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# NASA TECH BRIEF



## Multiple Port Pressure Scanner Valve Features Greater Accuracy, Quicker Data

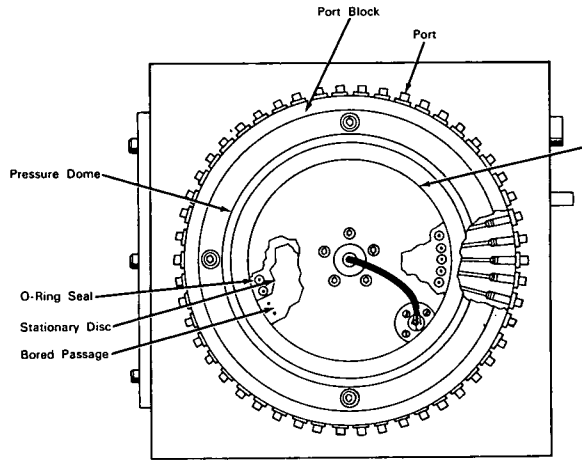


FIGURE 1

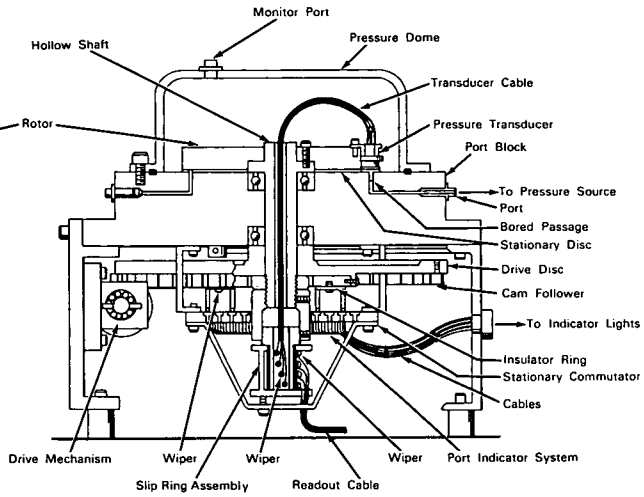


FIGURE 2

**The problem:** Fast, accurate measurement of many pressures and quick reduction of the recorded data.
**The solution:** A multiple port pressure scanning valve that successively connects a pressure transducer to many pressures and gives a quick readout for rapid data reduction.
**How it's done:** A multipressure measuring system is designed around an electronic manometer with a range of zero to 300 centimeters of mercury absolute, and an accuracy of ±0.005 mm of mercury measured at 0.20 mm of mercury.

A stationary cylindrical pressure port block is fitted with multiple ports around its periphery. Four of these ports are connected to "standards" for random leak checking; a fifth is connected to a hard vacuum source used for system checking, and the balance are available for measuring pressures within the range of the transducer. The port block has axially bored passages intersecting each of the ports and opening on the face of the port block. A stationary disc, immediately above the port block, is punched and fitted with O-ring seals that index with the passages. A rotor mounting a pressure transducer is attached to a hollow shaft in a plane immediately above the stationary disc. The transducer is electrically connected by a cable feeding down through the bore of the shaft. A drive disc is attached to the shaft and includes a set of cam followers around the periphery of its underside. The cam followers are engaged by the worm-type gear of a drive mechanism mounted at right angles.

An insulator ring with two pairs of wipers is mounted to the underside of the drive disc. As the assembly revolves, the wipers contact a stationary commutator—part of a port indicator system. Cables

(continued overleaf)

lead to an external array of indicator lights that show which of the ports is being sampled.

The lower end of the hollow shaft mounts a slip ring assembly that is in contact internally with a set of transducer lead wipers and externally with a set of wipers connected to a readout cable. As the revolving members rotate, the transducer samples each connected pressure in turn, and the readout may be used in any manner the user prefers. The output of the subject model is used to record 99 channels of pressure data on punched paper tape in about 30 seconds. The tape is then used as input to a computer for final data reduction. The time used for data acquisition, tabulation, and reduction is thus reduced from several days to a matter of minutes. Additionally, systematic and random errors of previous methods are eliminated.

Leak testing and efficiency checking of the multiport valve is quickly accomplished using a monitor port in a pressure dome in conjunction with readings from the four ports connected to "standards" and the one connected to a hard vacuum. A comparison of the hard vacuum reading and a "standard" reading with dome pressure reveals any leaks.

**Notes:**

1. This device could be used to monitor pressure drop and flow rates in large industrial filter installations.
2. Numerous critical pressure points in chemical or pharmaceutical processing plants could be monitored at a central point and continuous records maintained.
3. Inquiries concerning this invention may be directed to:

   Technology Utilization Officer
   Jet Propulsion Laboratory
   4800 Oak Grove Drive
   Pasadena, California, 91103
   Reference: B64-10031

**Patent status:** NASA encourages the immediate commercial use of this invention. It is owned by NASA and inquiries about obtaining royalty-free rights for its commercial use may be made to NASA Headquarters, Washington, D.C., 20546.

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