

# NASA TECH BRIEF

*Ames Research Center*

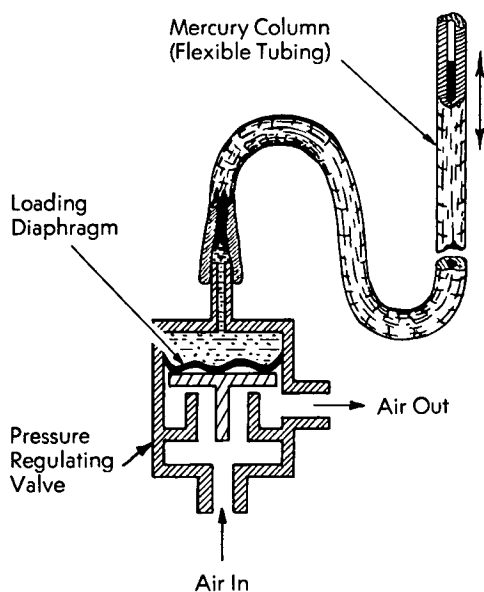


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## Programmed-Pressure Air Supply for Positive-Pressure Breathing System

### The problem:

To control the air supplied to an open-loop, positive-pressure breathing system so that repetitive pressure-time profiles can be obtained during every insufflation-exhaust cycle.



### The solution:

A motor-driven cam which varies the height of a mercury column connected to the loading diaphragm of a pressure-regulating valve.

### How it's done:

Air at positive pressure (up to 100 mm) is supplied by a small carbon-vane compressor to subjects wearing helmets and torso bladders; the pressure in

the system is controlled by a backloaded needle valve, and the entire system also includes a secondary safety relief valve, filters, and mufflers. The helmet effluent is routed to the backloaded regulating valve, which establishes the breathing-system pressure; the loading on the valve is determined by the height of a mercury column which is varied cyclically by an aluminum cam that raises or lowers the column of mercury contained in a flexible tube. Gears driven by a synchronous motor are coupled to the cam so that it rotates once every 30 minutes.

Breathing pressure can be readily varied by the cam, usually from 25 to 100 mm Hg; a portion of the cam is equipped with an adjustable segment which permits lowering of the normal cam profile so that it is possible to start the breathing pressure cycle below 15 mm. After the cycle is started, the cam segment is locked in the normal operating position. Cams can be shaped and sized to provide nearly any pressure profile.

The pressure control system permits considerable selectivity in the treatment of pressure programs; for example, a single constant-pressure level between 15 and 100 mm Hg can be obtained simply by turning off the cam drive motor at the appropriate time. Moreover, the level of the selected pressure profile can be increased or decreased by changing the level of the backloading valve relative to the cam.

### Notes:

Requests for further information may be directed to:

Technology Utilization Officer  
Ames Research Center  
Moffett Field, California 94035  
Reference: TSP 74-10075

(continued overleaf)

**Patent status:**

NASA has decided not to apply for a patent.

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