NASA TECH BRIEF

Motor Brush Wear Measured with Strain Gages

A strain gage transducer has been applied to monitor brush wear in sealed electric motors which use a leaf-type brush support spring. Formerly it was necessary to disassemble the motors and measure the brushes mechanically.

In this application, two strain gages are installed, one on each side of the spring. The gages are connected to form two adjacent arms of a balanced bridge circuit. Two temperature-compensated precision resistors mounted on the motor case form the other two arms. When the bridge is supplied with low-voltage dc and connected to a suitable readout device, such as a microvoltmeter or oscilloscope, measurement of the amount of brush material remaining, the rate of brush wear, the armature runout and the brush signature is possible.

The following steps are taken to prevent the calibration of the gages from changing during operation. The gages are bonded to the spring with high-temperature cement, which is then cured for 24 hours at 250°F and 20 psig. Following the cure, the temperature is cycled between room temperature and a level 25% above that encountered by the brush during normal operation to eliminate cement creep, the most common source of calibration shift. Cycling is continued until the installation shows no change in output over the entire temperature range. The output voltage is then calibrated with respect to brush displacement, and the unit is ready for use.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Code 207.1
Greenbelt, Maryland 20771
Reference: B70-10266

Patent status:

No patent action is contemplated by NASA.

Source: W. T. Farrell and C. R. Peek of
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