

Teletype Corporation  
 Chicago, Illinois, U.S.A.

DESCRIPTION AND ADJUSTMENTS OF 33RY AND 34RY POLAR RELAYS

1. GENERAL

a. 33RY RELAY (Automatic Electric Co. #203) - This is a two-winding, two position, permanent magnet polar relay.

b. 34RY RELAY (Automatic Electric Co. #202) - This is a four-winding, two position, permanent magnet polar relay. Each winding on these relays terminate at a separate pair of pins on the base.

c. COIL CHARACTERISTICS

RELAY	WINDING	TOTAL NO. OF TURNS	D.C. RESISTANCE	A.C. (60 CY.) RESISTANCE	INDUCTANCE 60 CYCLES
33RY	2-7	3160	136 Ohms	150 Ohms	0.65 Henry
	3-6	3160	136 Ohms	150 Ohms	0.65 Henry
34RY	ⓓ-Ⓚ	2800	139 Ohms	155 Ohms	0.5 Henry
	D-U	2800	139 Ohms	155 Ohms	0.5 Henry
	A-A'	1400	101 Ohms	105 Ohms	0.125 Henry
	O-O'	1400	101 Ohms	105 Ohms	0.125 Henry

(During test of one winding, such as pins 3-6, no connection is made to the other windings unless it is part of the test).

d. TERMINAL MARKINGS

33RY

- 1- Tongue
- 4- Marking Contact
- 5- Spacing Contact
- 2 and 7 - Winding Terminals
- 3 and 6 - Winding Terminals

34RY

- S- Spacing Contact
- T- Tongue
- M- Marking Contact
- D- Down
- U- Up
- ⓓ- Down
- Ⓚ- Up
- O-O' Opposing Winding
- A-A' Accelerating Winding

NOTE-----

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#### e. BASE TERMINALS

(1) The 33RY Relay has eight pin-type terminals with four (two large and two small) mounting legs. (Figure 1). This terminal arrangement facilitates the use of the 33RY relay in circuits in which the 30RY relay is used, if an adequate capacitor-resistor spark suppressor is provided.

(2) The 34RY Relay has eleven banana type terminals (Figure 3) and requires an appropriate socket or jack that may be either flush or surface mounted.

f. CONTACTS - Both the 33RY and 34RY Relay are equipped with long life tungsten carbide contacts. These contacts have a higher contact resistance, particularly at low pressures, than other commonly used contact materials. Therefore, it is important that a relatively high contact pressure be maintained for most applications.

## 2. MAINTENANCE AND ADJUSTMENT

a. The factory adjustment of these relays should not be disturbed prior to placing the relay in service. However, after many months of operation, the relay characteristics may have shifted enough to jeopardize circuit performance. In normal maintenance, adjustment of the "Bias" and "Contact Gap" only will require attention. (Figures 1 and 3). These adjustments are made using a #8 Six Spline Short-Arm Socket-Screw Key or a #8 Six Spline Screwdriver Type Socket-Screw Key (Bristol Company, Waterbury 20, Connecticut) to adjust the set screws and clamping screws.

b. It is essential that a test set, if used, correctly measure pulses from tungsten-carbide contacts. Due to the higher and more variable contact resistance of tungsten carbide, a test set should meet the requirements set forth in Figure 2 in order to determine its suitability. Test sets designed for use with these relays are as follows:

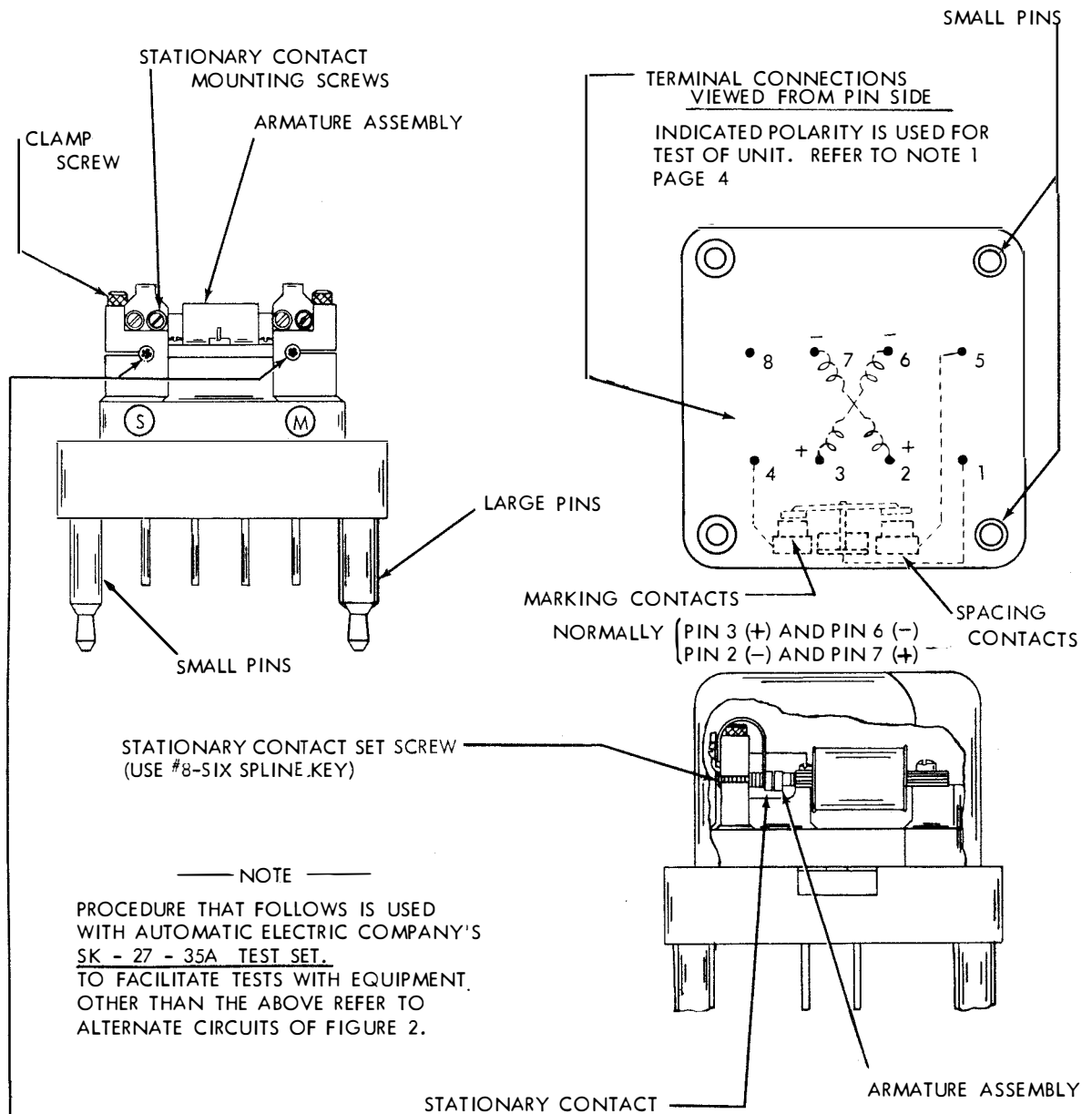
Automatic Electric Co. test set #SK-27-35A (similar to circuits in Figure 2) for use with 33RY relay.

Western Union Telegraph Co. test set #42-B (Figure 3) for use with 34RY relay.

When such facilities are not available, it is recommended that the 33RY and 34RY relays be tested in an actual operating circuit that includes an arc suppressor.

c. During maintenance, or sometimes after a polar relay has been placed in service, it may be desirable to move the armature from one contact to the other by hand. This should be done only by pressing on the appropriate contact at the end of the armature bar using an insulating (non-magnetic) object and never by force on the armature spring. Pressing on the spring, which is made of soft material, may introduce a bias.

CAUTION-----THE POSITION AND ALIGNMENT OF THE ARMATURE ASSEMBLY SHOULD NOT BE DISTURBED



NOTE  
PROCEDURE THAT FOLLOWS IS USED WITH AUTOMATIC ELECTRIC COMPANY'S SK - 27 - 35A TEST SET. TO FACILITATE TESTS WITH EQUIPMENT OTHER THAN THE ABOVE REFER TO ALTERNATE CIRCUITS OF FIGURE 2.

(A) BIAS (MAGNETIC BALANCE)

REQUIREMENT----WITH TEST SET IN BIAS POSITION, DEFLECTION OF MILLIAMMETER NEEDLE FROM ITS ZERO POSITION SHOULD NOT BE GREATER THAN  $\pm 1/2$  DIVISION. TO ADJUST----WITH EACH STATIONARY CONTACT SET SCREW---CLAMPING SCREW LOOSENED, TURN SET SCREWS IN OPPOSITE DIRECTION BY EQUAL AMOUNTS. CAUTION----A DELICATE TOUCH IS NECESSARY; TURN EACH SET SCREW ONLY A FEW DEGREES AT A TIME AND IN OPPOSITE DIRECTIONS. MAKE SURE CLAMPING SCREWS ARE TIGHTENED BEFORE RE-CHECKING ADJUSTMENTS.

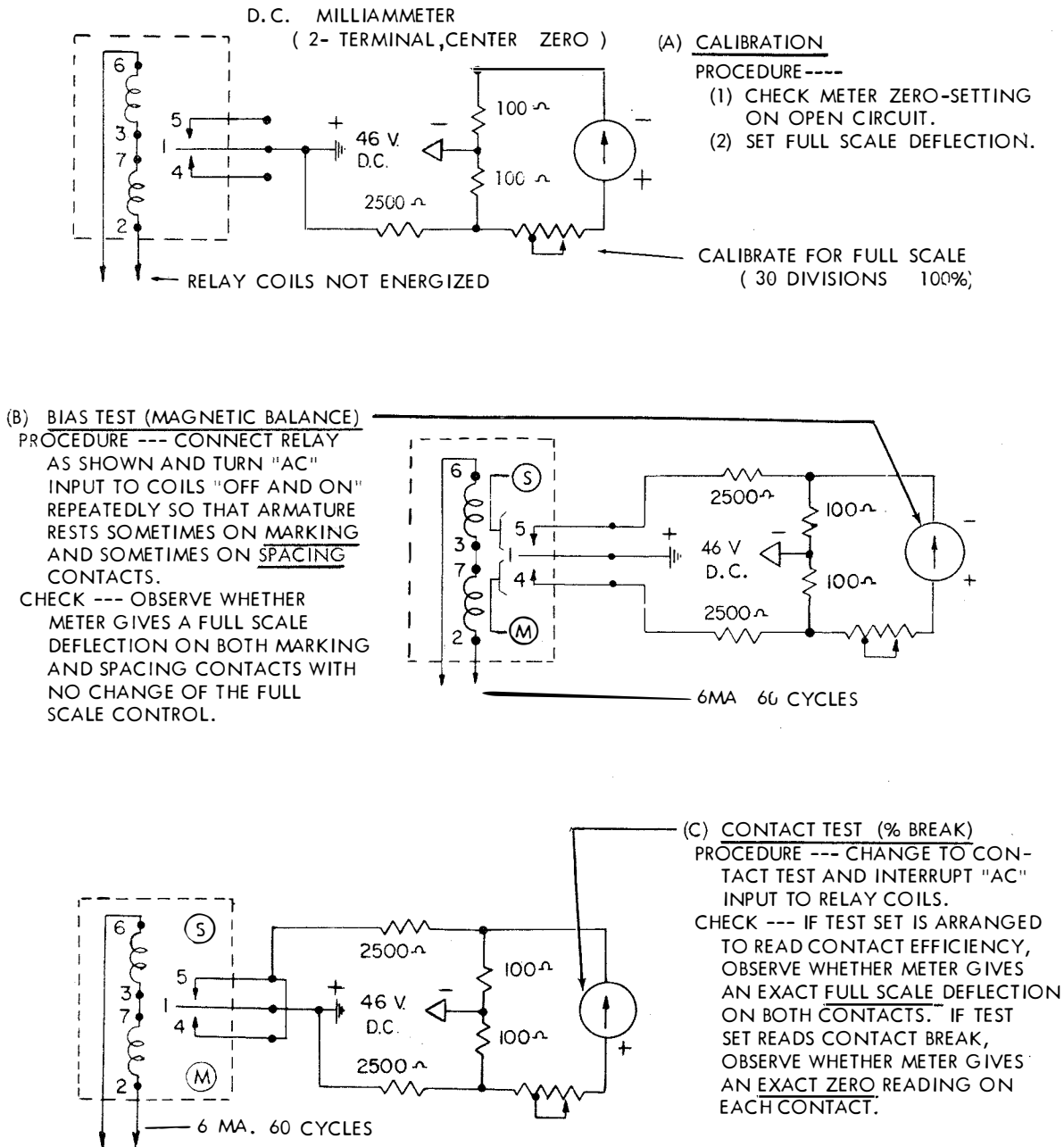
(B) CONTACT GAP

REQUIREMENT----WITH TEST SET IN CONTACT POSITION, DEFLECTION OF MILLIAMMETER NEEDLE SHOULD BE MIN. PLUS 5 DIVISIONS-----MAX. PLUS 8 DIVISIONS. TO ADJUST----SAME PROCEDURE AS ABOVE EXCEPT THAT SET SCREWS ARE TURNED EQUAL AMOUNTS IN SAME DIRECTION RATHER THAN OPPOSITE DIRECTIONS. NOTE----FOR ADJUSTMENT, THE MAX. VALUE IS PLUS 7.5 DIVISIONS IN PLACE OF 8 DIVISIONS. ALWAYS RE-CHECK BIAS ADJUSTMENT AFTER CONTACT GAP IS MADE.

FIGURE 1. RELAY 33RY

NOTE 1 ---IF MAGNET COILS ARE ENERGIZED WITH A POLARITY AS SHOWN IN FIGURE 1, THE RELAY SHOULD CLOSE ITS #1 & #4 CONTACTS.

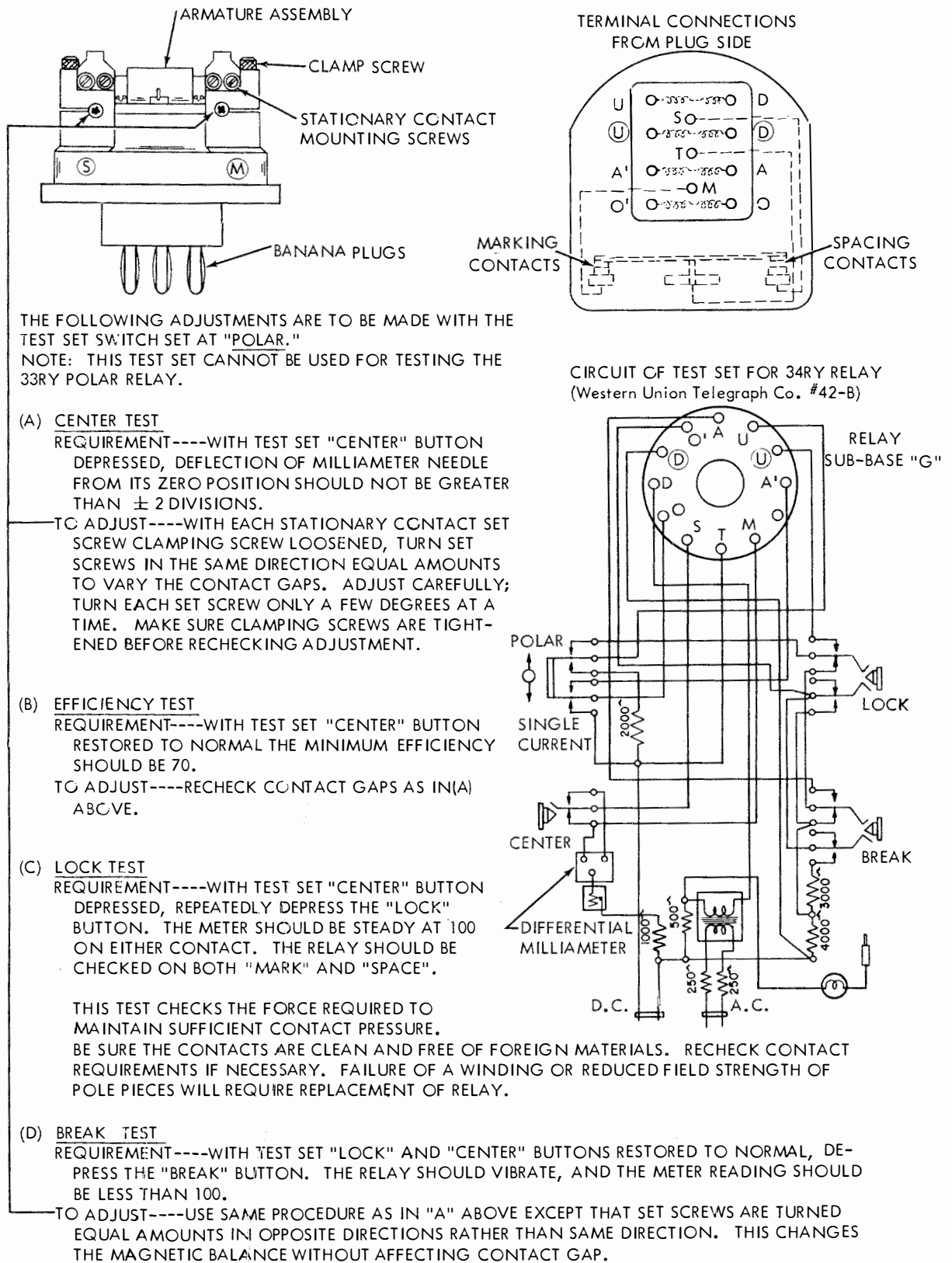
THE FOLLOWING PROCEDURE IS RECOMMENDED BEFORE USING ANY TEST SET TO DETERMINE WHETHER THE SET IS SUITABLE TO CHECK TUNGSTEN-CARBIDE CONTACTS.



EVALUATION OF A PARTICULAR TEST SET

REPEAT (B) AND (C) WITH TWO MORE RELAYS (33RY). IF METER READS AN EXACT FULL SCALE OR ZERO WHEN THE A.C. IS TURNED OFF, THE TEST SET IS SUITABLE FOR TUNGSTEN-CARBIDE CONTACTS. A FAILURE OF ONE RELAY MAY BE CAUSED BY A DIRTY CONTACT. FAILURE OF SEVERAL CONTACTS IS A GOOD INDICATION THAT THE TEST SET IS NOT SUITABLE FOR TUNGSTEN-CARBIDE CONTACTS.

FIGURE 2. 33RY TEST CIRCUITS



NOTES

1. WHEN MAKING THE "CENTER" AND "EFFICIENCY" TESTS THE D-U WINDING IS ENERGIZED WITH APPROXIMATELY 20 MA. A.C.
2. WHEN MAKING THE "LOCK" TEST D-U AND  $\text{D}-\text{U}$  WINDINGS ARE CONNECTED IN SERIES OPPOSING AND ENERGIZED WITH APPROXIMATELY 80 MA. A.C.
3. WHEN MAKING THE "BREAK" TEST, WINDINGS A-A', D-U AND O-O' ARE CONNECTED IN SERIES AIDING AND ENERGIZED WITH APPROXIMATELY 13 MA. A.C.

FIGURE 3. RELAY 34RY

