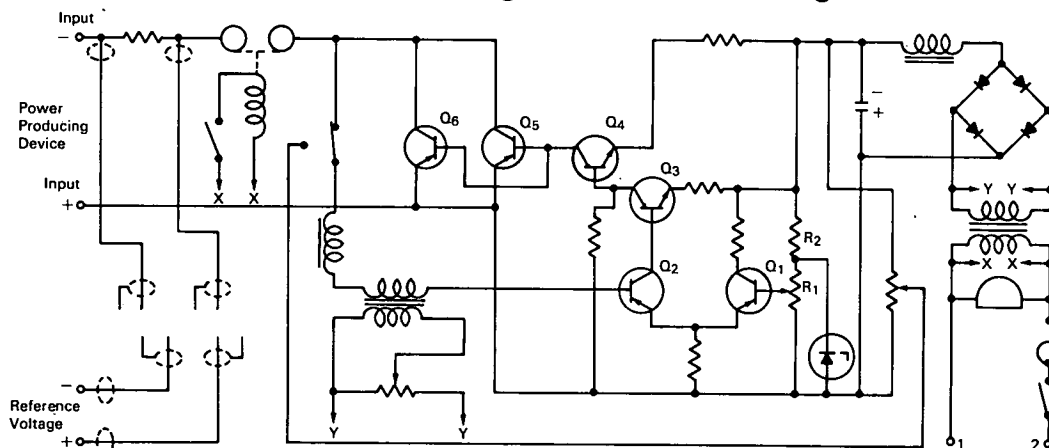


NASA TECH BRIEF



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Electronic Load for Testing Power Generating Devices



A test instrument has been devised for life test of various electric power generating devices such as thermionic energy conversion devices, thermoelectric generators, etc. The devices are connected to the input of the load and their outputs compared with a reference voltage. The load automatically adjusts until the voltage output of the power generating device matches the reference voltage. The load circuitry provides constant current or constant voltage loads as desired and may be operated to sweep between open circuit and saturation conditions at a 60 cps rate.

One embodiment of the load is illustrated and operates as described below.

The power producing device to be tested is connected across the power switching transistors Q5 and Q6 with the indicated polarities. The type and number of transistors (in parallel with Q5 and Q6) is determined by the power producing device to be tested. Q4 drives the power switching transistors Q5 and Q6. Q1 and Q2 form a differential amplifier. A reference voltage that may be adjusted by R1 will maintain a constant voltage across R2.

In the constant voltage operation, the voltage of the power producing device is sensed across the switching transistor and compared at Q2 to the reference voltage. If the voltage of the power producing device is higher than the selected reference voltage, Q2 will drive Q3 into conduction. This, in turn, will drive the drive transistor Q4 until the voltage across the current switching transistors Q5 and Q6 approaches the selected reference voltage. Q3 and Q4 will provide sufficient drive to maintain this voltage at a constant level. Due to the high gains of the differential amplifier (Q1 and Q2) this arrangement will maintain a constant voltage across the input terminals over a wide range of currents.

In the constant current mode, the voltage sensing loop is disconnected from the input terminal and is switched across an adjustable voltage divider. A constant driving current can now be selected which will be maintained independent of the input voltage. To obtain a dynamic output performance of the device under test, the current switching transistor is alternately switched from open to saturation condition.

(continued overleaf)

This is done at a 60 cps rate and the amplitude is adjusted by means of a potentiometer. A choke, placed in the base circuit of Q₂, prevents the load from oscillating.

Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
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Pasadena, California 91103
Reference: B68-10203

Patent status:

No patent action is contemplated by NASA.

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