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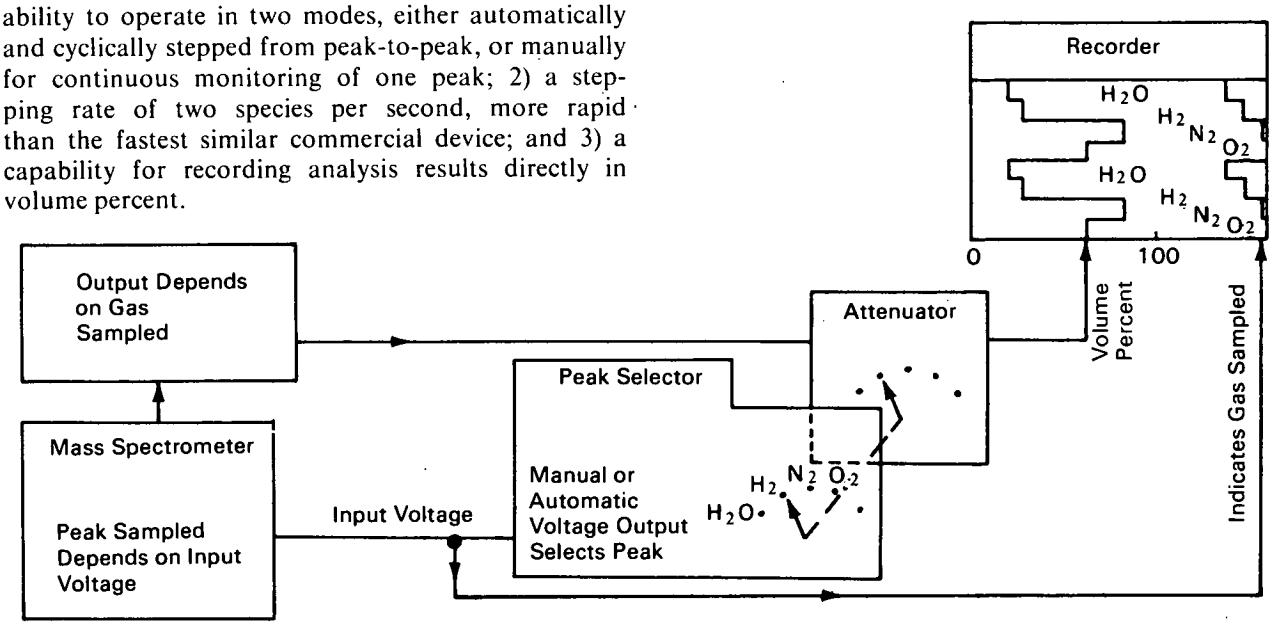
NASA TECH BRIEF

Langley Research Center

Fast Peak Selector for Mass Spectrometer

A new analytical tool can rapidly determine the quantities of up to six preselected molecular species in a gaseous sample. Its novel features include: 1) an ability to operate in two modes, either automatically and cyclically stepped from peak-to-peak, or manually for continuous monitoring of one peak; 2) a stepping rate of two species per second, more rapid than the fastest similar commercial device; and 3) a capability for recording analysis results directly in volume percent.



System Diagram

The six-channel peak selector, which operates by varying the control voltage for the mass spectrometer, replaces the mass-selector control, the mass-range control, and the multiplier unit of earlier systems. Each channel includes circuitry for determining the control voltage supplied to the spectrometer, attenuating the spectrometer output, and providing a channel identification signal to the output recorder. The peak selector also includes circuitry for selecting either automatic or manual operation and, in the automatic mode, for stepping from channel-to-channel at a rate of two steps per second (a rate of four per second is probably attainable). In the manual mode, any of the six channels may be selected for continuous monitoring.

To enable the output of the mass spectrometer to be calibrated directly in volume percent, the input gas pressure must be kept constant. This is accomplished as follows: The output from the sample collection probe, with a pressure ranging from about 135.7 kN/m^2 to 2064.9 kN/m^2 (5 to 285 psig), is fed through 9.0 m (30 feet) of 0.003 m (0.120-in.) I.D. tubing to a 121.9 kN/m^2 (3-psig) relief valve. Gas not released by the valve flows through a selector box to a 2047.8 kN/M^2 (15-psig) relief valve. Again, gas not released by the valve flows through a capillary to the gold leak input of the

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mass spectrometer. For calibrated readout, pressure at the gold leak must remain constant at 332.5 N/m^2 (2.5 mm Hg). Any deviation from this pressure is indicated on a null meter, and must be corrected by manually adjusting a valve between the gold leak and the mechanical bypass pump.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
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Reference: TSP71-10009

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to:

Patent Counsel
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Source: G.M. Sawyer and R.M. Pasko of
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