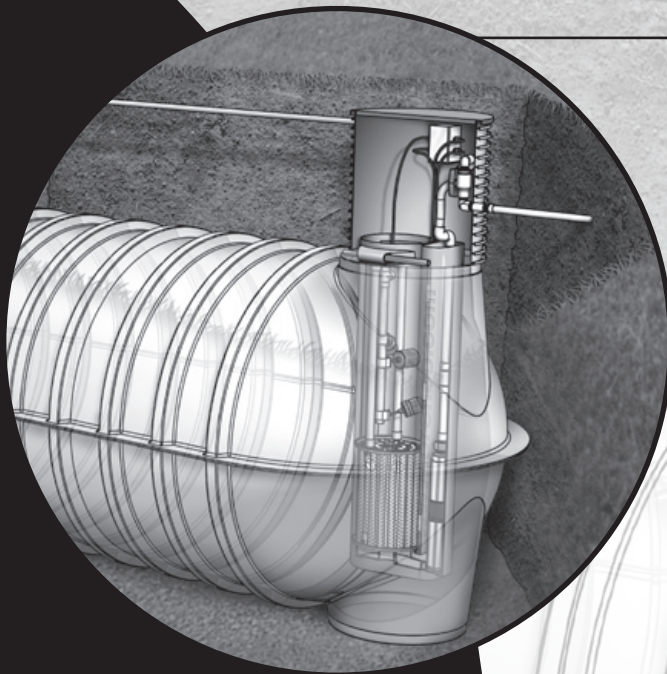


Installation Manual

ProSTEP™ Effluent Pump Packages

Residential Applications



*An illustrated step-by-step guide
for installing and maintaining a
ProSTEP™ Effluent Pump Package*



Orenco Systems®
Incorporated

*Changing the Way the
World Does Wastewater®*

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Installation Manual: *ProSTEP™ Effluent Pump Packages*

Before You Begin **Page 1**

Installation **Page 2**

Step 1:	Install Access Risers on Tank	Page 2
Step 2:	Install Biotube® Pump Vault in Tank	Page 3
Step 3:	Install Splice Box in Riser	Page 3
Step 4:	Install Pump & Discharge Assembly	Page 4
Step 5:	Install Float Switch Assembly	Page 4
Step 6:	Install Control Panel	Page 6
Step 7:	Backfill Installation	Page 6
Step 8:	Test Panel, Pump, and Float Switches	Page 7
Step 9:	Perform Final Installation Checks	Page 10

Maintenance **Page 12**

Step 1:	Check and Clean Biotube Filter Cartridge	Page 12
Step 2:	Clean and Test Float Switches	Page 12
Step 3:	Inspect and Clean Pump and Pump Vault	Page 13
Step 4:	Inspect and Service Splice Box	Page 13
Step 5:	Reinstall Components and Restart System	Page 14

Appendixes **Page 15**

Appendix 1:	Grommet Installation Instructions	Page 15
Appendix 2:	Splice Box Wiring Instructions	Page 16

Reference Documents

This manual covers installation of all components of a ProSTEP™ Pump Package for typical systems. If you have custom installation procedures, refer to the documentation that came with your custom components. This document also refers to a number of other documents that can be found on our online Document Library for more detailed instructions. Some of these documents include the following:

- *Access Riser Instructions (NIN-RLA-RR-1)*
- *Discharge Plumbing Assembly Installation, Operation, and Maintenance Instructions (NIN-HV-HV-2)*
- *Float Switch Assembly Installation, Operation, and Maintenance Instructions (NIN-MF-MF-1)*
- *Float Collar Instruction Guide (NIN-MF-MFC-1)*
- *Splice Box Installation, Operation, and Maintenance Instructions (EIN-SB-SB-1)*
- *External Splice Box Installation Instructions, (EIN-SB-SBEX-1)*
- *Explosion-Proof Cord Connector Installation Instructions (EIN-SB-SBX-1)*

To access our online Document Library, go to www.orenco.com and click the “Document Library” link.

Products described in this manual are covered by U.S. patents 5,492,635 and 4,439,323.

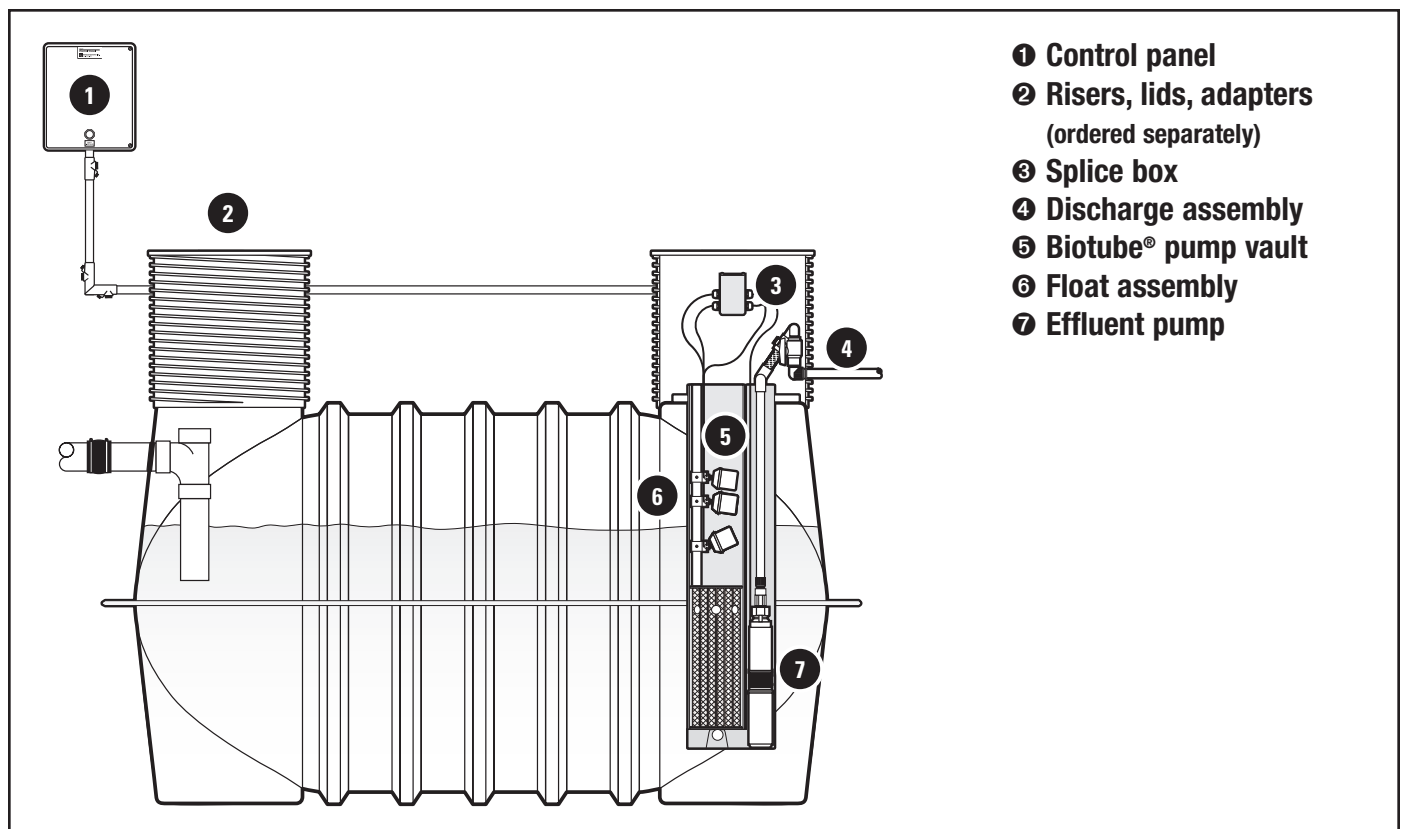
Before You Begin

At Orenco, we've worked hard to make your installation as easy and "hassle-free" as possible. The ProSTEP™ Pump Package comes as a totally integrated package that can be installed in most tanks in a matter of hours. All components are designed to fit together well, and field cuts are kept to a minimum.

Before you begin installing your Orenco ProSTEP™ Pump Package, read this entire manual. You'll save yourself time and money on installation day, and you'll reduce the potential for call-backs. In particular, review the preparation steps and the installation sequence before doing anything. First, make sure the watertight tank has been installed according to the manufacturer's instructions, and that it has been tested for watertightness. If required by the tank manufacturer, all backfilling should be completed as well.

Check the Package!

When your equipment arrives, be sure to check your ProSTEP™ Pump Package for all components. Each Orenco pump package comes with a control panel, splice box, discharge assembly, Biotube® pump vault, float assembly, and effluent pump.



Since there is so much variation in tank sizes, you must order risers, lids, and riser-to-tank adapters separately. You will also need appropriate adhesives. Additionally, you may need bolt-down kits and grommets. For commercial applications, conduit seal kits may be necessary. All of these are available in Orenco's General Onsite Products Catalog. Catalogs are available from your local Distributor, from Orenco, and online, at www.orenco.com.

NOTE: All pipe diameters given are U.S. nominal IPS pipe sizes. If you are using metric pipe, you may need adapters to connect to the U.S. fittings supplied.

Step 1: Install Access Risers on Tank

Orenco fiberglass tanks accept 24-inch (600-mm) risers with no adapter needed, or 30-inch (750-mm) risers with FRTA30-FRP adapters. Concrete tanks may have tank adapters cast in. If adapters haven't been installed, see NIN-RLA-RR-1, *Access Risers and Tank Adapters*, for adapter installation instructions.

NOTE: If you need to install a grommet, see Appendix 1 before proceeding.

Step 1a: Wipe the areas to be bonded with a clean rag to ensure a clean, dry bonding surface.

Concrete Tanks

Step 1b: To bond a riser to an Orenco tank adapter, select the appropriate methacrylate adhesive and apply it to the adapter. Follow the instructions in NIN-RLA-RR-1, *Access Risers and Tank Adapters*.

Step 1c: Carefully slide the riser onto the adapter. Orient the riser according to the engineering plans before the adhesive starts to set. For risers with electrical conduits running to them, be aware when you orient the risers that U.S. National Electrical Code limits the sum of all bends in a wire run to 360 degrees.

Step 1d: If you are using ADH100 on the inside of the joint between the adapter and riser, apply a bead to the inside of the joint, and then use a putty knife or similar tool to form the bead into a smooth, continuous fillet between the tank adapter and the riser.

Orenco Fiberglass Tanks

Step 1e: If you are installing a 24-inch (600-mm) riser on an Orenco fiberglass tank, use a methacrylate adhesive, such as MA320, MA530, or MA515, to attach the riser. To make a watertight fillet inside the joint after the riser is attached, use ADH100 after the methacrylate adhesive sets.

All Tanks

Step 1f: After the adhesives have set, test for watertightness. Cap the tank inlet pipe. Place 2 inches (50 mm) of appropriate backfill material on top of the tank and then fill the tank with clean water to a level 2 inches (50 mm) above the adhesive joint in the riser. To avoid structural damage to the tank, do not allow the water level to rise more than 3 inches (75 mm) into the riser.

CAUTION: Check the tank manufacturer's guidelines before filling the tank. Some tank manufacturers require a partial or complete backfill before a tank is filled.

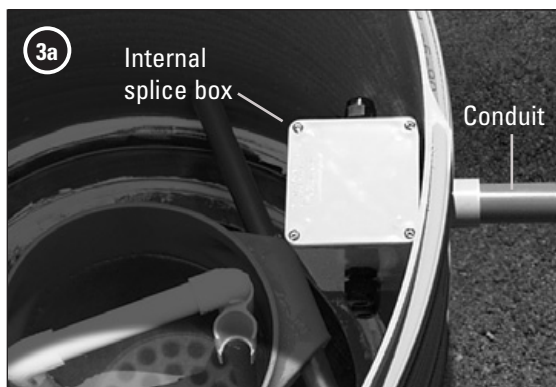
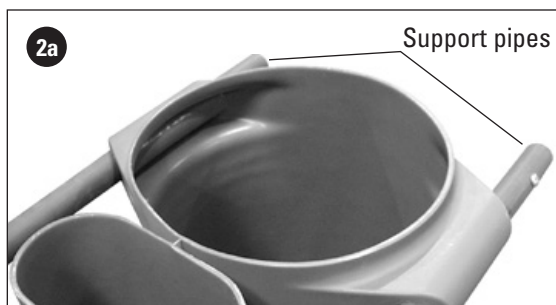


MA320 adhesive on bolt-down riser lid adapter



ADH100 adhesive





Step 2: Install Biotube® Pump Vault in Tank

Most Biotube® pump vaults are designed to rest in the tank opening on two Schedule 80 support pipes. This suspends the vault above the bottom of the tank. Some models, called “earless” pump vaults, have no support pipes. They rest on the bottom of the tank.

Step 2a: For installing pump vaults in 24-inch (600-mm) risers, or for installing “earless” vaults, continue on to Step 2b. For installing pump vaults in 30-inch (750-mm) risers, first remove the installed support pipes and replace them with the longer pipes included in the pump vault packaging. If longer pipes aren’t included, contact your local Distributor or Orenco.

Step 2b: Gently lower the vault into position in the access riser. The support pipes should rest on top of the tank. “Earless” vaults should rest on the tank bottom.

IMPORTANT: *If the tank is full of liquid, rest the vault on top of the liquid surface and then fill the vault with water from a hose. This helps sink the vault and prevent floating material from entering the vault through the inlet holes.*

Step 2c: For accessing Biotube filter cartridges in risers over 18 inches (457 mm) high, cut the supplied extension handle to the appropriate length and glue it into the “T” at the top of the Biotube filter handle.

Step 3: Install Splice Box in Riser

Two types of splice boxes are available: internal and external. Detailed installation instructions are shipped with both types. See Appendix 2 for wiring instructions.

Internal Splice Box

Step 3a: Apply pipe lubricant to the outside of the conduit coupling and the inside of the splice box grommet in the riser wall. Slide the coupling through the grommet and press the box snug against the riser wall to allow room inside the riser. Orenco recommends sealing the conduit at the splice box and at the control panel to keep the panel free of gases and condensation.

External Splice Box

Step 3b: If the 5-inch (125-mm) hole and screw hole are not already cut, use the template and instructions supplied with the splice box to cut them. Install the grommet with a bead of ADH100 adhesive. Apply pipe lubricant to the splice box and push it through the grommet from outside of the riser. Thread the supplied screw through the washer and hook-and-loop strip, then screw it into the splice box from inside the riser. Glue the supplied plug into the second conduit hub if the hub isn’t used.

Step 4: Install Pump and Discharge Assembly

Step 4a: Apply Teflon® tape or paste to the threads of the pump discharge, and screw the male adapter at the bottom of the discharge assembly stem into the pump discharge by hand.

Step 4b: Fit the discharge assembly stem to the riser.

Risers 24-inch (600-mm) or Shorter

IMPORTANT: Do not use the pump cable to lower the pump!

Step 4c: Lower the pump and discharge assembly stem into the flow inducer. Mark the stem 1 inch (25 mm) above the top of the flow inducer. Remove the pump and discharge assembly. Cut the stem at the mark and glue the upper portion of the discharge assembly to the stem. Allow the glue to set. Carefully lower the pump and discharge assembly back into the flow inducer.

Risers Taller than 24-inch (600-mm)

Step 4d: Refer to NIN-HV-HV-2, *Discharge Plumbing Assembly Installation*, for more detailed instructions.

All Risers

Step 4e: Apply pipe lubricant to the discharge grommet in the access riser and the gray Schedule 80 nipple on the discharge assembly. Push the nipple through the grommet.

Step 4f: Make sure there is enough operating room for the gate valve or (optional) ball valve by rotating the handle back and forth.

Step 4g: Glue a slip × slip coupling or external flex connector to the exterior end of the nipple, outside of the riser.

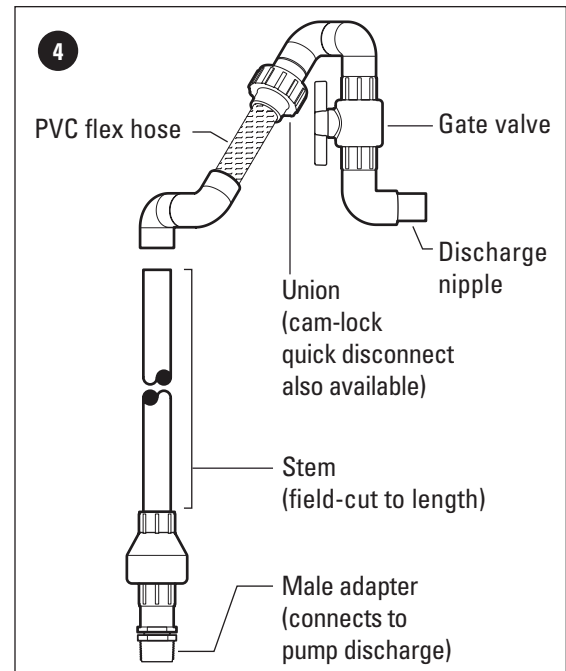
Step 4h: Glue the transport pipe to the coupling or connector.

Step 4i: Make sure the removable components in the riser (pump, removable section of the discharge assembly, Biotube cartridge, and vault) are easily removable with no interference. Make sure the vault's support pipes don't interfere with plumbing or wiring inside the riser.

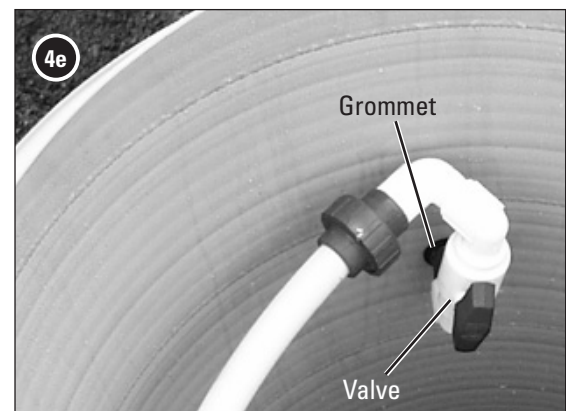
NOTE: Firmly tighten all connections in the discharge assembly by hand. Do not use a tool.

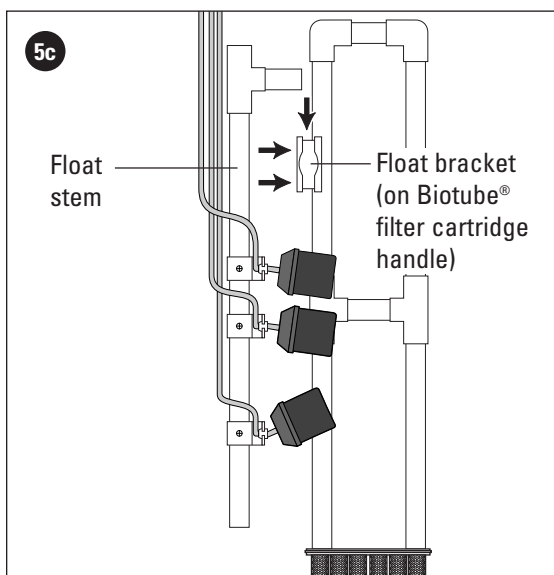
Step 5: Install Float Switch Assembly

Table 1 provides float switch functions, positions, and marker tag colors for typical demand-dose (Y,G; Y,G,W; Y,B,R; or Y,B,R,W) and timed-dose (Y,G,R; Y,G,R,W) float switch configurations.



Standard ProSTEP discharge plumbing assembly





Step 5: Install Float Switch Assembly (con't)

Step 5a: Make sure the positions, functions, and colors of the marker tags match the drawings, testing instructions, and splice box wiring diagrams for your system. (If they don't match, contact your local Distributor or Orenco.)

Float Positions, Functions, and Marker Tag Colors

System	Position	Function	Marker Tag Color
Demand-dose	Top	High-level alarm	Yellow
	Upper middle	Pump on	Blue
		Pump on/off	Green
	Lower middle or bottom	Pump off	Red
	Bottom	Redundant off/low-level alarm	White
Timed-dose	Top	High-level alarm/timer override	Yellow-Green
	Middle	Timer on/off	Red
	Bottom	Redundant off/low-level alarm	White

Step 5b: Make sure the float switch settings match the settings on the project plans/specifications. If needed, loosen the float collar setscrews — don't back the screws completely out of the collar — and adjust them per the plans/specifications. If settings aren't provided on the plans/specifications, set the float switches based on state and local regulatory requirements. (For assistance with float settings, contact your local Distributor or Orenco.)

WARNING: Do not lengthen the float stem without prior approval from Orenco. Doing so will void the warranty. Do not alter the float tether lengths. Altering tether lengths may disrupt proper operation of the assembly.

Step 5c: Fully snap the float switch assembly into the float bracket. Make sure the float switches can move freely up and down without interference from each other or contact with the vault wall. If there is interference, loosen the float collar setscrew(s) and rotate the collar(s) horizontally until all of the switches can move freely. Tighten the setscrew(s) when finished.

Step 5d: Wrap the excess lengths of float cord cables around the splice box and tie them together to prevent them from slipping back into the vault and interfering with the operation of the floats.

Step 5e: Measure from the float switch assembly handle to 6 in. (150 mm) below the riser lid. Cut and glue a section of 1-in. (25-mm) diameter PVC pipe of the same length into the handle. This will make it easier to service the float switch assembly.

Step 6: Install Control Panel

For specific control panel installation instructions, see the installation manual and wiring diagrams located in the door pouch inside your system's electrical control panel.*

Step 6a: Make sure the instructions and items supplied conform to all applicable state and local regulations.

Step 6b: A qualified and licensed electrician should install and service the panel and ancillary wiring in compliance with all national, state, and local electrical codes. Wiring includes ...

- a) Incoming power to the panel. One or more circuits may be required, depending upon the number of pumps and local electrical codes.
- b) Wiring from the control panel to the pump and floats.
- c) Wiring to a discharge pump and floats (if applicable).

NOTE: *We do not recommend installing a control panel against the wall of a bedroom, living room, or other living space. It can be mounted on a 4-inch × 4-inch (100-mm × 100-mm) post adjacent to such a wall.*

Step 7: Backfill Installation

Step 7a: Make sure all riser lids are secure before backfilling.

Step 7b: Follow the manufacturer's guidelines for backfilling the tank excavation.

Step 7c: Make sure the final grade slopes away from the tank to prevent surface water from ponding on or around it. After backfilling, the tank risers should protrude 1-3 inches (25-75 mm) above grade to allow for some settling of the tank.

NOTE: *Be sure to backfill evenly and carefully around the riser and all pipes and conduit, so that no breakage occurs.*



* If the instructions are missing or have been removed from the door pouch inside the control panel, call Orenco for a replacement.



Step 8: Test Panel Voltage and Amperage

Step 8a: Use the log sheet located in the door pouch inside of the control panel to document panel, pump, and float switch operation data. Put the log sheet back in the door pouch when finished.

Step 8b: Before continuing, make sure that the tank has enough liquid to run the pump for several minutes without the liquid dropping below the pump's minimum liquid level. Make sure that the ball valve on the discharge plumbing assembly is fully open.

Step 8c: Unsnap the float switch assembly from the bracket and remove it from the riser. If the assembly includes a "Redundant off/low-level alarm" float switch, place it in the "up" position.

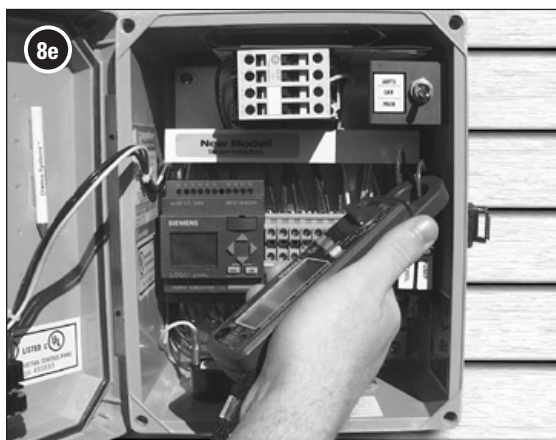
Step 8d: Turn on the control circuit breaker and turn on the pump circuit breaker. Both are located in the control panel.

Step 8e: Measure and record the following voltages and amperage.

- Static pump voltage. Set the "Auto/Off/Man" switch to "Off." With a voltmeter, measure static voltage between the top wire of the pump breaker and any neutral terminal. Record the voltage.
- Dynamic pump voltage. Set the "Auto/Off/Man" switch to "Man." Make sure the pump is running. With a voltmeter, measure dynamic voltage between the pump terminals in the control panel. Record the voltage when it is stable. (See panel wiring diagrams for the correct terminals.)
- Pump amperage. With a loop ammeter, hook the wire loop above the pump circuit breaker. Measure and record amperage. (Don't mistakenly measure the control breaker amperage.)



Measuring dynamic pump voltage



Measuring pump amperage

NOTE: There should be no more than a 10% difference between static and dynamic voltage. If the voltage drop is greater than 10%, ensure that the wire between the pump and the control panel is the correct size

Step 9: Test Panel and Float Switch Operation

Step 9a: Make sure the control panel has power and that the float switch assembly has been removed from the tank.

Step 9b: Set the “Auto/Off/Man” switch to “Auto” and test the float switches based on the system type (demand-or timed-dose) and the float switch assembly. Testing sequences and the expected results are provided below.

NOTE: If the expected results do not occur when you perform the test sequence, check the wiring diagrams for proper wiring.

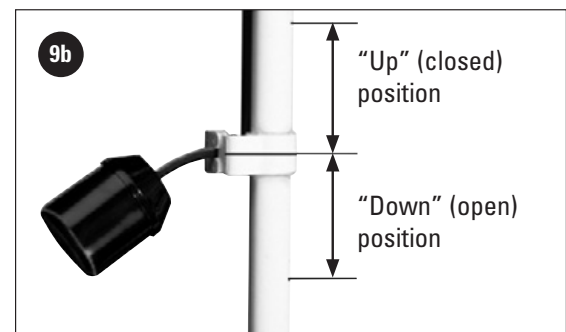
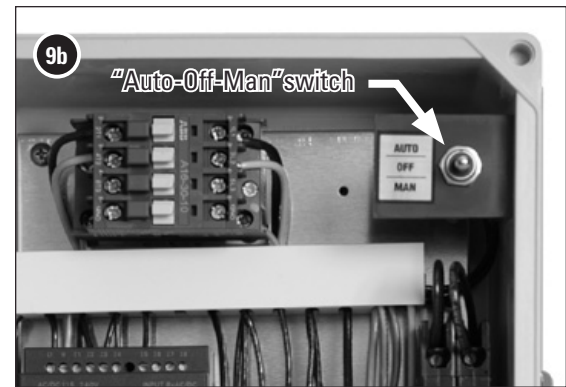
Demand-Dose Systems

Y,G or Y,G,W Float Switch Assemblies

- If the float switch assembly includes a “Redundant off/low-level alarm” switch, place it and the “Pump on/off” switch in the “up” position. The pump turns on. Place the “High-level alarm” switch in the “up” position. The audible alarm sounds and the panel door alarm light turns on.
- Place the “High-level alarm” switch in the “down” position. The audible alarm silences and the panel door alarm light turns off. Place the “Pump on/off” switch in the “down” position. The pump turns off. If the assembly includes a “Redundant off/low-level alarm” switch, place it in the “down” position. An audible alarm sounds and the panel door alarm light turns on. (On MVP panels, the panel door alarm light will turn on and blink.)
- Snap the float switch assembly back into the bracket. Make sure the float switches can move freely up and down without interference from each other or contact with the vault wall.

Y,B,R or Y,B,R,W Float Switch Assemblies

- If the float switch assembly includes a “Redundant off/low-level alarm” switch, place it and the “Pump off” switch in the “up” position. Place the “Pump on” switch in the “up” position. The pump turns on. Place the “High-level alarm” switch in the “up” position. The audible alarm sounds and the panel door alarm light turns on.
- Place the “High-level alarm” switch in the “down” position. The audible alarm silences and the panel door alarm light turns off. Place the “Pump on” switch in the “down” position. The pump continues to run. Place the “Pump off” switch in the “down” position. The pump turns off. If the assembly includes a “Redundant off/low-level alarm” switch, place it in the “down” position. An audible alarm sounds and the panel door alarm light turns on. (On demand-dose MVP panels, the panel door alarm light turns on and blinks.)
- Snap the float switch assembly back into the bracket. Make sure the float switches can move freely up and down without interference from each other or contact with the vault wall.



Float positions

Timed-Dose Systems

Check the control panel timer settings against the project plans/specifications. If they don't match or aren't provided, set the timer based on state and local regulatory requirements. (For assistance, contact your local Distributor or Orenco.)

YG,R or YG,R,W Float Switch Assemblies (S1PT or S1PTR0)

- If the float switch assembly includes a “Redundant off/low-level alarm” switch, place it and the “Timer on/off” switch in the “up” position. The “Off” light on the timer in the control panel turns on. During normal operation, the timer counts down and runs the pump when the “Off” cycle is complete if the “Timer on/off” switch remains in the “up” position. Place the “High-level alarm” switch in the “up” position. The audible alarm sounds and the panel door alarm light turns on. If you are using the timer override function, the pump turns on automatically.
- Place the “High-level alarm” switch in the “down” position. The audible alarm silences and the panel door alarm light turns off. If you are using the timer override function, the pump turns off automatically. Place the “Timer on/off” switch in the “down” position. The “Off” light on the timer in the control panel turns off. If the assembly includes a “Redundant off/low-level alarm” switch, place it in the “down” position. An audible alarm sounds and the panel door alarm light turns on.



Siemens Logo Unit, located in MVP Panel

Y,R,W or YG,R,W Float Switch Assemblies (MVP)

After applying power to the control panel, go to the “Input” screen on the Logo unit, per the instructions supplied with your panel.

- Place the “Redundant off/low-level alarm” switch in the “up” position. The #1 input on the Logo screen is highlighted. Place the “Timer on/off” switch in the “up” position. The #2 input on the Logo screen is highlighted. During normal operation, the timer counts down and runs the pump when the “Off” cycle is complete if the “Timer on/off” switch remains in the “up” position. Place the “High-level alarm” switch in the “up” position. The #4 input on the Logo screen is highlighted, the audible alarm sounds, and the panel door alarm light turns on. If you are using the override timer function, the #3 input on the Logo panel is highlighted.
- Place the “High-level alarm” switch in the “down” position. The audible alarm silences, the panel door alarm light turns off, and the #4 input on the Logo screen is not highlighted. If you are using the override timer function, the #3 input on the Logo screen is not highlighted. Place the “Timer on/off” switch in the “down” position. The #2 input on the Logo screen is not highlighted. Place the “Redundant off/low-level alarm” switch in the “down” position. An audible alarm sounds and the panel door alarm light turns on and blinks. The #1 input on the Logo panel is not highlighted. The alarm condition ends when the “Redundant off/low-level alarm” float switch is back in the “up” position.

Step 10: Perform Final Installation Checks

Step 10a: Make sure the removable components in the riser (float switch assembly, pump, removable section of the discharge assembly, Biotube cartridge, and pump vault) are all easily removable with no interference.

Step 10b: Make sure the vault's support pipes don't interfere with plumbing or wiring inside the riser.

Step 10c: Verify that the discharge assembly is installed hand-tight at the pump and at the union. If the discharge assembly has a cam lock connection, make sure it is connected and locked.

Step 10d: Make sure that all valves are connected and open.

Step 10e: Make sure the "Auto/Off/Man" switch is in the "Auto" position and that the control panel circuit breakers are in the "On" position.

Step 10f: If household water lines were turned off during this installation, make sure that the household water lines are turned on again.

Step 10g: Make sure that all lids and lid bolts are properly installed and secure.

WARNING: AN UNLOCKED LID OR OPEN TANK ACCESS IS A SAFETY HAZARD! *Keep the tank access lid secure to the riser at all times with stainless steel lid bolts. If bolts are lost or damaged, call your Distributor immediately for bolts. Or call Orenco at (800) 348-9843 or +1 (541) 459-4449. If the tank lid becomes detached from the riser or if the lid or riser becomes damaged, BLOCK ACCESS TO THE TANK OPENING IMMEDIATELY AND KEEP CHILDREN AWAY until all repairs are made.*



Before Performing Maintenance ...

- Wear clothing that covers all parts of the body exposed to wastewater or effluent and personal protection equipment (rubber gloves, goggles) whenever handling components that come in contact with wastewater or effluent.
- Practice proper personal hygiene after service is complete.
- When working with electrical components, switch off the power at the service entrance panel and set the circuit breaker(s) to “Off.” If the control panel is not within view of the pumping system, use lockout/tagout procedures.

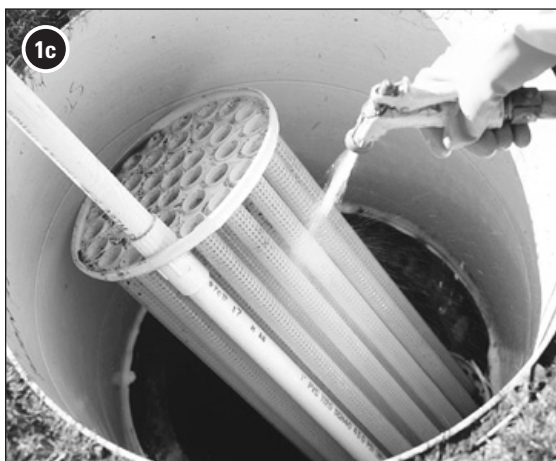
Step 1: Check and Clean Biotube Filter Cartridge

Check for good flow through the Biotube filter cartridge and clean it if necessary.

Step 1a: Set the “Auto/Off/Man” switch to “Man” and let the pump run for about 30 seconds. Watch for any noticeable difference between the liquid levels in the pump vault and the tank.

Step 1b: Set the “Auto/Off/Man” switch to “Auto.” If the difference between the liquid levels in the pump vault and the tank is two inches (50 mm) or more, or if the low-level alarm is activated, the Biotube filter cartridge should be cleaned.

Step 1b: Clean the Biotube filter cartridge if necessary. Remove the Biotube cartridge from the pump vault. Hold the cartridge over the access riser at the tank inlet or above the primary compartment of the tank and carefully spray the build-up into the tank. Do not clean the cartridge over the pump vault.



Step 2: Clean and Test Float Switches

See documents NIN-MF-MFC-1, NIN-MF-MF-1, and EIN-SB-SB-1 for more information on servicing, replacing, and wiring float switch assemblies and float switches.

Step 2a: Unsnap the float switch assembly from the bracket and inspect for solids buildup on the float switches.

Step 2b: If necessary, hold the float switch assembly over the access riser at the tank inlet or above the primary compartment of the tank and clean off any solids buildup on the switches.

Step 2c: Test the operation of the switches according to the installation section of this manual. Remove and replace any inoperative switches.

Step 2d: After testing, make sure the switches are properly secured to the float stem and that the cords are neatly wrapped inside the riser to prevent interference with float switch operation.

Step 3: Inspect and Clean Pump and Pump Vault

Step 3a: Close the valve on the discharge assembly, disconnect the discharge assembly at the union, and remove the pump from the pump vault.

IMPORTANT: Do not use the pump cable to raise the pump!

Step 3b: Place the pump on a cleanable surface such as the inside of the riser lid, a tarp, or inside a plastic trash can.

Step 3c: Check the intake screen and remove any debris or particles clogging the screen. Record the type of debris, if any (cigarette butts, hair, lint, cat litter, cloth wipes, gum, grease build-up, etc.) on a system maintenance log and report your findings to the user/homeowner (for education).

Step 3d: Remove the pump vault from the tank and inspect it for any solids buildup.

Step 3e: If necessary, use a hose to spray down the inside walls of the pump vault and carefully pour the pump vault's contents back into the tank.



The pump can be removed without disconnecting the power cable.

Step 4: Inspect and Service Splice Box

WARNING: Before doing any work on the wiring to the level control floats and pump in the vault or in the control panel, switch off the circuit breakers in the control panel and switch off the power to the system at the service entrance panel.

Step 4a: Remove the splice box lid and check for moisture. (Some condensation inside of the splice box is normal.) Inspect the splice box to ensure lid and connections are secure.

Step 4b: If the splice box has been 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 from the splice box with a syringe, sponge, or similar method.

Step 4b: When finished, reinstall the splice box lid.

Step 5: Reinstall Components and Restart System

Step 5a: Install the pump vault in the tank. Gently lower the vault into position in the access riser. The support pipes should rest on top of the tank. "Earless" vaults should rest on the tank bottom.

IMPORTANT: Rest the vault on top of the liquid surface and then fill the vault with water from a hose. This helps sink the vault and prevent floating material from entering the vault through the inlet holes.

Step 5b: Lower the pump and discharge assembly into the flow inducer on the pump vault and connect the union or cam lock. The union should be hand tight. Do not use mechanical tools to tighten the union. *IMPORTANT: Do not use the pump cable to raise the pump!*

Step 5c: Open the valve on the discharge assembly.

Step 5d: Lower the Biotube filter cartridge into the pump vault.

Step 5e: Fully snap the float switch assembly into the float bracket. Make sure the float switches can move freely up and down without interference from each other or contact with the vault wall. If there is interference, loosen the float collar setscrew(s) and rotate the collar(s) horizontally until all of the switches can move freely. Tighten the setscrew(s) when finished.

Step 5f: Wrap the excess lengths of float cord cables around the splice box and secure them to prevent them from slipping back into the vault and interfering with the operation of the floats.

Step 5g: Make sure the “Auto/Off/Man” switch is in the “Auto” position and that the control panel circuit breakers and service panel circuit breakers are in the “On” position.

Step 5h: Make sure that all lids and lid bolts are properly installed and secure.

WARNING: AN UNLOCKED LID OR OPEN TANK ACCESS IS A SAFETY HAZARD! Keep the tank access lid secure to the riser at all times with stainless steel lid bolts. If bolts are lost or damaged, call your Distributor immediately for bolts. Or call Orenco at (800) 348-9843 or +1 (541) 459-4449. If the tank lid becomes detached from the riser or if the lid or riser becomes damaged, ***BLOCK ACCESS TO THE TANK OPENING IMMEDIATELY AND KEEP CHILDREN AWAY until all repairs are made.***

Appendix 1: Grommet Installation Instructions

Orenco offers hole saws with pocket cutters in several sizes that make cutting grommet holes simple and easy. These RKHS hole saws cut away the ribs as the hole is cut, eliminating the need to notch and break the riser ribs with an angle grinder and chisel.

- RKHS100 for 1-inch grommets
- RKHS125 for 1¼-inch grommets
- RKHS150 for 1½-inch grommets
- RKHS200 for 2-inch grommets

Step 1: To install grommets in the field, first mark the riser for location of the grommets. (For Perma-Loc risers, you should try to avoid cutting through the pipe seam — the extra thick rib — unless it is unavoidable.)

Grommet Hole Saw Sizing Chart

Grommet Size (in.)	Hole Size (in.)
½	1
¾	1¼
1	1⅞
1¼	1¾
1½	2⅞
2	2¾
3	3⅞
4	5

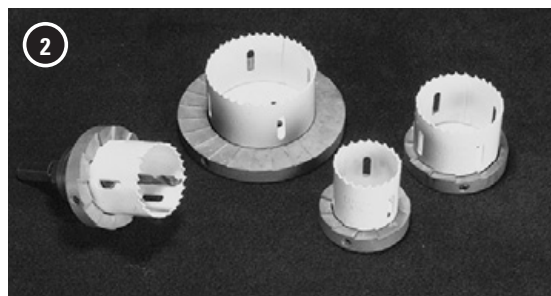
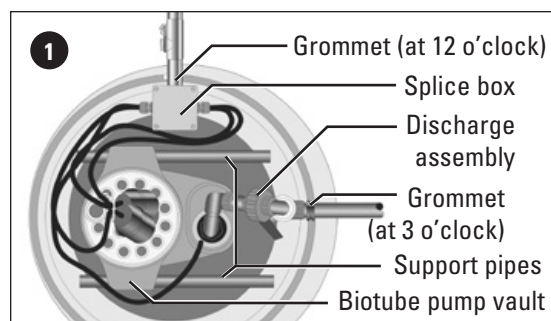
NOTE:

Grommet size = nominal (IPS) pipe size. For more information about grommet dimensions and actual pipe O.D., see Orenco's Grommet Technical Data Sheet (NTD-RLA-PG-1), available from the Document Library at www.orenco.com.

Step 2: Using the correctly-sized RKHS hole saw and a drill of at least 18 volts, cut the hole and grind the ribs down until you have a flat, smooth surface for installing your grommet. Do not grind too deeply into the riser — about ⅛ inch (1.6 mm) is sufficient.

Step 3: Use a wire brush to clean up the cut, then a deburring tool or knife to deburr the edges of the opening, being careful not to enlarge the opening.

Step 4: Install the grommet in the riser. Apply a bead of ADH100 adhesive to the groove of the grommet prior to insertion into the riser hole. This will make the grommet more secure and will overcome any imperfections in the drilled hole.

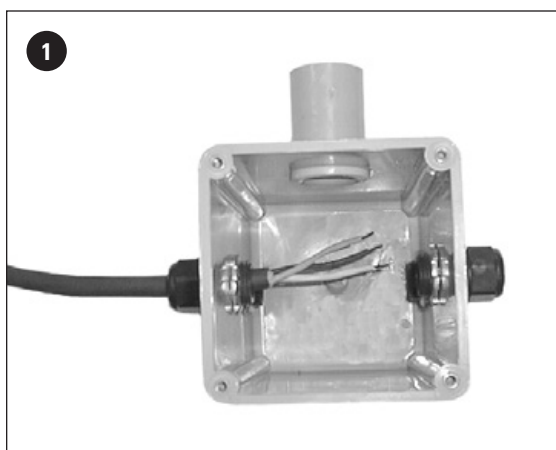




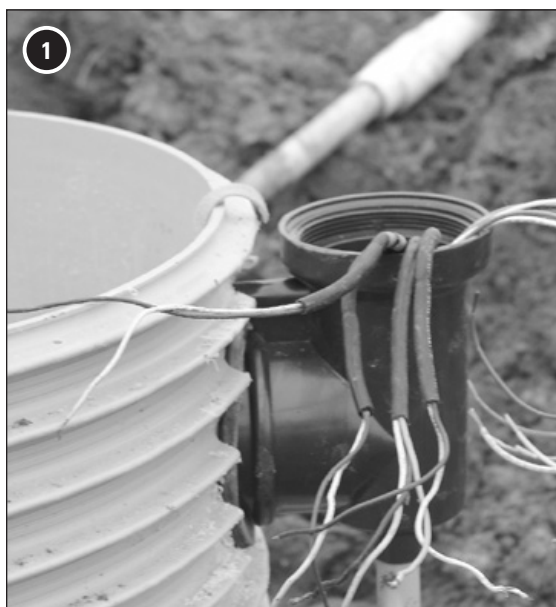
Internal Splice Box



External Splice Box



Internal Splice Box



External Splice Box

Appendix 2: Splice Box Wiring Instructions

This appendix covers simple splice box wiring instructions. For more detailed explanations with field wiring sizes, recommended breaker sizes, and field wire color charts, refer to *Splice Box Installation, Operation, and Maintenance Instructions* (EIN-SB-SB-1). For explosion-proof (Class I, Division 1) splice boxes, see *Explosion-Proof Cord Connector Installation Instructions* (EIN-SB-SBX-1). For the External Splice Box, see EIN-SBEX-1. These instructions also come inside each splice box.

All splice boxes are provided with waterproof wire nuts necessary to splice the appropriate floats and pumps.

Step 1: Push the appropriate pump and float 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 resplicing.

Step 2: 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. Refer to the Splice Box Wiring diagram provided for the control panel and check the float arrangement for your system to determine the number of wires you need.

Wires should be color-coded or otherwise marked to help wire the control panel. The wire color chart in EIN-SB-SB-1 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.

All splices inside the splice box must be made waterproof using the waterproof wire nuts supplied. Use the Wire Nut Capacities chart below to select the right wire nut for each splice. Splices that are not waterproof may cause malfunctions of the pump controls if water leaks into the splice box.

NOTE: Use wire nuts in accordance with local or national codes. Use only with copper wire.

Wire Nut Capacities

Connectors are rated for outdoor connections with the following wire combinations:

Large Red 600 V	Small Orange 600 V
One 10 AWG and one 12 AWG	Two 14 AWG
One 10 AWG and one 14 AWG	One 14 AWG and one 16 AWG
Two-to-four 12 AWG	One 14 AWG and one or two 18 AWG
One 12 AWG and one-to-four 14 AWG	Two 16 AWG
One 12 AWG and two-to-four 16 AWG	One 16 AWG and one 18 AWG
One 12 AWG and three 18 AWG	Two 16 AWG and one or two 18 AWG
Two-to-four 14 AWG	Two-to-four 18 AWG
Two-to-six 16 AWG	

Step 3: For large red wire nuts, strip $\frac{5}{8}$ inch (16 mm) of insulation from the end of each wire, regardless of wire gauge. For small orange wire nuts, strip $\frac{3}{8}$ in. (10 mm) of insulation from 14 AWG to 16 AWG wires, and strip $\frac{1}{2}$ inch (13 mm) of insulation from 18 AWG to 22 AWG wires. Prevent frayed strands as much as possible.

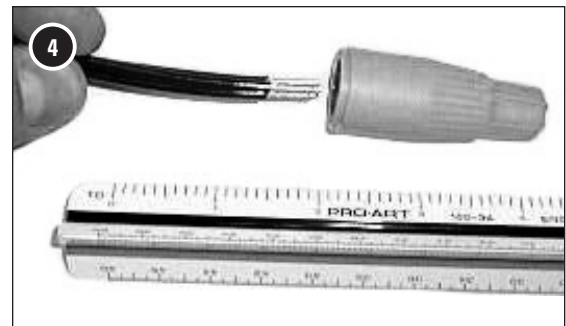
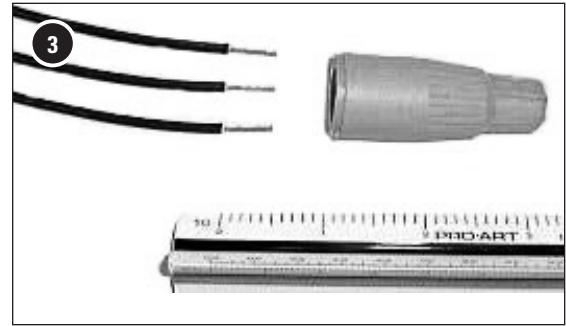
Step 4: Align wires in a bundle. Wire ends of the same gauge should be even with one another. Extend smaller wires slightly past larger ones, and stranded wires slightly past solid ones.

Hold the bundle of wires firmly, 2 inches (50 mm) from the wire ends. Fully insert all the wires together through the sealant into the connector. Continuing to hold wires firmly, twist the connector clockwise onto the wires.

Step 5: Gently tug on each wire entering the wire nut to check the mechanical connection. Smooth any exuded sealant around the wires where they enter the connector.

NOTE: Waterproof wire nuts are not reusable. To change a splice, twist off the wire nut and replace it with a new one.

Step 6: After the wires are connected, seal around them where the conduits enter the splice box with approved electrical silicone sealant.



Residential Applications



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