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# Auxiliary Air System for Use in Laboratory Emergencies

Electrically operated systems that provide aeration to water holding aquatic animals are dependent on a constant power supply. Power failures are unpredictable, and although they are usually of short duration, stress or mortality of many aquatic animals can occur within a few minutes.

An emergency air system was developed at the National Marine Fisheries Service Aquaculture Research Station near Manchester, Washington, to provide aeration to the laboratory's holding facility in the event of an electric power failure. The system employs a SCUBA air station consisting of a SCUBA compressor and four air cylinders, each rated 8.5 m³ at 168.74 kg/cm². The air station is connected to the laboratory's main air supply by two 110-V solenoid valves and a high-pressure regulator (Fig. 1). The regulator should be installed in a warm location to prevent freezing when air is released from the cylinders.

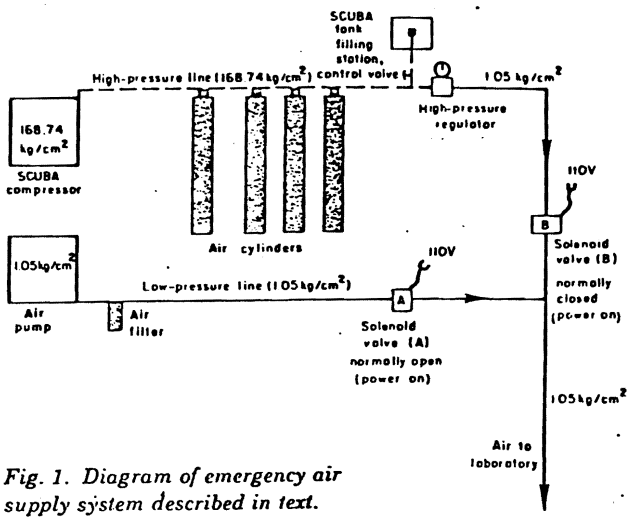


*Fig. 1. Diagram of emergency air supply system described in text.*

During normal operation (electrical power on), the laboratory's electric rotary vane pump supplies air to the laboratory at 1.06 kg/cm² through a low-pressure line. Air leaving the pump flows through a filter and a 110-V solenoid valve (valve A in Fig. 1, Ross[1] model 2772 A 4011). The second solenoid valve (valve B, Ross model 2771 A 4011) prevents flow from the compressed air cylinders into the laboratory air line.

When a power failure occurs, valve A closes and valve B opens. Air flows from the four cylinders through the high-pressure line to a regulator where the pressure is reduced to about 1.05 kg/cm² before it enters valve B. Effective operating time of the emergency system is about 2.5 h at a flow rate of 0.20 m³ of air per minute.

When power is restored, valve A opens and valve B closes, stopping flow from the emergency system and allowing air to resume flow from the electric pump. The SCUBA compressor, which is controlled by a pressure valve, automatically starts and refills the cylinders to 168.74 kg/cm².

This system provides the advantages of: (1) a reliable emergency air supply to a small laboratory; (2) additional use for a SCUBA compressor and compressed air station; (3) low cost (in 1976, about $155.00 for two solenoid valves and a pressure regulator to connect the two systems); (4) total automation; and (5) operability in areas where internal combustion engines are not practical.

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[1] Reference to trade names does not imply endorsement by the National Marine Fisheries Service.

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