

COMMON SYSTEMS
PULSE CHECKING TEST SET
FOR CHECKING PULSING SPEED AND
PER CENT BREAK OF INTERRUPTERS

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded

(CAL) KS-7987
Potentiometer
X Option

Superseded By

(CAL) KS-8680
Potentiometer
W Option

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The use of the KS-7987 potentiometer is superseded by KS-8680 potentiometer.

D.2 Options W and X are added to the options used table and circuit note 102.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3310-MKS-RLL-XH

DO NOT BE USED AS AN ORIGINAL
BY THE HAWTHORNE PRINT SHOP

CIRCUIT DESCRIPTION
SWITCHING SYSTEMS DEVELOPMENT DEPARTMENT

CD-96362-01
Issue 3-D
Appendix 1-D
Dwg. Issue 4-D

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CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded Superseded By
 (P) 239GF Relay (P) 280AR Relay
 Z Option Y Option

C. CHANGES IN CIRCUIT REQUIREMENTS
OTHER THAN THOSE APPLYING TO ADDED
OR REMOVED APPARATUS

C.1 Prior to this issue a soak value of
110 ma was shown for the (P) relay.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The use of the 239GF relay is
rated "Mfr. Disc." and superseded
by the 280AR relay to provide a polar-
ized relay with improved adjustment
stability.

D.2 Circuit note 102 and the options
used table is added.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3310-MHK-RLL-ES

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PER CENT BREAK OF INTERRUPTERS

CHANGES

B. CHANGES IN APPARATUS

B.1 Added

LW7A Cord Assembly
Fig. 4

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Fig. 4 is added.

All other headings under "Changes",
no change.

1. PURPOSE OF CIRCUIT

1.1 This test set is designed to provide a means for measuring pulsing speed and per cent break of interrupter circuits by the direct reading method. Connection to the circuit under test is made with a patching cord or where desired wiring may be used by connecting to the binding posts.

2. WORKING LIMITS

2.1 For Measuring Pulsing Speed

2.11 Maximum 40 pulses, minimum 3 pulses per second.

2.12 20 to 80 per cent break of pulses.

2.2 For Measuring Per Cent Break

2.21 Minimum, 3 pulses per second.

3. FUNCTIONS

3.1 Provides for measuring pulse speeds of interrupters from 0 to 20 p.p.s. on one scale and 0 to 40 p.p.s. on the other scale.

3.2 Provides for measuring per cent break of interrupters.

4. CONNECTING CIRCUITS

When this circuit is listed on a key-sheet, the connecting information shown thereon is to be followed.

4.1 Battery and Ground Supply,
SD-90619-01.

4.2 Interrupter Circuit typical,
SD-25062-01.

DESCRIPTION OF OPERATION

5. INITIAL CALIBRATION

5.1 With the lever key normal and with no patching cords connected, connect "A" lead to the midpoint of G resistance. By means of the adjusting screw on top of the meter, adjust so that the pointer is on the 100 per cent break scale division. Connect battery and ground to the test set. Set CAL potentiometer so that the meter reads zero per cent break. Connect the P jacks to an interrupter having a speed of 30 pulses per second, with a per cent break of from 20 to 80. The rotating button key should be in 40 position. Operate PPS key. Allow time for the meter to reach its final setting. It may oscillate slightly. Note the midpoint of its oscillation. If the reading at this point is appreciable above or below 30 pulses per second it indicates that the "A" lead should be shifted. Before shifting the "A" lead restore PPS key and disconnect the interrupter and battery and ground from the test set. If the reading was below 30 pulses per second shift "A" lead to increase the series resistance. If the reading was above 30 pulse per second shift "A" lead to decrease the series resistance. After the "A" lead has been shifted, reconnect battery and ground to the test set and again set CAL potentiometer, so that the meter reads zero per cent break. Reconnect the 30 pulses per second interrupter and repeat the check. The procedure should be repeated until the best connection for the "A" lead is determined. The set should then be able to meet the requirements covered in circuit note 1. The accuracy of the pulse per second readings is dependent upon the accuracy of the calibrating interrupter.

The connection of the "A" lead after it is once correctly connected, should not have to be changed unless there is trouble with the test set or unless some of the apparatus or wiring is changed.

However, resetting the CAL potentiometer may have to be done frequently. Also the setting of the position on the 100 per cent break scale division, with battery and ground disconnected from the test set should be checked frequently.

6. PATCHING

6.1 Connection to the circuit under test is made by using the cord in fig. 2 connected to (P) jack where test jacks are provided in the interrupter circuit. If no test jacks are provided the cord in fig. 3 may be used or if more convenient wiring may be used connecting to binding posts P. & G. If a revertive impulse interrupter is to be tested, the cord in Fig. 4 should be used and connected to P binding post of this circuit and to the sleeve of the (MX) or (MN) jack of the revertive impulse interrupter test set. Battery and ground should be connected to the set with a cord in fig. 2 connected to BAT-G jack or by connecting to binding posts BAT and G. The interrupter under test should be started.

6.2 Per Cent Break Test

With the lever key normal, set CAL rheostat so that the meter reads zero per cent break. The PCB key is operated connecting the tip of the P jack thru the meter and resistances to the mid-point of D resistance, to which battery is connected thru the 300 ohm winding of D resistance and to which ground is connected thru the 500 ohm winding and CAL potentiometer. The interrupter, which is connected in series with P jack or binding post, intermittently connects ground, from the ring of P jack or from G binding post, into the circuit causing the per cent break meter to deflect and indicate the per cent break. Time should be allowed for the meter to take its final setting before noting the reading.

6.3 Pulsing Speed Test

With CAL potentiometer left as for the per cent break test and with the rotating button key in the 40 position, PPS key should be operated. With PPS key operated, the outer end of the

winding of (P) relay is connected to battery thru C resistance. As the inner end of (P) relay is connected to battery and ground thru B resistance with PCB key normal, the resistance battery connected to the outer end of its winding will hold closed the 3 and 5 contacts of (P) relay. However, the operation of PPS key connects the tip of (P) jack to the outer end of the (P) relay winding and when the interrupter, to which the test set is connected closes its contact, direct ground from the ring of (P) jack or from G binding post thru the interrupter contacts will be connected to the outer end of the winding of (P) relay; this will reverse the current thru the (P) relay winding and it will open its 3 and 5 contacts and close its 2 and 5 contacts. Thus (P) relay follows the interrupter. The grounded condensers C1, C2 and C3 are connected to the 5 contact of the (P) relay. While (P) relay closes its 3 and 5 contacts condensers C1, C2 and C3 are charged by the potential at the mid-point of D resistance. While (P) relay closes its 2 and 5 contacts the C1, C2 and C3 condensers are discharged thru the meter to ground. This causes the meter to deflect and the faster the speed of pulsing the greater will be the resulting deflection. The meter deflection is directly proportional to the speed, and the speed in pulses per second is as indicated on the 40 to 0 scale. If the indicated speed is less than 20 pulses per second, the rotating button key should be operated to the 20 position. This causes grounded condensers C4, C5 and C6 to be connected in parallel with C1, C2 and C3 condensers. This causes the meter deflection to be doubled, and the speed in pulses per second is as indicated on the 20 to 0 scale. Time should be allowed for the meter to take its final setting before noting the reading.

BELL TELEPHONE LABORATORIES, INC.

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