Installation, Operations & Maintenance Manual

Airlift Pumps

The FloMov dual injection airlift pump combines two common practices into one. Oxygenation of the water combined with lifting the water is accomplished using low pressure air. This results in 50-70 % less energy consumption than typical pumping systems.

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General Information:

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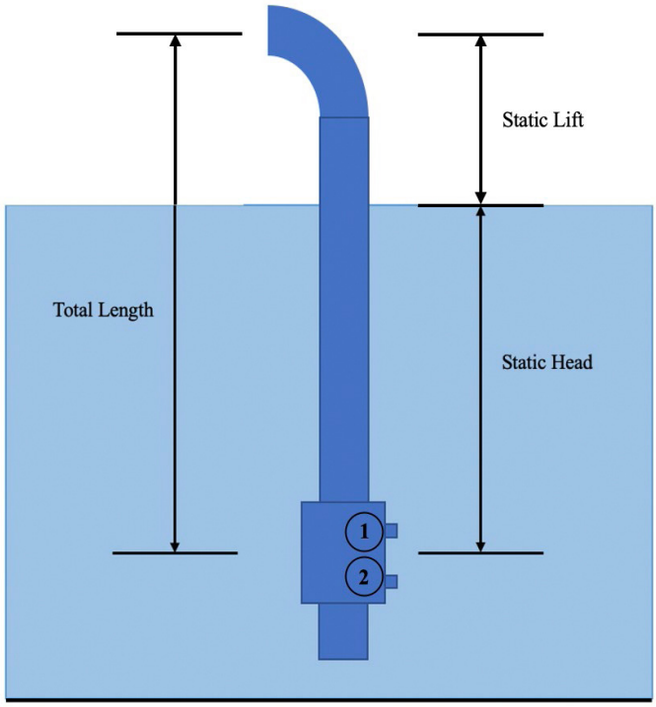
Key words:

Static Lift: Amount of distance from water level to top of discharge pipe

Static Head: Amount of distance that the airlift pump and discharge pipe is submerged in water

Submergence Ratio: Ratio between static head and total length of the airlift pump system (airlift pump + discharge pipe)



Installation

FloMov Pumps operate best at higher submergence ratios, it is not recommended to have a submergence ratio below 50%. Contact FloNergia for technical advice if you wish to use a submergence ratio below 50%. FloMov pumps need at least one pipe diameter of clearance between the bottom of the pump system and the bottom of the water filled tank.

Guidelines for integrating the airlift pump into your system

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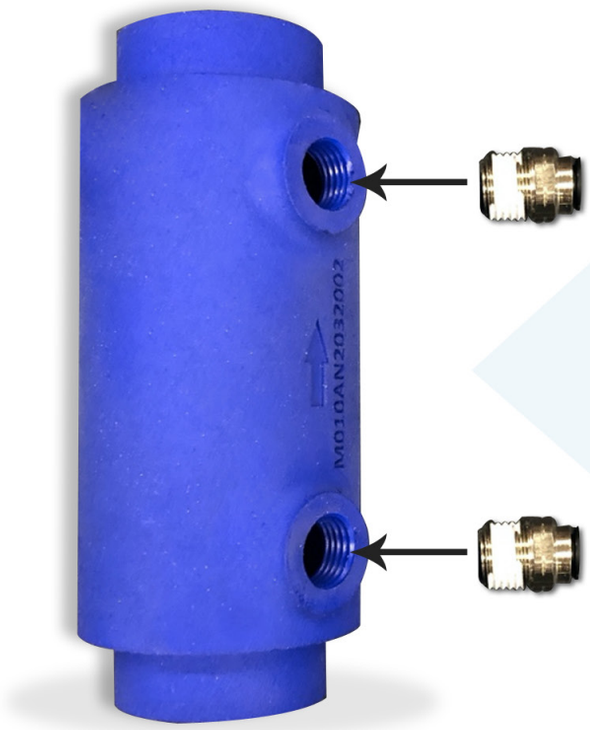
1. The airlift pump must be installed in the vertical position with the directional arrow on the pump body pointing towards the surface of the water.



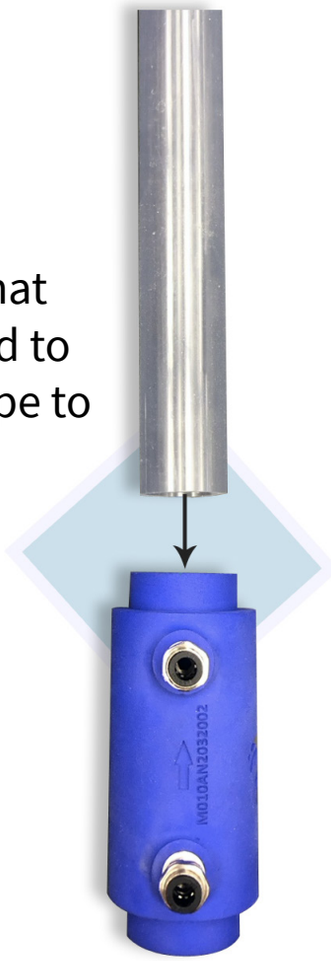
2. Install hose barbs for air source hose lines

3. Install discharge pipe to top side of the airlift pump

   a. Make sure length of pipe is in accordance to desired submergence ratio needed for the system

   b. We suggest that flexible couplings be used to facilitate removal for service

Option: Flexible coupling that can be used to connect pipe to pump



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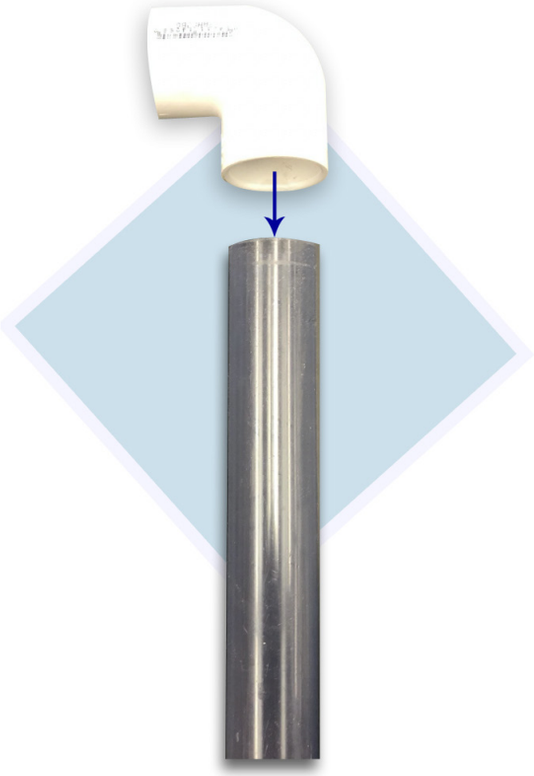
4. Install 90 degree elbow to top of discharge pipe

a. It is recommended to use a long radius elbow for the ½”, 1” and 2” pumps



Option: Flexible coupling that can be used to connect pipe to pump

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5. If needed install an intake pipe on the bottom of the pump

a. This does not affect submergence ratio

b. We suggest that flexible couplings be used to facilitate removal for service

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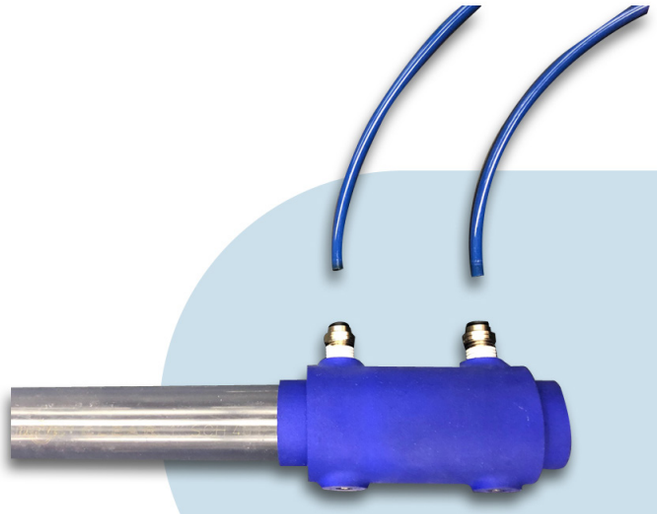
6. Install tubing from air supply system to each injection point of the pump

a. Connect to hose barbs installed in step 2

b. Option: Use valves or mass flow controllers to control air flow in tubes



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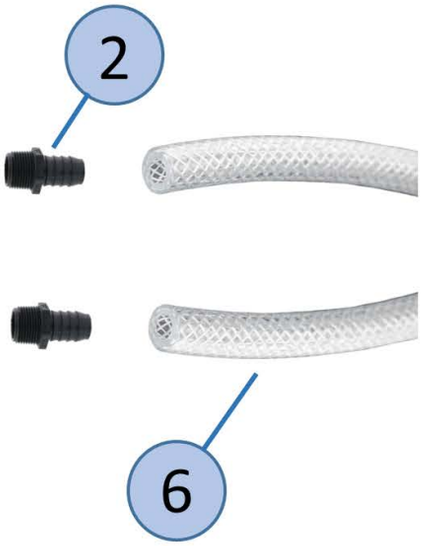
7. Place airlift pump system in position, either inside the tank, or outside the tank, as desired

a. Make sure airlift pump system is safely secure to pump support system or against the tank wall. Such that the pump cannot move or oscillate

b. Make sure pump is vertical upwards for best performance

Install larger pump sizes (4", 6" & 8") following previously outlined steps

7 Example of a 4" FloMov pump installed inside a tank using framing to secure the setup to the tank wall and prevent oscillation



Air supply

Use a Y splitter and valves to control the air flow and direct it between the 2 injection ports

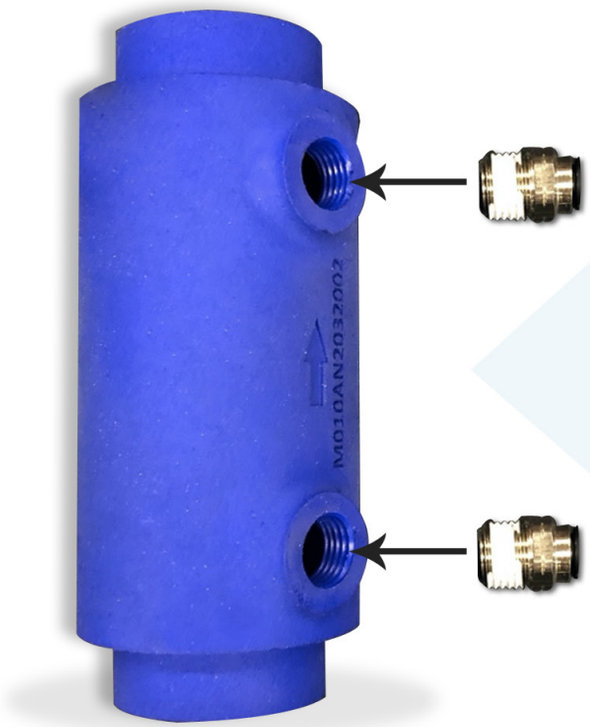
*The minimum airline diameter is 1 inch for 4-, 6-, and 8-inch pumps.

Operation

To operate the airlift pump, air will be injected into the pump through two injection points, as shown below:

1. Axial injection meant to enhance liquid pumping rate

2. Radial injection meant to enhance oxygen-ation in water



Each air injection line should have an inline valve to control the air flow rates into each section of the pump. General operational conditions for air distribution in airlift pump are listed in the following table:

Radial Injection	Axial Injection	Purpose
50 %	50 %	For distribution of gas injection for both lifting and oxygenation
25 %	75 %	For higher liquid lifting while still oxygenating the water at a lower rate
75 %	25 %	For high oxygenation needed with minimum lifting needed

It should be noted that the table represents general settings used based on desired operation of the pump. However, the conditions may be altered to suit application.

Maintenance

The table below highlights the suggested service guide to trouble shoot performance issues:

Trouble	Purpose
Airlift pump blockage	• Close valves on gas injection lines. • Drain the system of water if possible • Turn on air compressor system and open the valves such that the pressurized air flowing through the pump will remove any blockage
Biomass build up	• Remove pump from system • Flush pump with chlorine or other suitable cleaner to remove biomass build up
Insufficient submergence pipe	• Turn airlift pump system off • Check static water levels • Add or remove water to attain desired submergence ratio
Insufficient air flow to pump	• Check for pressure build up in air injection lines • Check that air supply system is working at full capacity

If any other problems continue to exist, please contact Joshua.rosettani@flonergia.com

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