A DEVICE PERMITTING THE USE OF SHOCK WITH CONTACT RELAYS¹

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The typical contact relay arrangement is activated by a lowering of the resistance between two contacts. It will not, however, work properly if a voltage is impressed across the contact so that the subject (S) receives a shock when contact is made.

The simple circuit shown in Fig. 1 allows a voltage to be impressed across the S and yet have the contact relay operate in its conventional manner. The specific apparatus was designed for use in a drinkometer situation where it was desired to both shock the consummatory response and record lap information, but the circuit could be used in any situation involving both shock and contact.

The basic operation of the circuit is quite simple. With the switch, (S1) in the shock position, current from the AC shock voltage source passes through S1 and through the full wave bridge rectifier, consisting of the four diodes, D1 through D4. This produces a DC signal across the emitter and base of the transistor which then causes the path through the collector and base of the transistor to become conductive. The contact relay sees this as a decrease in resistance and closes.

With S1 in the non-shock position, the shock source is disconnected. Provided S is in the circuit the current path is as follows: in at the positive (+) terminal through D1, through S, through the switch, and back out through the negative (-) terminal.

The purpose of the variable resistor (R1) is to control the amount of current passing

through the transistor and thus control the sensitivity of the contact relay while in the shock detecting function. The capacitor (C1) is optional. It may be needed to filter the signal going to the transistor. It may, however, cause the circuit to become sluggish if its value is too large.

The shock source may be DC of either polarity as well as AC. While the 2N398 was chosen because of its high voltage characteristics, it may be possible in many cases to use any general purpose light duty transistor.

The portion of the circuit labeled "contact relay" is a typical transistor contact relay. It should be noted that this contact relay will allow more current to pass through the S than is the case with contact relays employing thyatron tubes. The experimenter should check to make sure that this value, while low, is not greater than that desired for a specific application.

ALL DIODES = International Rectifier Corp. SD500
 C1 = 50 μ f, 50 volt electrolytic
 R1 = 100 K
 R2 = 500K
 S1 = SPDT switch
 T1 = see text
 B1 = 22 μ volts
 L1 = 10,000 ohm relay

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