

Proper Ventilation for the Air Pump

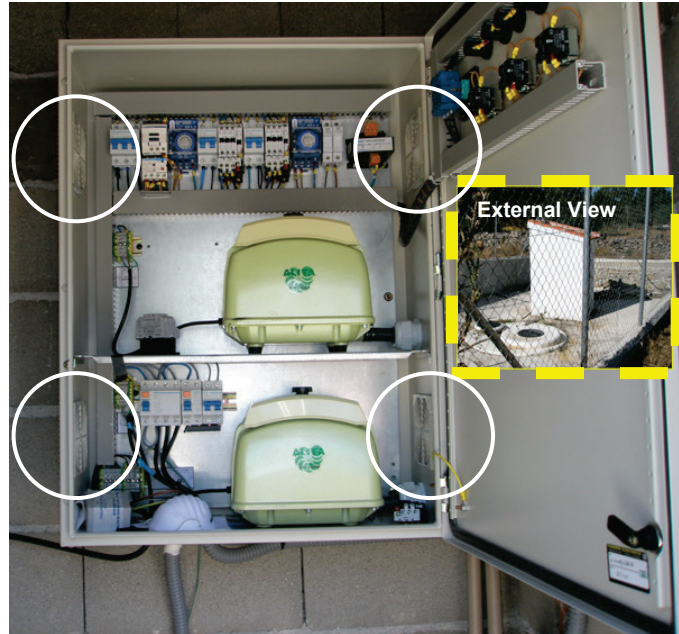
Air compressors can produce large amount of heat during continuous operation. If rate of heat dissipation is significantly slower than rate of heat production, the durability and reliability of the compressor can suffer due to long term thermal stress. Therefore proper cooling technique becomes ever more important for higher capacity pumps. For linear air pumps, high rate of air circulation around the pump housing can help reduce the thermal stress on the internal pumping diaphragms, and more importantly extending the diaphragm service life.

Following example demonstrates a poorly ventilated system that resulted in premature diaphragm failure and a lengthy system down time.

Photo on the right shows two model AL-200 linear air pumps (each produce ~7.4 CFM @ 3 psi) are installed in a wall mounted electrical box in a standalone outdoor structure. No ventilation fan is installed on any of the four vents on two sides of the electrical box. When this panel door is closed, there is only inward air movement produce by the two pumps.

With the door closed, the weather proof outdoor structure lacks any significant openings or source of ventilation that promote air circulation through the structure.

The two air pumps in this box within a box environment ran very hot 24/7, their diaphragms failed in less than a year.



Thermal stress will reduce diaphragm service life dramatically. By installing ventilation fans to pull air across the pumps and out of the enclosure, the diaphragm durability and pump reliability will be greatly improved for the above installation.

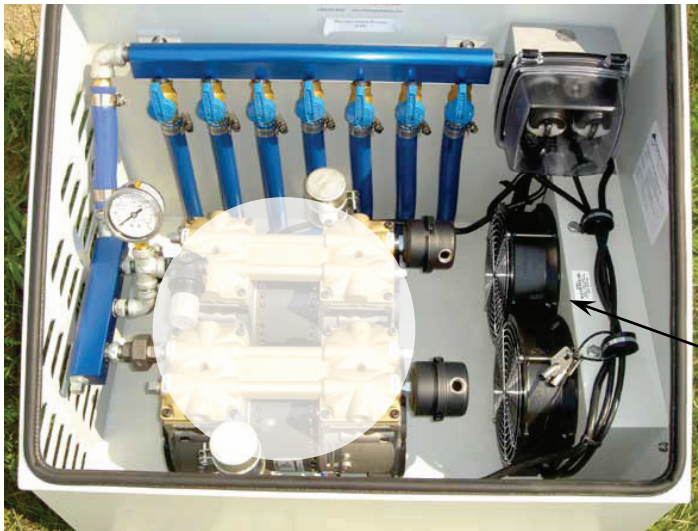
Forced Ventilation is the best way to achieve rapid heat dissipation.



The system shown on the left offers a good example on forced ventilation.

The rotary air compressor (2.3 CFM @ 5 psi) inside the metal enclosure is designed to be cooled by the 140 CFM capacity fan mounted on the right as it draws the air out of the box continuously.

Ventilation Fan



Here a large outdoor weatherproof enclosure is housing two (2) units of rotary air compressors. Two (2) cooling fans total 580 CFM in capacity are installed to guard against excessive compressor operating temperatures.

Ventilation Fans

“An ounce of prevention is worth a pound of cure.” - Benjamin Franklin

Proper ventilation can extend the diaphragm and pump service life significantly; the difference can be in years. The ventilation fan and its power usage are only a fraction of the cost compare to replacement diaphragm modules, magnetic bar or the entire pump.

In addition, periodic diaphragm module replacement help reduces the risk of extended down time and lowers the probability of additional parts damage. Diaphragm service life varies with application and operating conditions, it can be under a year (~9,000 hrs) for high stress loads or over 6 years (50,000+ hours) for light to medium pressure loads. Replace diaphragm modules every 2, 3 or 4 years depending on work load and pump setup. Mandatory yearly replacement is suggested for mission critical applications where 100% up time is imperative.

For better durability and reliability, follow the suggestions below when installing the air pump:

1. Reduce Pressure Stresses

- Use hose and fittings with large inside diameters. Deploy ample of air diffusers and bleed off any excess air flow. Periodically clean or replace old clogged air diffusers and valves. Avoid using air diffusers with high air resistance properties.
- Keep continuous operating pressure under 25 kPa (3.6 PSI). Pressure load exceeds 30 kPa (4.3 PSI) place higher pressure and thermal stresses on pumping diaphragms, hence reducing their durability.

2. Reduce Thermal Stresses

- Shade pump against continuous sunshine. When placed under some form of protective structure, have at least two (2) sides of the structure fully opened to allow natural air circulation.
- APPLY FORCED VENTILATION when install pump under an enclosure, outdoor shed, pump house, below ground or at any indoor locations.
NOTE: Temperature controlled room do not necessarily equate to sufficient air movement around the pump.

3. Remove all sources of gasoline, grease or oil near the vicinity of the air pump.