Brief 66-10270

NASA TECH BRIEF



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Magnetically Operated Limit Switch Has Improved Reliability, Minimizes Arcing



The problem:

To design a reliable, low travel, snap action limit switch that operates with negligible arcing. Most conventional low travel limit switches use a currentcarrying spring and a plunger which requires considerable actuating and holding forces. These switches arc excessively on make and break, and tend to be unreliable because they consist of a relatively large number of parts.

The solution:

A limit switch that employs an electrically nonconductive permanent magnet consisting of a ferrimagnetic ceramic and ferromagnetic pole shoes that form a magnetic and electrically conductive circuit with a ferrous metal armature.

How it's done:

The electrically conductive pole shoes are mounted with rivets on opposite pole faces of the ferrimagnetic, electrically nonconductive ceramic. Terminal screws connect an external electrical monitoring circuit to the pole shoes. The electrically conductive armature is arranged to face the ends of the pole shoes. A movement differential required for snap action is provided by the space between the armature and the

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This document was prepared under the sponsorship of the National Aeronautics and Space Administration. Neither the United States Government nor any person acting on behalf of the United States Government assumes any liability resulting from the use of the information contained in this document, or warrants that such use will be free from privately owned rights. actuating plunger, which is connected to the device to be monitored.

In operation, the armature will be rapidly attracted to the pole shoes somewhat ahead of the plunger, thereby closing the external electrical circuit. The electrical circuit is broken rapidly, shortly after the start of the downward movement of the plunger. These rapid make and break actions suppress arcing, thereby minimizing contact erosion. Because the current is interrupted within a magnetic field, arcs will also be extinguished by the well-known blowout action.

Note:

Inquiries concerning this invention may be directed to:

Technology Utilization Officer Manned Spacecraft Center Houston, Texas, 77058 Reference: B66-10270

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C., 20546.

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