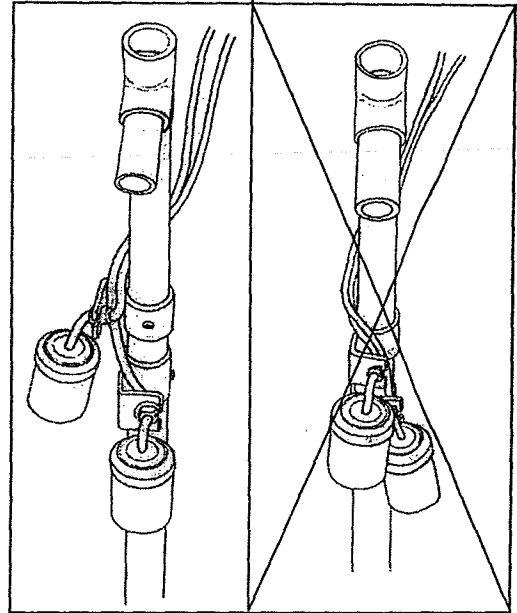
2. To check for proper float switch operation, move each switch up and down and check for interference. Remove the assembly from its holding bracket by snapping it out of the holding bracket.



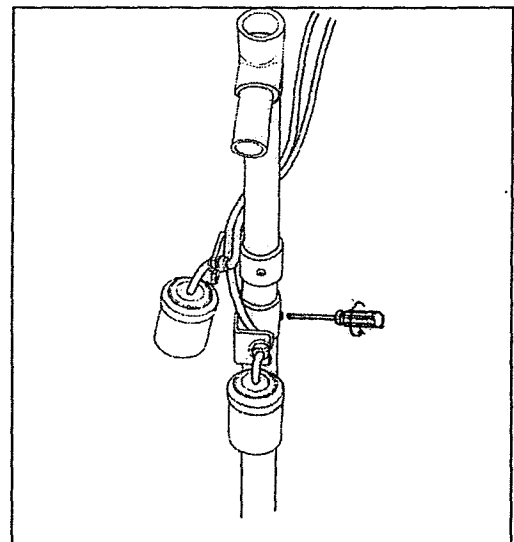
Installation Instructions cont.

3. If any float interferes with another, the float may be adjusted by loosening the stainless steel set screw provided in the float collar. Using a phillips screwdriver, slowly back the screw out of the collar to a point which the collar may be adjusted. Be careful not to back the screw completely out of the collar. Carefully rotate the collar on the stem until the float switches can move freely past one another. Tighten the stainless steel set screw and recheck.

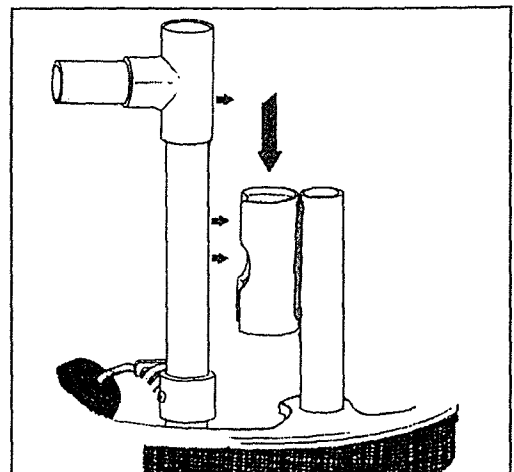
Warning: Be careful not to alter the the tether lengths of any of the floats. Alteration of the tether length may affect proper operation of the assembly.



4. Check the float settings with the project plans and specifications. If the settings need to be adjusted, loosen the set screw as described in step 3. Adjust the float switches to the desired level and tighten the set screw. Make sure any float level settings do not violate any state or local regulations. **The float stem provided is the maximum length possible without interfering with the pump minimum liquid level or screened pump vault intake ports. Never lengthen the float stem without prior approval from OSI. Lengthening of the float stem will void the warranty.**

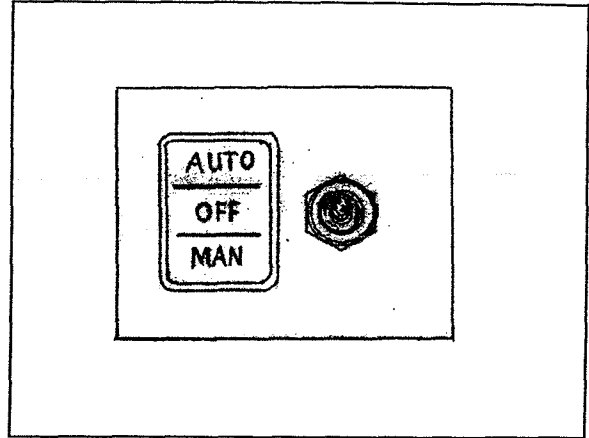


5. Replace the float assembly in the holding bracket. Make sure the assembly snaps fully into the bracket.
6. To allow for easy removal of a float assembly, a 1" diameter handle may be added to the top of the float assembly. Measure the distance from the top of the float assembly up to about one foot from grade level. Cut a 1" diameter PVC pipe to the measured length and glue it into the handle.

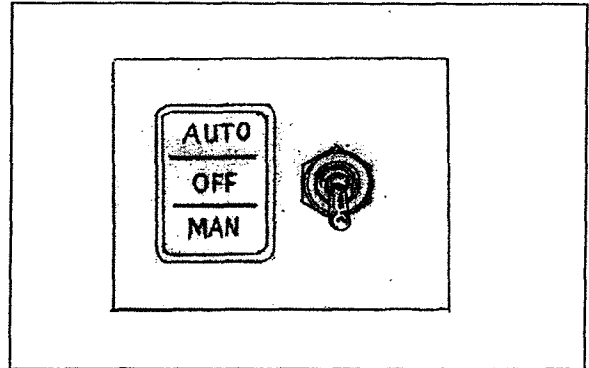


Maintenance Instructions

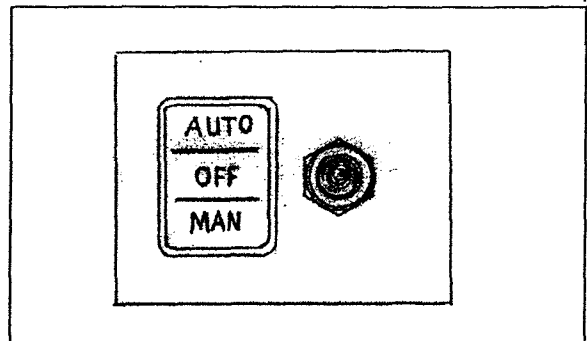
1. During the annual inspection, close the gate or ball valve, then place the toggle switch in the "Off" position. Disconnect the union and point the discharge downward.



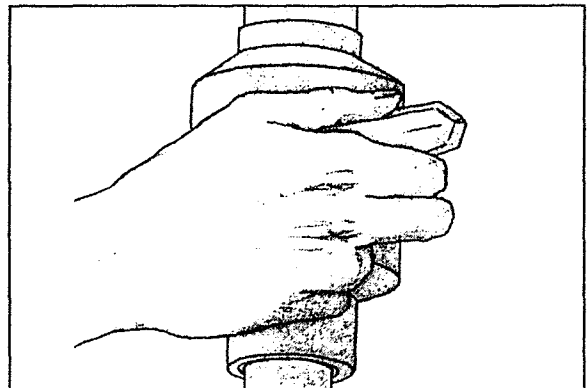
2. At the control panel, flip the toggle switch to the "Manual" position. Confirm that the pump is pumping; the effluent from the pump should be pumping out of the union half back into the screened pump vault.



3. Place the toggle switch back to the "Off" position and reconnect the union.



4. Exercise the ball valve to ensure that no solids are obstructing its path of rotation.



5. Open the valve completely and return the toggle switch to the "Automatic" position.

Splice Boxes



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Installation, Operation and Maintenance

Model SB__

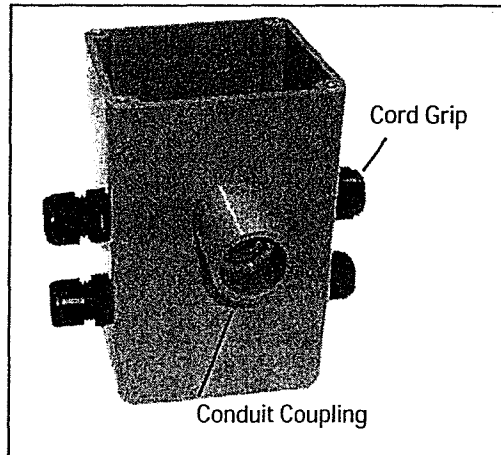
Installation Instructions:

The electrical splice box provides a safe and legal space for splicing cables, typically from pumps or float switches. It should be mounted inside the access riser, over the pump or filter unit, where the components being spliced are within sight of the installer. For explosion proof (Class 1, Div. 1) splice boxes, please see document EIN-SB-SBX-1.

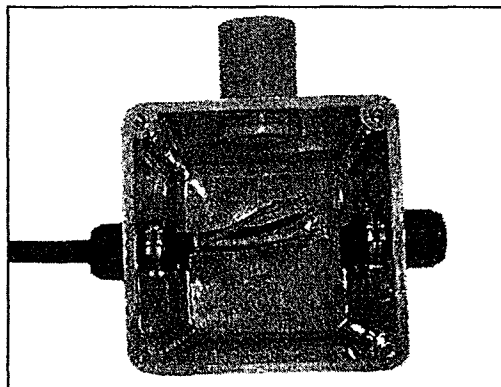
The splice box is provided with heat shrink/ butt connectors and waterproof wire nut(s) necessary to splice the appropriate floats and pumps.

1. The splice box should be mounted inside the access riser. The access riser is typically supplied with a grommet for installation of the splice box. If a grommet is not installed, please refer to riser, lid, and accessory instructions document EIN-RLA-RLA-1 for grommet installation instructions.

Lubricate both the outside of the conduit coupling and the grommet. Slide the coupling through the grommet in the access riser wall. Make sure the box is pushed snug against the wall, allowing for removal of any pumping equipment.



2. Push the appropriate pump and level control wires through the watertight cord grips into the electrical splice box. Leave an adequate length of electrical cable coiled inside the riser to allow for easy removal of the pump and float assembly. **Do not remove the colored markers or the paper tags from the float cables, and do not try to thread the markers and tag through the cord grip.** Tighten the cord grips *by hand, not by tool*, then test the tightness of the cord grips by tugging on each cable. A cable is secure when the cord grip is tight enough to prevent slippage. Adequate lengths of cable should be left within the splice box to allow easy removal for future disconnecting and re-splicing.



Installation Instructions cont.

- Run properly sized wires from the control panel to the splice box. The wires can be brought through a conduit, or can be direct buried using suitable direct-burial wire. Conduit that enters the splice box must be sealed with a conduit seal or acceptable watertight cord connection, to prevent the infiltration of water into the splice box. The number of wires required depends on the control panel and the number of floats and pumps used. This can be determined by consulting the Splice Box Wiring diagram provided for the control panel and float arrangement being used.

If the floats do not carry direct pump current, the wire should be sized at 14 AWG. Refer to Chart 1 to determine the proper size for the pump wire and any float wire required to carry direct pump current. When calculating wire size, you need to take the length and size of your branch circuit wires from the *service entrance panel to the pump control panel* into account. Wire that is too small can cause an excessive voltage drop and poor pump performance.

Chart 1. Recommended Breaker & Wire Size

Pump Motor Size	Breaker size	Wire Size	Max Distance*
115 VAC 1/3 hp	20 amp	12 AWG	210 ft
1/2 hp	20 amp	12 AWG	160 ft
230 VAC 1/2 hp	15 amp	14 AWG	400 ft
1 hp	20 amp	12 AWG	400 ft
1 1/2 hp	20 amp	12 AWG	310 ft

* load center to motor.

Wires should be color coded or otherwise marked to aid in wiring the control panel. The following chart lists common colors recommended for each of the wires. Colors may refer to either the color of the wire's insulating jacket or the color of an electrical tape marker.

Chart 2. Recommended Field Wire Colors

Float Cables

Float Function	Float Marker	Wire Color
High Water Alarm	Yellow	Yellow
Lag Pump On (Duplex)	Purple	Purple
Lead Pump On (Duplex)	Blue	Blue
Lead Pump Off (Duplex)	Red	Red
On / Off	Green	Blue
Redundant Off / Low Level Alarm	White	Orange
Float Common Wire	-	Brown

Pump Cable(s)

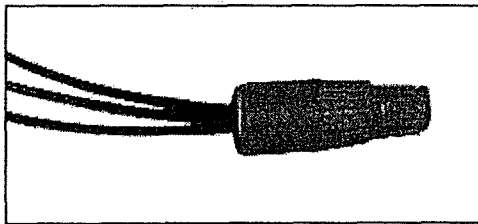
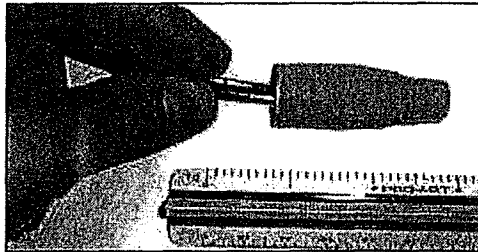
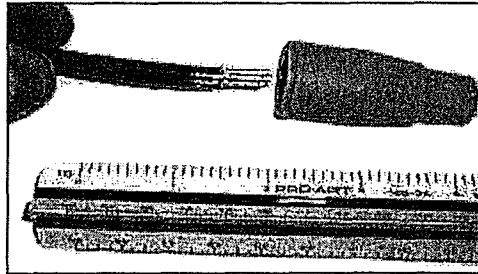
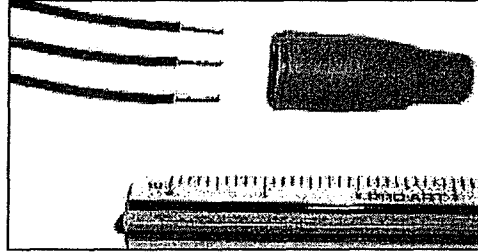
Pump Wire (L1)	Black
Pump Wire (Neutral, 115vpumps)	White
Pump Wire (L2, 230vpumps)	Red
Ground	Green

Installation Instructions cont.

All splices within the splice box shall be made waterproof using wire nuts or butt connectors and heat shrink tubing as shown on the appropriate splice box diagram. The splices must be waterproof! Splices that are not waterproof may cause a malfunction of the pump controls if water should leak into the splice box. Refer to the Splice Box Wiring Diagram(s) provided for instructions on how to connect the floats switches.

4. Splicing With Waterproof Wirenuts

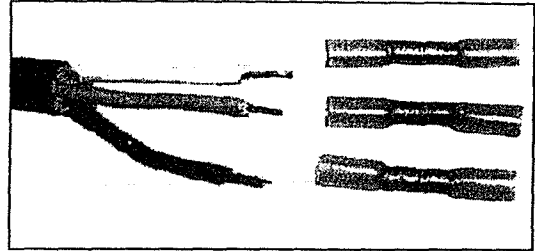
- a. Remove approximately 1/2" of insulation from the end of each wire to be connected. Prevent frayed strands as much as possible.
- b. Do not pre-twist entire wire bundle. Only twist individual stranded wires slightly if needed. Hold wire bundle firmly 2 inches from wire ends. Fully insert all the wires together through the sealant into the connector. Continuing to hold wires firmly, twist connector clockwise onto wires.
- c. Once a connection is made, tug on each wire entering the connector to check the mechanical connection. **Note: Watertight connectors are not reusable. To change a splice, twist off and replace with a new connector.**



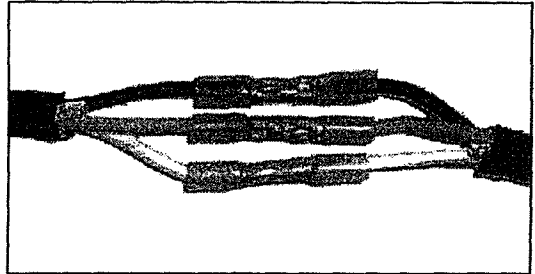
Installation Instructions cont.

5. Splicing With Butt Connectors & Heat Shrink

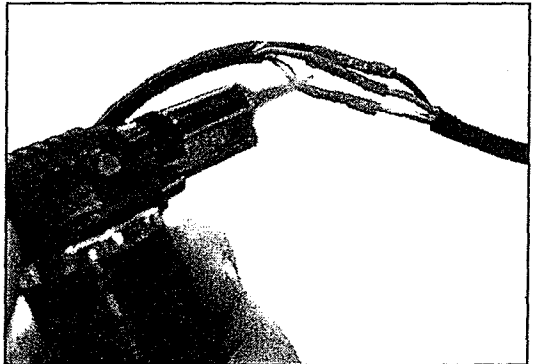
- a. Remove approximately 3/8" of insulation from the end of each motor lead and wire to be connected.



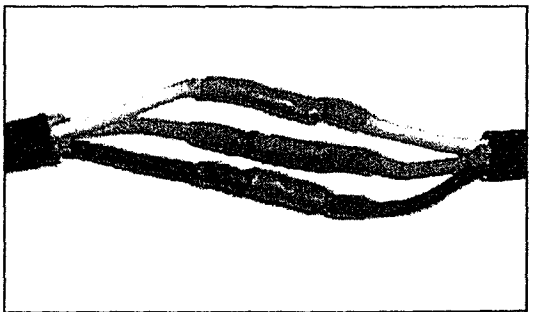
- b. Insert bare lead ends into the butt connector and crimp with a crimping tool designed to crimp insulated connectors. Other types of tools can puncture the heat shrink tubing. Once a connection is crimped, tug on the butt connector to check the connection.



- c. To shrink the insulated heat shrink tubing, apply moderate heat with a propane torch or heat gun (or any tool that will provide adequate heat.) **Caution: Keep the torch moving; too much concentrated heat will damage the tubing.**



- d. When tubing begins to shrink, increase concentration of heat at the edge of the butt connector. As the tube collapses on the wire, work heat out to each end until entire tube has collapsed tightly around the wire. Enough heat should be applied to melt the sealing glue on the inside of the shrink tube. As the tube collapses around the wire, some sealant should ooze out of the end of the tube providing a water tight seal.



6. After all splicing is completed, reattach the lid using the stainless steel screws provided.

7. Operation and maintenance

Remove splice box lid and check for moisture. Make repairs as required. Some condensation is normal.

Attention!



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Splicing Kit

The enclosed watertight splicing kit *MUST* be used to protect the splices from failure due to moisture. Failure to use the enclosed kit or other suitable watertight connectors will *VOID THE WARRANTY*. Use of non-watertight wire nuts is not acceptable.

Wiring Diagram

If you do not have a diagram (or if the diagram you have does not match the model number on the panel wiring diagram), please call your local distributor and have the correct splice box wiring diagram sent to you. Please have your panel model number and float functions ready when you call.

STEP 1 Strip wires 5/8".

STEP 2 Pre-twist individual stranded conductors just enough to prevent fraying of strands when inserting into wire nut.

CAUTION: When stranded conductors are used in combination with solid conductors, significant pre-twisting of stranded conductors will cause strands to be cut when wire nut is tightened.

STEP 3 Align stripped wires together, ends even, but lead smaller stranded conductors slightly ahead of larger solid and stranded wires.

STEP 4 Insert wires into connector.

STEP 5 Twist in a clockwise direction till tight.

APPLICATION:

Copper to copper only (not for Aluminum.) DO NOT REUSE. UL Listed & CSA Certified as a PRESSURE-TYPE connector.

The following chart explains wiring connectors that can be used with the aqua blue/red connector.

6 or 7 #22	1 #14 w/1-3 #16 or #18	2 #12 w/1-2 #14 or #16 or #18
4 #20	3 #14 w/1 #16 or #18	2 #10 w/1-3 #14
3-5 #18	1 #12 w/1 #14 or #16	1 #10 w/1-2 #12
2-4 #16	1 #10 w/1 #14	2 #10 w/1 #14
2-4 #14	2-3 #10	3 #16 w/1 #18
2-4 #12	1 #12 w/2-4 #16	1 #14 w/1-2 #16 or #18
2 #16 w/2 #18	1 #12 w/1-4 #14	1 #8