OmniMax™ 8ft Wide Unit
Installation Instructions

ADDRESS

Orenco Systems, Inc.
814 Airway Ave.
Sutherlin, OR 97479, USA

CONTACT

800-348-9843
+1 541-459-4449
www.orenco.com

DOCUMENT

NIN-TRT-MBB-2
Rev. 2 © 08/26

Table of Contents

About These Instructions

This manual contains an Installation Overview and a set of Installation Steps. It is not intended to replace installer training or requirements and instructions detailed in your engineering plan set. It may include additional steps that require completion prior to, during, or after the installation of Orenco components. Check to be sure all instructions and items supplied comply with all applicable regulations. If you discover any inconsistencies between your plan set and the instructions in this manual, contact your engineer or your dealer.

Installation Overview provides a simple overview of the installation steps. It is intended as a summary only, to provide a suggested order of operations – it does not provide complete instructions.

Installation Steps provide general instructions for each installation step along with references to installation documents for specific components. Many Orenco products come with installation instructions. All of these instructions are available in hard copy from Orenco and online in the Orenco Document Library.

Before You Begin

Before beginning, read these instructions and any documents referenced in them, and confirm the instructions for all of these products are the most current available. Check the Orenco Document Library to be sure your documents are current.

Please note that you must perform the installation according to the current manual. If you do not, the system's warranty will be void. If you are not an authorized installer, contact your dealer for training and authorization before installing this system. The dealer can provide technical support, training, and replacement components. To find the nearest dealer, check the Orenco Distributor Locator. If there is no dealer in your area, contact Orenco.

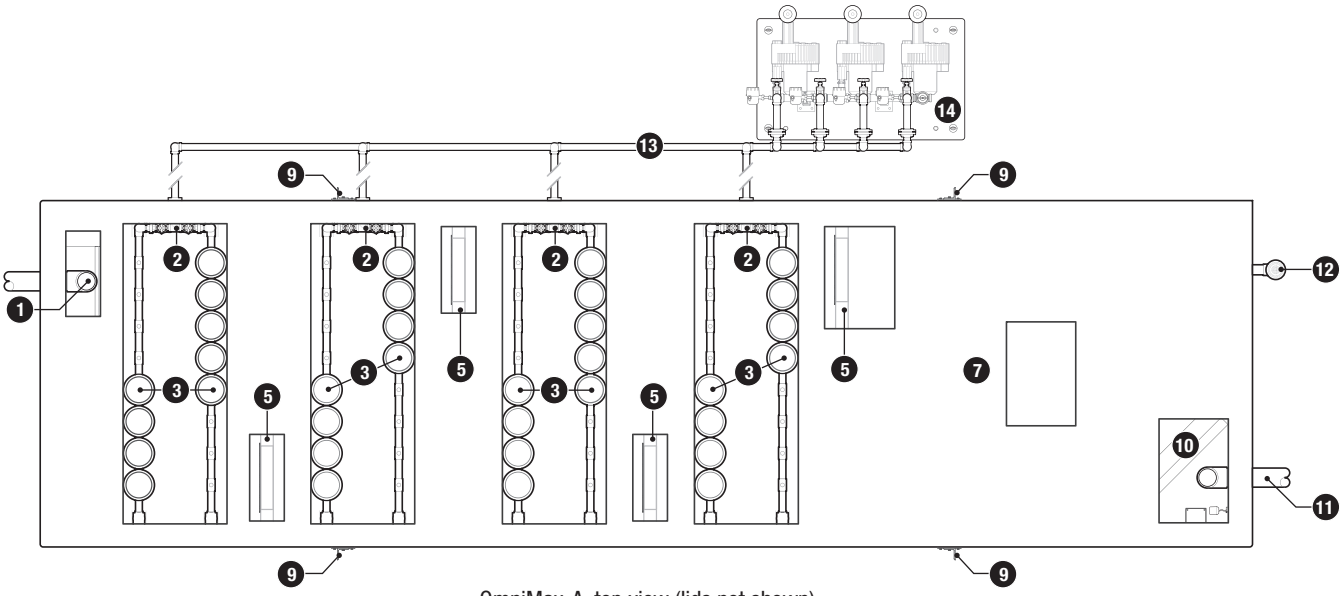
Be sure all of the necessary components are present before beginning the installation. Contact your dealer or Orenco at www.orenco.com if any components are missing or damaged.

Note — *All pipe diameters provided are US nominal PVC pipe sizes. If you're using metric pipe, you may need adapters to connect to the US fittings supplied with the unit(s).*

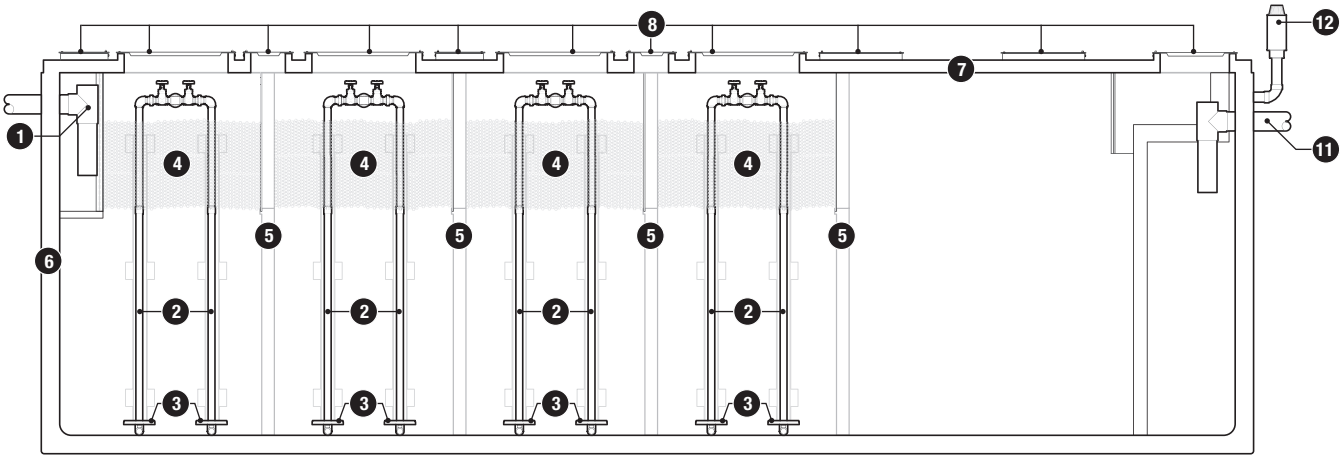
Standard Unit Components

Sample OmniMax-A Unit

Orenco's OmniMax-A (aerating moving bed bioreactor) units are highly customizable; multiple options and unit configurations are available. The configuration and components shown in this diagram are not intended to match the specific unit(s) used in each installation.



OmniMax-A, top view (lids not shown)



OmniMax-A, side cutaway view

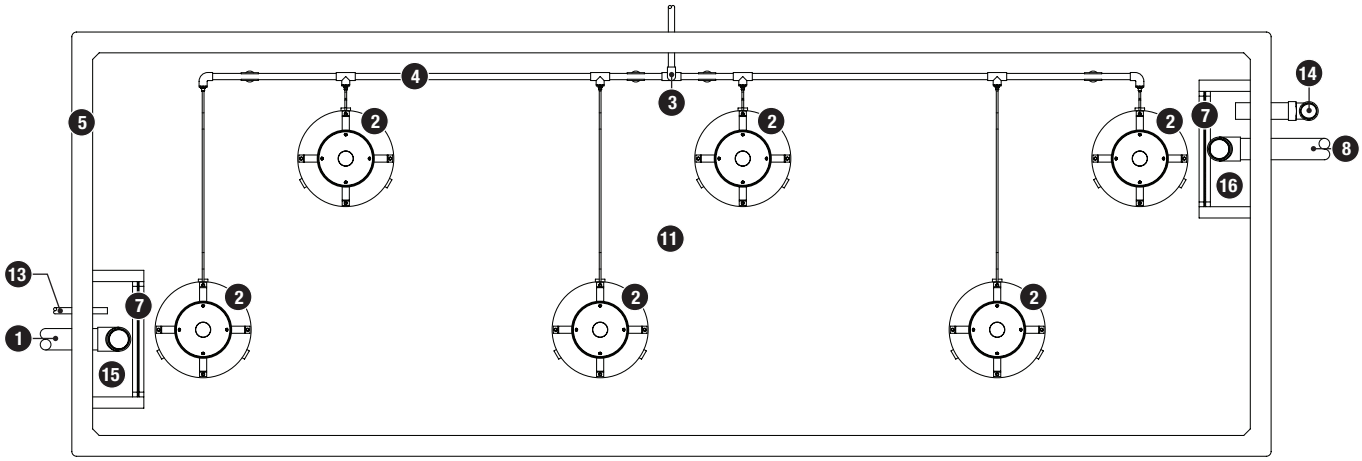
Components

1. Inlet with media retention plate
2. Air diffuser manifolds (duplex)
3. Air diffusers (quantity varies)
4. Biofilm carrier
5. Baffle
6. Tank wall
7. Tank top
8. Access lids
9. Lifting bracket
10. Corner weir
11. Outlet
12. Air vent
13. Air line
14. Air blower (3-blower configuration)

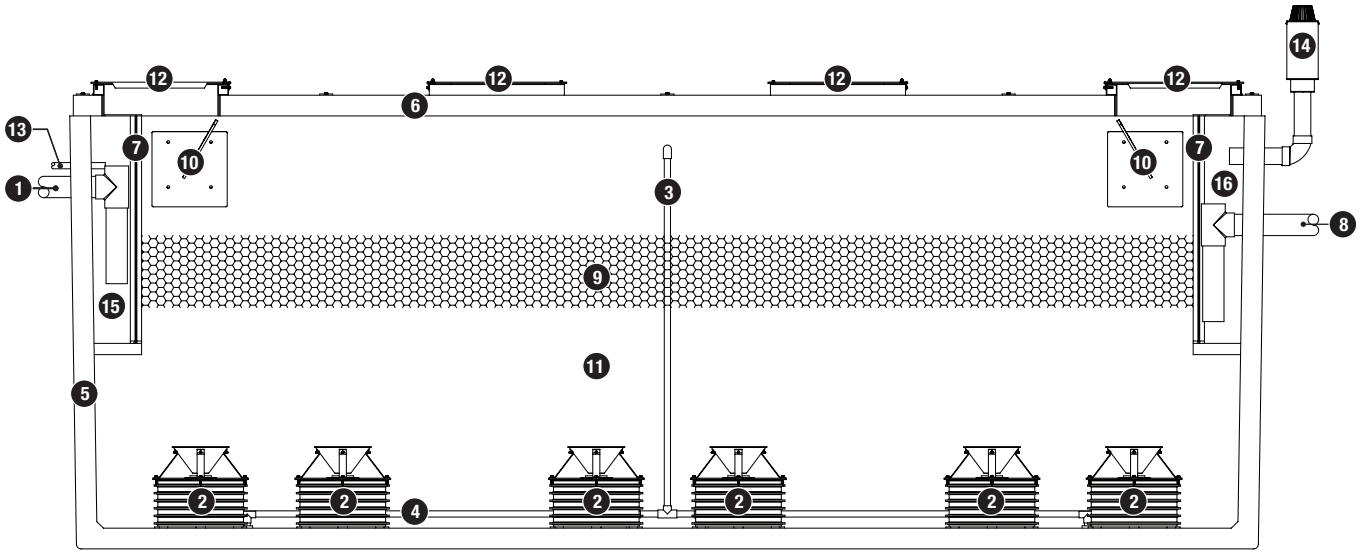
Standard Unit Components, cont.

Sample OmniMax-D Unit

Orenco's OmniMax-D (denitrifying moving bed bioreactor) units are highly customizable; multiple options and unit configurations are available. The configuration and components shown in this diagram are not intended to match the specific unit(s) used in each installation.



OmniMax-D, top cutaway view



OmniMax-D, side cutaway view

Components

1. Inlet
2. Pneumatic mixers
3. Air line from blower assembly (blower assembly not shown)
4. Pneumatic mixer line
5. Tank wall
6. Tank top
7. Media retention plate
8. Gravity outlet
9. Biofilm carrier
10. Lifting bracket
11. Denitrifying chamber
12. Access lid
13. Carbon feed line
14. Air vent
15. Inlet box
16. Outlet box

Installation Overview

Step 1. Review and compare the plan set to the actual site.

Step 2. For in-ground installations, perform the excavation(s) for the unit(s) to the depths shown on the plan set.

Step 3. Prepare the pads for the unit(s).

Step 4. Set the unit(s) into position.

Step 5. For in-ground installations, construct antibuoyancy measures on the unit(s) if they are required by the plan set.

Step 6. For above-ground installations, install any platforms and railings included with the unit(s).

Step 7. Connect the plumbing. (If needed, backfill in stages until you reach the grade specified on the plan set.)

Step 8. Test for watertightness.

Step 9. Complete the backfilling around the unit(s).

Step 10. Mount and connect the control panel for the unit(s), or route and connect to the existing control panel.

Step 11. Install the blower skid (OmniMax-A).

Step 12. Install the blower (OmniMax-D).

Step 13. Install any additional equipment including any remaining ventilation piping and/or other auxiliary piping/equipment.

Step 14. Refer to the start-up instructions.

Installation Steps

Table 1. Recommended Spacing for Units Equipped with Antibuoyancy Measures

Burial depth*, ft (m)	Minimum distance between units, ft (m)
5.5 (1.7)	8 (2.4)
6.5 (2.0)	10 (3.0)
7.5 (2.3)	12 (3.7)

** Burial depths are measured from the bottom of the OmniMax unit.*

Step 1. Review and Compare Plan Set

Review the plan set and compare it with the actual physical site:

- Make sure there are no obstructions on the site that could interfere with the installation.
- Check that all locations and elevations match the plan set.
- Discuss any differences between the plan set, the site, and these instructions with the engineer before continuing.

Key Points

- Follow the plan set for specific spacing distances between OmniMax units, as well as between the units and other components. Contact your dealer for more information.
- See Table 1 for depth and spacing recommendations.
- If the plan set calls for the unit(s) to be buried, contact your dealer or Orenco for additional instructions before proceeding.
- See the plan set for specific berming or burial depths of units.
- Maintain a minimum slope of 1⁄8in per ft (10mm per m or 1%) in all gravity transport piping.

Installation Steps

Step 2. Perform Excavations

Note — *For units installed above grade, with or without berms, skip this step and go to Step 3.*

If the plan set calls for the unit(s) to be buried, perform the excavation(s).

- Mark the site(s) for the unit(s) and plumbing runs.
- Make the excavation(s) to the specifications listed in the plans.
- If high groundwater is discovered, contact the engineer.
- If necessary, install shoring. Consult the engineer and applicable regulations for shoring requirements.
- If specified, excavate and prep French drains or other drainage systems.

Step 3. Prepare Unit Pad(s)

Note — *An appropriately sized, level pad of concrete or asphalt can be used in place of a compacted pad.*

Step 3a. Make the bottom of the excavation or the pad site for each unit level and free of debris, rocks, and sharp objects.

- The bottom of the excavation or the pad site has to be stable and uniform to ensure equal bearing across the unit bottom.

Step 3b. Lay a level, compacted pad of ≤3/4in (19mm) aggregate, pea gravel, or approved granule overlying a firm, uniform base.

- Compact the pad to 95% compaction.
- Lay the pad at least 7.5ft (about 2.3m) wide and as long as the unit.

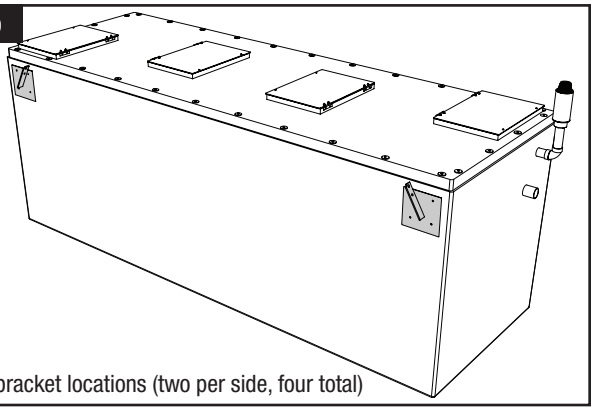
Key Points

- Completely level pads are critical for correct installation. A level pad should not vary more than 1/4in (6mm) in any direction.
- If the base soil is unstable (peat, quicksand, muck, soft or highly expansive clay, etc.), overexcavate the site depth and set a firm, 6in (150mm) compacted pad of ≤1/2in to ≤3/4in (13 to 19mm) aggregate.
- If you have doubt about the soil's stability, consult a local civil or structural engineer.

Compacted aggregate pad

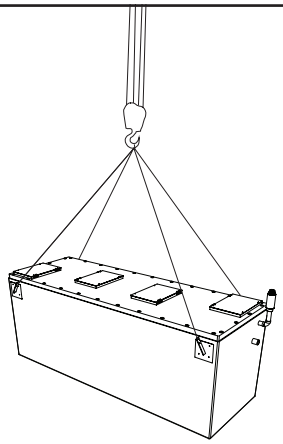
Installation Steps

Step 4b



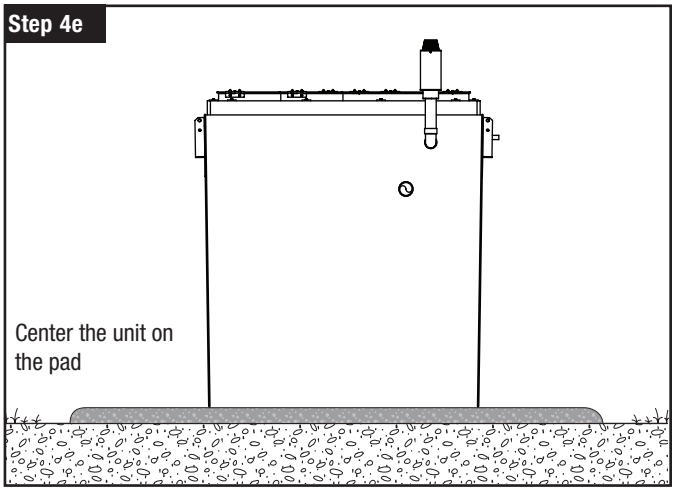
Lifting bracket locations (two per side, four total)

Step 4d



Lift the unit

Step 4e



Center the unit on the pad

Step 4. Set Unit(s)

IMPORTANT

- **Know the unit's weight and use proper lifting equipment.**
- **OmniMax units can weigh over 30,000lbs (13,608kg) depending on the model. If you are unsure of the unit's weight, contact Orenco before attempting to lift it.**
- **Do not use chains near the lifting brackets; damage to the fiberglass top can occur.**
- **Keep nonessential personnel clear when moving and setting units!**

Key Point — When installing multiple units, confirm each unit's location and direction before off-loading and placing it.

Step 4a. Position the transport vehicle and lifting equipment as close to the pad as possible.

- If the unit has been transported to the site in a shipping container, see *Removing Units from Shipping Containers*, NIN-ATX-MAX-1.

Step 4b. Attach the provided lifting cables to the four lifting brackets on the unit and raise the lifting equipment until all of the cables are tight.

Step 4c. If antiflotation brackets are included with the unit, attach them to the unit's base with the supplied hardware.

Step 4d. Lift the unit off of the transport and move it into position with the correct orientation.

Step 4e. Lower the unit onto the pad.

- Keep the unit centered on the pad as you lower it.

Step 4f. Verify that the unit is level.

Installation Steps

Step 5. Construct Antibuoyancy Measures

Key Points

- The standard method for constructing antibuoyancy measures is described below. For other methods, contact your dealer or Orenco.
- Contact the project engineer if you are unsure about the need for antibuoyancy measures.

Step 5a. Build forms 12in high × 20in wide (300mm × 500mm) along the full length of both long sides of the unit.

Step 5b. Place three evenly spaced runs of #4 rebar on top of the anti-flotation brackets, down both sides of the unit, along its entire length.

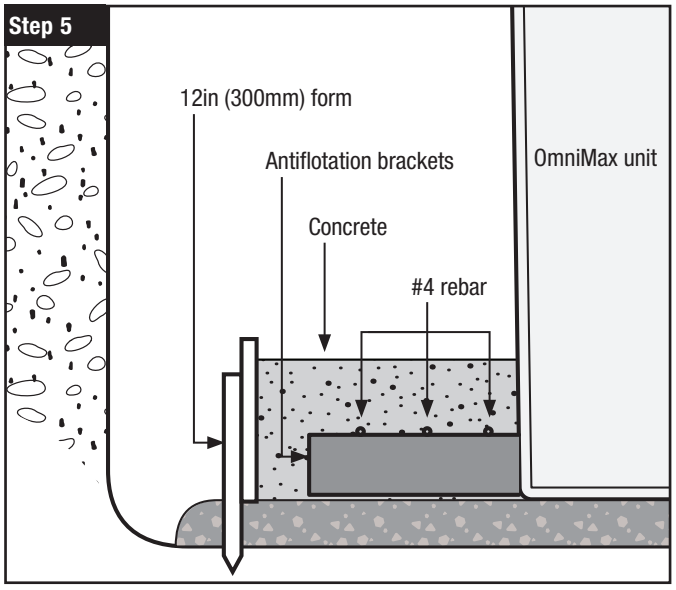
- Tack-weld or wire-tie the rebar pieces in place on the brackets.

Step 5c. Pour concrete into the forms.

IMPORTANT — Use a 4000psi (27,580kPa) minimum concrete mix!

- The concrete has to cover the rebar by a minimum of 1.5in (40mm) after it is poured and level.

Step 5d. Wait for the concrete to set before backfilling.



Step 6. Install Platforms and Railings

If the unit's components include platforms and railings, install them now.

IMPORTANT — Wear proper safety equipment when installing platforms and railings!

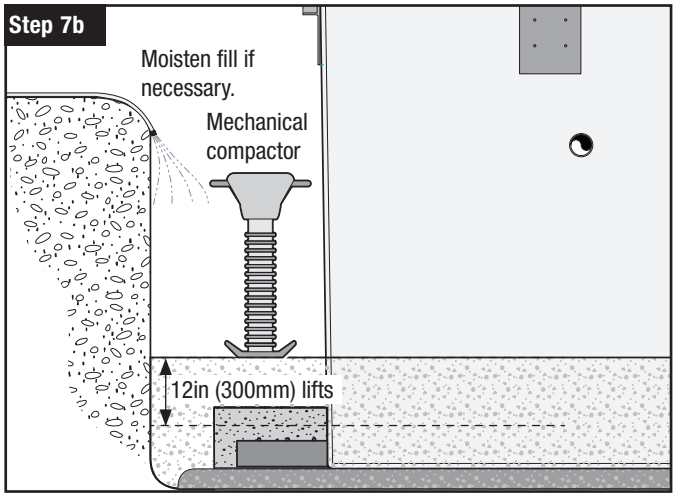
Note — *Before installing the platforms and railings, make sure that all of the parts and hardware have been received.*

Step 6a. Unfold the platforms into a horizontal position, install the platform posts, and secure them to the unit(s) with the supplied hardware.

Step 6b. Place and secure the railings to the unit(s) with the supplied hardware.

Step 6c. Install the ladder(s) and secure them with the supplied hardware.

Installation Steps



Step 7. Connect Plumbing

Step 7a. Using the plan set, identify the location of all transport lines and air lines between the OmniMax unit(s) and other system components.

Key Point — Contact Orenco before proceeding if the plan set shows the unit buried below grade.

Step 7b. Fill the unit to the midpoint with water.

Step 7c. For in-ground or bermed installations, backfill around the unit to 24in (600mm) below the lowest unit penetration (liquid or air line).

- Do not backfill to a level higher than specified on the plan set.
- Lay a level, 95% compacted bed of ≤3/4in (19mm) aggregate, pea gravel, or approved granule for transfer lines.
- Backfill in 12in (300mm) lifts – don't damage transport lines.
- Use a mechanical compactor to compact each lift.
- If necessary, moisten the backfill material with water to help compaction.

Step 7d. Connect the inlet and outlet piping to the OmniMax unit(s).

- Support the inlet and outlet piping to prevent sagging.

Step 7e. Connect the stainless steel air piping to the corresponding plumbing.

- Use either a 2in stainless steel flange or HPS boot to connect stainless steel plumbing to the unit.
  - When using pipe flanges, high temperature gaskets must be used.
  - Orenco recommends using an anti-seize compound on all stainless steel threaded connections.
  - For HPS boots, be sure both pipe ends are free of burrs and sharp edges before fitting the boot.

Step 7f. Label and track piping back to the control building for appropriate zones.

- For some systems, a single zone may have multiple penetration connections; see the site plans for appropriate plumbing in these circumstances.

Installation Steps

Step 8. Test Watertightness

IMPORTANT — NEVER submerge electrical conduit penetrations or junction boxes inside an OmniMax unit!

Perform this step for each unit, following all applicable regulations for watertightness testing.

Step 8a. Plug the unit's inlet and outlet with watertight plugs.

Step 8b. Fill the unit with water to 2in (about 50mm) above the inlet to test for watertightness.

- Do not fill the unit more than 2in (about 50mm) above the inlet.

Step 8c. Wait 30 minutes, then check for leaks around the penetrations and lines, as well as for changes in the liquid level inside the unit(s).

- Repair any leaks in the lines and connections.
- Contact Orenco if there is any leakage around plumbing penetrations in the unit(s) or changes in the liquid level inside the unit(s).

Step 8d. Remove the plugs when the unit passes the test.

Step 9. Backfill Around Units

For in-ground or bermed installations, backfill around the OmniMax unit(s) to the level listed on the plan set.

Step 9a. Lay a level, 95% compacted bed of ≤3/4in (19mm) aggregate, pea gravel, or approved granule for inlet and outlet piping.

Step 9b. Backfill in 12in (300mm) lifts.

Step 9c. Use a mechanical compactor to compact each lift.

If necessary, moisten the backfill material with water to help compaction.

Key Points

- Don't alter the slope of lines or damage the lines during backfilling.
- Do not use native material to backfill if it is very soft or highly expansive clay or if it contains debris, large >3/4in (19mm) rocks, sharp rocks, peat, or muck. In these cases, use ≤3/4in (19mm) crushed stone, washed and free of debris, as fill material.
  - In noncohesive soils with high seasonal water tables, use ≤3/4in (19mm) crushed rock as the backfill material.
  - Do not backfill with sand.
- Be sure that the final grade slopes away from the unit(s).

Step 10. Connect Control Panel

Notes

- *Installation instructions, schematics, and panel-specific wiring diagrams are included with each Orenco control panel. If any of these are missing, contact your dealer for a replacement.*
- *Follow the panel manufacturer's instructions and schematics if you are not using an Orenco control panel.*

Key Points

- This step should be performed by a licensed, qualified electrician.
- Follow all applicable regulations and electric codes.
- Use waterproof wire connectors to prevent electrical issues.
- Seal the conduit at the control panel and at the splice box with UL-listed sealing foam, putty, silicone sealant, or an Orenco seal kit.

Step 10a. Turn off power to the control panel.

Step 10b. Route and install electrical conduit between the unit(s), air supply, and the control panel.

Step 10c. Route all necessary electrical wires or cables between the unit(s), the air supply, and the control panel.

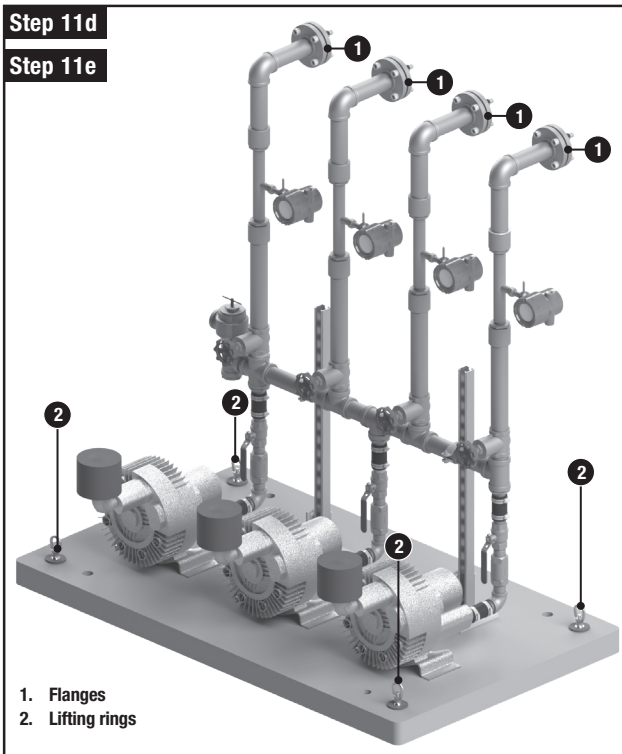
Step 10d. Make all electrical connections between the unit(s), the air supply, and control panel, as shown in the system's wiring diagram.

Step 10e. Restore power to the control panel.

Installation Steps

Step 11d

Step 11e



1. Flanges
2. Lifting rings

Typical three-blower skid assembly system

Step 11. Install Blower Skid (OmniMax-A)

Step 11a. Inspect the blower skid assembly for any damage.

Step 11b. Review the site plans for placement of the blower skid and installation of all associated plumbing/electrical requirements.

Step 11c. Prepare the area within the controls building for placement of the blower skid, according to the plan set.

- Be sure to allow for service space around the skid for servicing of the blowers and equipment.

Step 11d. Remove the 2in stainless steel flanges from the blower outlet piping and set them aside.

Step 11e. Lift the skid by the lifting rings or with forks from the bottom.

IMPORTANT — **Be sure to use appropriate lifting equipment! The skid could weigh over 600lbs (272kg). If the weight is unknown, contact Orenco.**

Step 11f. Move the skid into the appropriate position and orientation.

- While positioning, you may need to simultaneously run the air piping through the control building wall as you maneuver the skid.

Step 11g. Secure the skid to the floor if required.

- See the plans to confirm if the skid is secured or not.

Step 11h. Install any sealing devices for the wall penetrations for the 2in stainless steel blower outlet piping from the skid.

Step 11i. Reinstall the flanges onto the threaded blower pipe ends.

IMPORTANT — **For the flange gaskets, only use high temperature style gaskets rated for ≤200°F (93°C).**

Key Point — Orenco recommends using an anti-seize compound on stainless steel threads.

Step 11j. Connect the piping from the blower outlet to the unit(s).

Step 11k. Determine the incoming voltage from the variable-frequency drive (VFD) in the control panel.

- OmniMax-A blowers can operate on either 240V or 480V 3-phase.

Step 11l. Connect the wiring to the blower motors. The back of the junction box cover on the blower has a wiring schematic based on the voltage to the blower motor. Configure the wiring appropriately.

Installation Steps

Step 11. Install Blower Skid (OmniMax-A), cont.

Step 11m. Connect wiring to each of the electric flow meters on the blower skid to the appropriate terminals in the control panel.

- Some systems may require 4-20mA signal wiring from each flow meter as well.
- Refer to the control panel wiring diagram and site plans for more information.

Step 11n. Verify that the blower skid works by powering it on, observing its function, and powering it back off.

- Verify that each blower is operational.

Step 12. Install Blower (OmniMax-D)

Step 12a. Prepare the area within the controls building for placement of the blower, according to the plan set.

- Be sure to allow for service space around the blower.

Step 12b. Remove the 1.25in (32mm) stainless steel flanges from the blower outlet piping and set them aside.

Step 12c. Position the blower in the correct orientation while running the 1.25in (32mm) blower outlet piping through the control building wall.

- You may need to maneuver the piping while positioning the blower.

Step 12d. Secure the blower to the floor (refer to the plans).

Step 12e. Seal the wall penetrations around the piping.

Step 12f. Install a 1.25in (32mm) PVC receiving adapter onto the threaded ends of the blower piping.

- Orenco recommends using anti-seize compound on the threads.

Step 12g. Connect the piping from the blower outlet to the unit.

Step 12h. Determine the incoming voltage in the control panel.

- The OmniMax-D blowers can operate on 120V and 240V for single-phase, and 240V or 480V for three-phase.

Step 12i. Connect the wiring to the blower motors. The back of the blower's junction box cover has a schematic for how to wire depending on the voltage to the blower motor. Configure the wiring appropriately.

- Refer to the control panel wiring diagram, the engineer's plans, and the documentation provided by the blower manufacturer for more information.

Step 12j. Verify that the blower works by powering it on, observing its function, and powering it back off.

Step 13. Install Any Additional Equipment

Review the site plans and install any remaining ventilation piping and/or other auxiliary piping/equipment.

Step 14. Refer to Start-Up Instructions

Perform the initial start-up steps while the electrician is on-site to correct any wiring issues. Refer to the applicable O&M manual for start-up instructions:

- *OmniMax-A Operation and Maintenance Instructions,* NIN-TRT-MBB-3
- *OmniMax-D Operation and Maintenance Instructions,* NIN-TRT-MBB-1