NEW LIMITATION CHANGE

TO
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AUTHORITY

SAMSO USAF ltr, 28 Feb 1972
OBJECT

To examine the effect of temperature variations, acceleration, vibration, and shock upon the performance of the specimen vibrator.

SPECIMEN

Two Cornell-Dubilier 5622-8 vibrators.

APPARATUS

1. Benco Portable Temperature Chamber
2. Gemisco Centrifuge
3. Galileo Model 111 Shaker
4. Glemite Ballistic Pendulum
5. Appropriate power supply and monitoring oscilloscope

PROCEDURE

The vibrator was wired as per Figure 1, page 4. The following test conditions were imposed on the specimen vibrators:
1. Temperature: -20°C, 0°C, +20°C, +40°C, +60°C, +75°C

2. Acceleration: Six directions, (see Figure 2, Page 2) up to the centrifuge maximum of about 105 "G", then down to standstill.

3. Vibration: Three planes, 20 to 2000 ops, at 10 "G".

4. Shock: Three 100 "G" impacts in each of six directions.

The vibrator output was monitored with an oscilloscope.

RESULTS

1. No significant change was observed in the output square wave of Vibrator No. 1 throughout the temperature test.

2. Vibrator No. 1 gave the following results under acceleration:

<table>
<thead>
<tr>
<th>Table I</th>
<th>Acceleration Test Data</th>
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<tbody>
<tr>
<td>DIRECTION</td>
<td>DISTORTION OF OUTPUT SQUARE WAVE BEGINS AT:</td>
</tr>
<tr>
<td>1</td>
<td>25 G</td>
</tr>
<tr>
<td>2</td>
<td>73 G</td>
</tr>
<tr>
<td>3</td>
<td>NONE</td>
</tr>
<tr>
<td>4</td>
<td>49 G</td>
</tr>
<tr>
<td>5</td>
<td>16 G</td>
</tr>
<tr>
<td>6</td>
<td>21 G</td>
</tr>
</tbody>
</table>

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3. Vibrator No. 1 became inoperative shortly after vibration tests began in plane 3-4 (Ref. Figure 2). Specimen No. 2 was installed. The vibration testing appeared to have small effect on its output square wave, except for a slight pulsation of the entire wave form at about 40 cps in planes 3-4 and 5-6.

4. Under shock testing, Vibrator No. 2 output remained relatively unaffected.

CONCLUSIONS

Unit No. 1 was cut open for inspection, revealing that the moving contacts had fouled against a portion of the vibrator's structure during vibration and became jammed there. No physical damage had occurred.

Barring the possibility of such jamming of its mechanical components, the vibrator appears to give fairly constant square wave output under the above environments, except under acceleration in certain directions. A possible deterrent to acceptance of this unit for certain applications may be the inadequacy of the actual wave form generated.
FIG. 1. WIRING DIAGRAM

Arrows indicate direction of acceleration; reaction force is opposite.

FIG. 2. TEST ORIENTATION