

# OSCAR-II Installation Manual, Idaho

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Manufactured by:

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## System Description:

The *OSCAR-II* treatment unit is comprised of 1,000 gallon treatment vessel, 1,000 gallon pump/surge tank, headworks, coils, medium sand, and control equipment.

Wastewater is collected in a standard treatment vessel where CBOD5 and TSS levels are reduced to at least 100 and 75 mg/l, respectively. Effluent flows from the treatment vessel to the pump/surge tank. Effluent from the pump/surge tank is dosed through a 120 mesh disc filter to the *OSCAR-II* coils installed in medium sand. Effluent discharged from the coils is treated by the medium sand prior to infiltrating into the receiving soil and final discharge.

### Prior to Installing an *OSCAR-II* Unit:

Before installing a *OSCAR-II* unit, the installer must complete in-class and in- field training by representatives designated by *Lowridge Onsite Technologies, LLC*. The Installer must insure that no water softener discharge is plumbed into any of the drains that feed the system. The residential *OSCAR-II* unit is intended to treat ***only*** wastewater generated by normal activities from laundry machines, toilets, showers, and kitchen and bathroom sinks. No special chemical additives are needed for the normal functioning of the *OSCAR-II* unit.

### List of components:

1. Control panel: *LF1P-RF*
2. Reverse flush Headworks: three (3) oil filter 0-100 psi pressure gauges, one (1) 3/4"-120 mesh, 130 micron *Arkal*<sup>™</sup> disc filter, five (5) Netafim 1" normally closed solenoid valves and container.
3. Float switches
4. Discharge pump, 1/2 hp
5. 3/4" *ARAD* flow meter
6. *OSCAR* coils
7. Misc. fittings and blank tubing

## Unloading and un-packaging instructions:

*Lowridge Onsite Technologies, LLC* takes great care to manufacture and package the *OSCAR-II* unit to prevent damage during shipping and handling. It is expected that everyone from the manufacturing personal to the installation crew take reasonable steps not to drop, throw, or damage the product. Do not handle the *Coil* by the tubing.

If there are defects in any of the components, call *Lowridge*.

## Installation steps:

For reference, please see instructional videos on our website at: [www.lowridgetech.com](http://www.lowridgetech.com), click on “Training Video” page.

### Step 1: Determine the orientation and position of the tanks.

Some designs will have specific locations for the system components based on required set - backs, elevation, logistical issues, or aesthetic concerns. Before excavating begins, verify that the proposed locations of the tanks are laid out in a manner that will allow for efficient pipe connections.

### Step 2: Excavate the holes for tanks.

Excavate the tank holes as per the tank manufacturer’s recommendations. Take appropriate steps to insure the tanks will not settle after backfill.

### Step 3: Setting tanks.

**Tanks:** Set tanks according to tank manufacturer’s recommendations. The septic tank and dosing chamber must be an approved as per TGM Section 5.2 Approved Septic Tanks and IDAPA 58.01.03.007.07. The volume of the dosing chamber should be equal to at least two times the system design flow when a single pump is used.

### Step 4: Install dosing pump.

Place the pump into the pump/surge tank. Attach a 1” union on the horizontal supply line and exit the tank through the riser wall. Make sure to use an appropriate grommet or other method to insure the protrusion is water tight.

### Step 5: Install headworks and flow meter.

The best installation location of the headworks is on top of one of the tanks. The tank top provides a solid base of support and acts as a barrier against mole and gopher infestation. If

the risers are taller than 12", cut an additional riser for an extension. Cut the rise pipe the difference between the height of the tank risers and the height of the reverse flush headworks (12"). Place the extra riser piece on the tank where the headworks is located. Fill the riser with compacted soil or other aggregates. Place the headworks on the riser and secure the headworks to the riser with screws. Plumb the pump, meter and headworks at right angles as shown below.

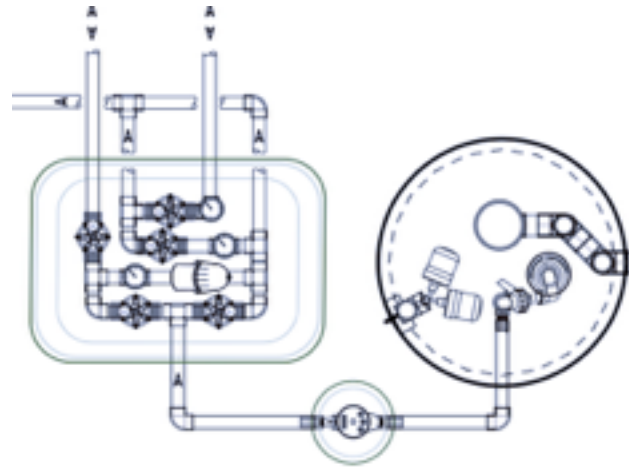


Illustration 1

Illustration 2

## Step 6: Plumbing connections

The headworks has four (4) plumbing connections: pump line from dosing pump, *OSCAR-II* supply line, *OSCAR-II* flush line, flush vent line to tank inlet. Plumb the connections to the headworks so that the pipes are supported by the top of the tank or hand bed the pipes before backfilling the system.

## Step 7: Wire control panel, floats, and pump.

Mount the control panel on a post chest to eye level.

Always use PVC electrical conduit between the splice boxes and the control panel and follow all applicable electrical codes. Do not use direct burial wire on *OSCAR-II* systems. Follow the wiring directions provided inside the control panel.

Power requirements for the *OSCAR-II* system are as follows:

- Discharge pump, 110 volt, up to 18 amps start and 11 amps running
- Headworks 24 volts, 0.4 to 0.6 amps

## Step 8: Floats and Pump settings.

Set float using the floats and float clips provided. The bottom float (Timer enable float) should be set at a minimum of 24” above the bottom of the tank to insure the entire pump motor and wet end are completely submerged. The top float (high level alarm) should be set at least 6” above the bottom float. A greater distance can be used if a large working volume is required.

## Step 9: Back fill and water test.

Prior to backfilling, all tanks should be water tested and all start-up procedures must be completed. Fill tanks to 2” above riser connections and mark water level. There should be no measurable water loss for 2 hours. Backfill tanks with appropriate material. At all times follow tank manufacturer’s instructions. Hand-bed all pipes.

## Step 10: OSCAR installation.

### Installation:

Before preparing the basal area for the sand layer the soil moisture content must be checked to prevent smearing the soil interface. Dig a small excavation in the basal area with a hand shovel. The excavation need only be 12” wide and 12” deep. If the exposed sides of the excavation are shinny without any cracks or crumbled edges, the soil is too moist. If the exposed soil surface crumbles and cracks, the soil is dry enough for preparation.

To prepare the soil interface, stake the basal area and remove any forest duff and forest under growth, if present. Trees and stumps should be left in place. In pasture or lawn areas, mow the grass as short as possible. After removing as much loose organic material as possible, “rake” the soil surface 2-3” deep parallel to the contour throughout staked basal area. The teeth of a backhoe bucket can be used. Do not remove sod.



Illustration 3

Apply the base layer of sand media as per the design. The top of sand layer under the coil must be level.



#### Illustration 4

Place the coils and connect the supply and flush manifolds as prescribed in the design.

Place the final 6" of sand media for final cover. It is recommended to immediately broadcast grass seed or plant a ground cover, preferably periwinkle (*vinca-minor*). A layer of natural mineral soil can be added to cover the sand, but is not needed to establish plant growth. Do not use a manufactured top soil mix. Also, avoid soil that is high in organic matter. A couple of inches of beauty bark could be used to top dress the sand.

## Step 11: Panel Operation and Start-up procedures.

### Panel Operation:

The **LF2P-RF** control panel is a 110 volt universal panel for most single family *OSCAR-II* systems. It has the capacity to operate two outputs: a discharge pump and the “*Reverse Flush*” headworks. All logic is controlled by a Siemens Logo. The pump operation options are as follows:

- Discharge Pump (Pump #1): is operated in a time-dose mode. Pump #1 pressurizes the *OSCAR-II* and back-flushes the disc filter and forward flushes the *OSCAR-II Coils*.

The timers have the following factory default settings:

- Discharge pump dosing: 3:38 minutes off, 22 seconds on. (V1\_OFF, V1\_ON)
- Disc filter flush: after pre-set number of dose cycles have completed (90 doses), the disc filter flush “ON” cycle runs for 15 seconds. (V2\_ON).
- *Coil* flush: after Disc filter flush is completed, the *Coil* flushes for 2 minutes (V1V3\_ON).

### Start Up Procedures:

Prior to conducting any of the following procedures, inspect the wiring to insure the system is correctly wired. Pull the float tree from the tank and place across the tank opening so all the floats hang down. Now power up the system and turn all the breakers to the “ON” position and all of the toggle switches in the off position. Ensure there is enough water in tanks to conduct pump tests.

- a. Test floats:

On the Seimens Logo scroll to the input screen as shown here:

The actual screen will look like this:



**Screen Navigation:**

The screen use the four screens will

ns,

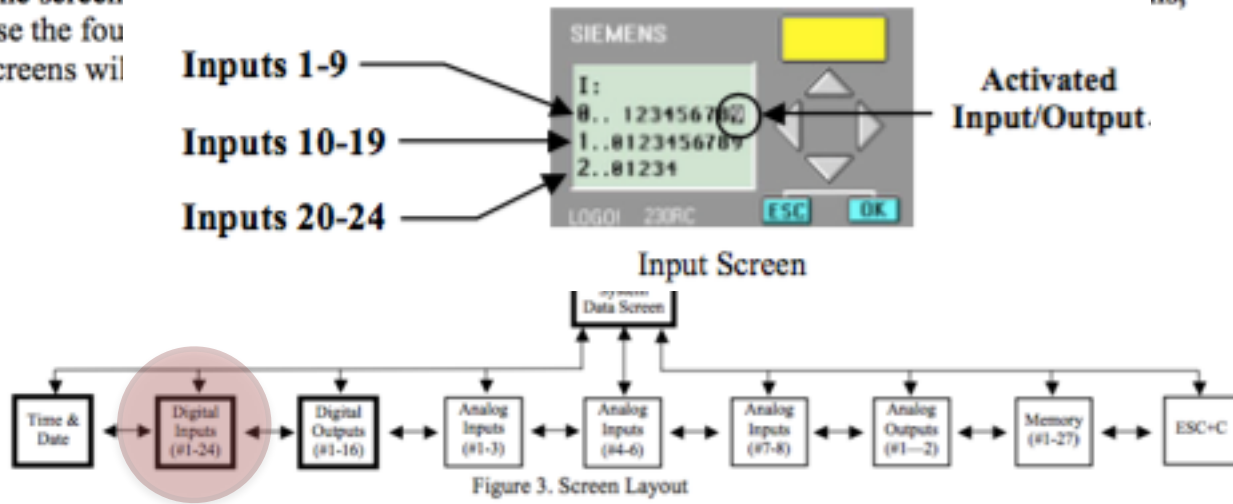


Illustration 5

When lifting the floats check this screen to determine if the floats are wired into the correct position. When the floats are lifted a corresponding digit will be back lit. The input values are as follows:

- 1 = bottom float
- 2 = top float

Test floats:

Lift top float. Input indicator “2” will back light and the alarm should sound and the beacon should illuminate.

Lift bottom float. Input indicator “1” will back light.

Place floats back into tank.

b. Test pumps and valves:

Discharge pump and valves:

Place valve 1 & 2 toggle switch and pump 1 toggle switch to MAN position. Pump should dose and all three pressure gauges should stabilize about 50 psi. Gauge 3 may read as low as 40 psi. No water should be flowing into septic tank.

Place valve 3 & 4 toggle switch to MAN and valves 1 & 2 toggle switch to OFF, pump #1 in MAN. Pump should run, pressures should change: gauge 2 highest pressure, gauge 1 less than 2, and gauge 3 should indicate 0 psi. Water should be flowing into septic tank very rapidly.

Place valves 1 & 2 and valve 5 in MAN position and valves 3 & 4 in OFF position, and pump 1 in MAN. Pressure on gauge 1 should indicate the highest pressure, gauge 2 less than 1, and gauge three should indicate between 0-3 psi and water should be flowing into septic tank at a moderate rate.

**TABLE 1**

<u>Design flow</u>	<u>Total coils</u>	<u># of lats.</u>	<u>Coils per lat.</u>	<u>Dose GPM</u>	<u>Flush GPM</u>	<u>Excess TDH</u>
250	5	5	1	1.75	9.75	50'
300	6	2	3	2.1	5.3	50'
360	8	4	2	2.8	9.2	50'
450	9	3	3	3.15	7.95	50'
480	10	5	2	3.5	11.5	50''
600	12	3	4	4.2	9	50'

Position all toggle switches to AUTO.

c. Check timer default settings:

V1 OFF = 3:38minutes

V1 ON = 22 seconds

V2 OFF = 30 seconds

V2 ON = 15 seconds  
V1V3 OFF = 30 seconds  
V1V3 On = 2 minutes

## Replacement Instructions:

There are several components that are critical to process performance: solenoid valves in the headworks, drip tubing in the *Coil*, and the dosing/flush pump.

### **Solenoid Valves, 2-way throttling valve, Netafim part number, LVET1GH2:**

To replace remove six screws, remove bonnet, remove and replace diaphragm, replace bonnet and tighten screws. Valves can be purchased from *Lowridge Onsite Technologies*.



Illustration 6: LVET1GH2

### **Coil, 4-100' laterals of Netafim Bioline, 08WRAM.4-06V500:**

To replace the *Coil* remove sand media from top of *Coil*, cut the 1/2" poly feed lines adjacent to the manifolds, fold the feed lines up, and removed *Coil*. Place the new *Coil* in the sand, fold down the feed lines and couple to the feed lines, and cover *Coil* with sand. *Coils* can be obtained from any *LOWeFLOW™* dealer or *Lowridge Onsite Technologies, LLC*.

Discharge pump, AY Mc Donald, 1/2 hp, 30 gpm 22050E2AJ:

Cut power to pump, disconnect wire connections in splice box, remove pump from tank, and disconnect pump from piping. Connect new pump piping, connect wiring in splice box, place pump into tank, and re-energize power to pump circuit.

## Material Specifications:

### Media:

Medium sand.

**Containment Vessels:** All containment vessels must be approved by Idaho Department of Environmental Quality. Man-way openings must be 24" or greater nominal size to surface grade with a locking lid to preclude un-authorized access. All tanks must be water tight to the riser lid opening. All Protrusion through the riser wall for electrical conduits and other piping must be sealed to preclude any water infiltration. Containment vessels can be concrete, polyethylene, or fiberglass.

Concrete: Where ever possible, concrete tank bodies should be single piece construction. Man-hole risers should be cast in-place.

**Plumbing:** All piping must be PVC. The 1" supply and flush lines must be sch40.

**Assembled components:** *Lowridge* assembles the following components: headworks, *Coil* (partially assembled), and *Coil* manifold connections.

Headworks: the headworks for the *OSCAR-II* is made of all 1" sch PVC pipe and fittings, 1" NC *Netafim* solenoid valves, 3/4" *Arkal* disc filter (120 mesh, 130 micron), Three oil filled pressure gauges, and a polyethylene valve box with lid.

Coil: The *Coil* is constructed of *Netafim Bioline™* (0.42 gph emitter at 6" spacing) attached to a 1/2" or 1" PVC bracket.

**Discharge Pump:** The discharge pump is a ½ hp, 115 volt, 30 gpm rated turbine pump.