

# A Constant Voltage Supply for a Pressure Transducer

JAMES E. BROCK, STEPHEN PURSLEY, M. G. DUNN, and  
ALAN CLAUSEN, Purdue University

Dry cells are the usual source of voltage for operating a pressure transducer of the strain gauge type. The voltage available from a dry cell decreases with use so some means of compensation is necessary in order to maintain a constant voltage to the transducer. The voltage supply described here maintains a constant output voltage over a relatively large range of current loads.

The circuit arrangement is shown in Fig. 1, and takes advantage of the regulating properties of a Zener diode. For this experiment a small isolating transformer was used with a 36 volt secondary.

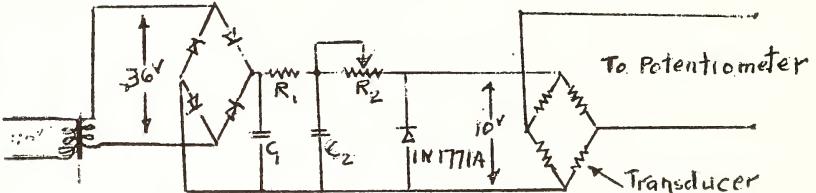


Fig. 1. Zener Reference Voltage Circuit for a Pressure Transducer.

The output from the transformer was rectified by a full wave dry plate rectifier of about 50 ma. capacity. Smoothing was secured with two 50 mfd condensers  $C_1$  and  $C_2$  and the 270 ohm series resistor  $R_1$ . The variable resistor  $R_2$ , in conjunction with the transducer load resistance of about 340 ohms, lowers the voltage to a point where the zener diode 1N1771A controls and maintains a constant 10 volt input to the transducer. The output from the transducer was measured with a potentiometer.

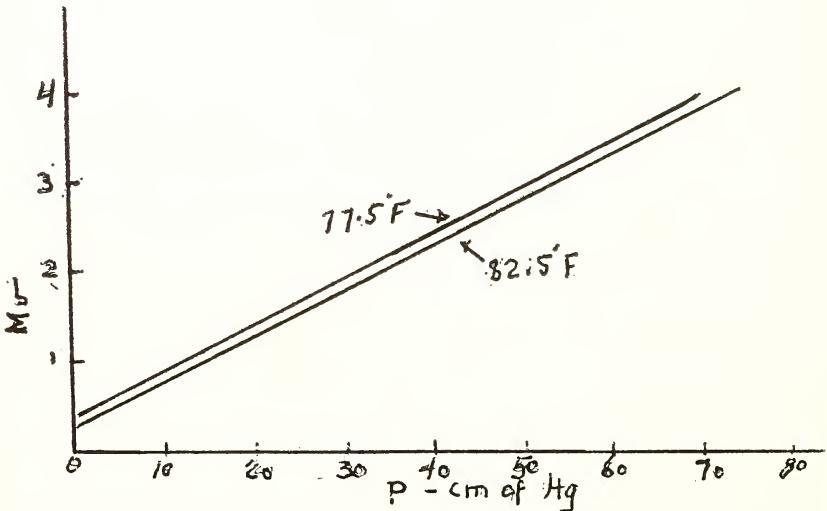


Fig. 2. Pressure vs. Millivolts curves for C. E. C. Type 4-326 Pressure Transducer at 77.5°F and 82.5°F

Two calibration curves for a Consolidated Electroynamics Corporation, type 4-326, pressure transducer made at different temperatures are shown in Fig. 2. The calibrating pressures to the transducer were supplied from a mercury in glass manometer.

The calibration was linear and the reproducibility depended on the accuracy of reading of the height of the mercury column in the manometer. There was no observable hysteresis effect.

The solid state devices used in the voltage supply network, and also the transducer, are temperature sensitive. Obviously, the system should be calibrated under conditions simulating closely those in which it is to be used.