PART III TECHNICAL INFORMATION

The circuit of the electronic null detector involves three functions: conversion of the d-c input signal to a-c, amplification of the a-c signal, and conversion of the amplified a-c signal to d-c.

An a-c amplifier is used because direct coupled d-c amplifiers are inherently subject to zero instability. The null detector must have an exceedingly stable zero.

5. INPUT CIRCUIT

The error signal input is applied across a three stage R-C filter circuit, which minimizes the effect of a-c interference developed across the input leads.

As shown in Fig. 3, alternate positions of the sensitivity switch short-circuit the detector input and open the external circuit. These are the zero check positions described in Section 2. The intermediate positions of this switch connect the external circuit across the input filter.

D-c to a-c conversion is accomplished by means of a contact-vibrator or chopper. This is, essentially, a single-pole double-throw switch, operated by the motion of a metal reed vibrating in response to a 50 or 60 cycle alternating magnetic field. The drive coil at the top of this unit is supplied with 50 or 60 cycle current from the power transformer. Therefore, the converter contacts operate in synchronism with the line frequency.

In Fig. 3 it can be seen that any input voltage is connected alternately to the two halves of the input transformer primary winding by the action of the converter. Thus, direct current

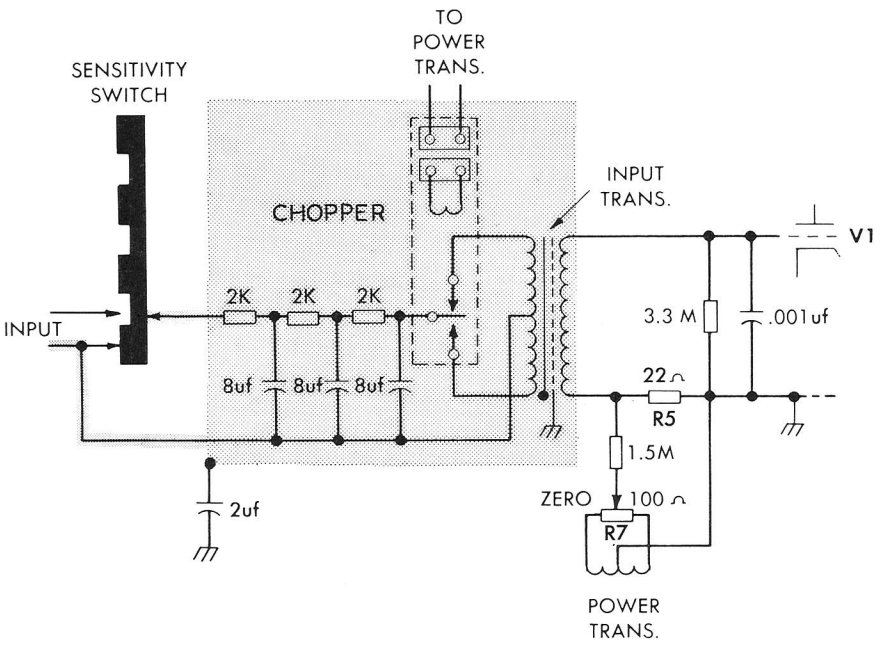

Fig. 3—The detector input circuit. The shaded areas identify guarded portions of the circuit.