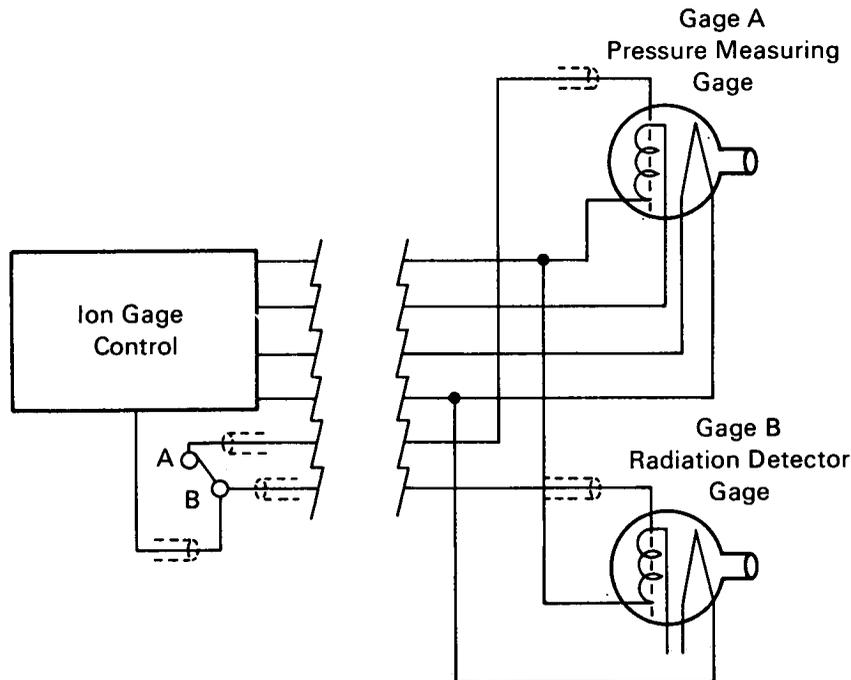


# NASA TECH BRIEF



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## Vacuum Gage System for Radiation Environment



### The problem:

Hot-cathode ionization gages (or ion gages) used to measure high-vacuum pressures are subject to error when ionizing radiation is present. These gages use electrons emitted from a hot filament to ionize the gases present in the vacuum system. The ions are collected and the ratio of ion current-to-electron current is used as a measure of the system pressure.

If another ionizing source (the radiation environment) is present, additional ions will be created. These additional ions will be collected along with the regular ion current, and the pressure indication will be in error.

### The solution:

A second ion gage is mounted near the pressure-measuring gage to detect and measure the radiation induced error.

### How it's done:

Two ionization gages are so mounted that they sense identical environments of pressure and radiation. Gage A (the pressure measuring gage) is wired in the conventional manner. The grid and filament of gage B (the detector gage) are connected to the grid and filament of gage A. Only one filament lead from gage B is connected so that the filament is not heated. The ion-collector leads are connected to the control unit

(continued overleaf)

through a switch so that the ion current from either gage may be measured.

Gage A and the control unit continue to function in the normal manner. The collector-lead switch can then be used periodically to determine the radiation-induced error. The output of gage B will also be in pressure units, so that the error from gage B can be directly subtracted from the output of gage A.

**Notes:**

1. No further documentation is available.
2. Technical questions may be directed to:

Technology Utilization Officer  
Lewis Research Center  
21000 Brookpark Road  
Cleveland, Ohio 44135  
Reference: B69-10156

**Patent status:**

No patent action is contemplated by NASA.

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