LINE AND CUT-OFF RELAYS

NO. 1 AND NO. 1-D OFFICES

1. GENERAL

1.01 This section describes tests of the relays of subscriber line circuits in No. 1 and No. 1-D offices. The tests are as follows:

(A) Line Relays

(B) Cut-Off Relays

1.02 The section has been reissued to include line and cut-off relays of No. 1-D switchboards and to cover line and cut-off relays having battery on the ring and the tip open.

1.03 If the electrical requirements for the relays are not shown on the circuit requirement tables use the values listed in sections of the A490 Division.

1.04 Care should be taken not to connect to a busy line. It is assumed that busy tests will be made in all cases before connections are established to the line to be tested.

1.05 While making cut-off relay tests, the line will be made busy. However, while making line relay tests, the line is not made busy and it is possible that a call may be completed in a multiple jack of the line under test. In this case false indications may be obtained.

1.06 If the line relay operates on the non-operate test or fails to release on the release test, it may be due to low insulation resistance of the line.

2. APPARATUS

2.01 Operator's Telephone Set.

2.02 35 type Test Set.

2.03 P3F Cord with a No. 109 and a No. 110 Plug.

Test (B) Only

2.04 P3F Cord with a No. 109 and a No. 110 Plug (see 3.18).

2.05 W2W Cord with a No. 110 Plug and No. 360 Tools (see 3.20 and 3.22).

2.06 No. 365 Tool for W2W Cord if used.

3. METHOD

3.01 Before using the test set, be sure that all resistance is cut in to avoid damaging the needle of the milammeter. This is accomplished by moving all resistance slides to the extreme right.

3.02 Care should be taken to see that the scale change key, designated MIL-AMPS, is not operated from its normal position unless the reading on the normal (.750 ampere) scale indicates that the current flow in the circuit does not exceed the scale range as indicated by the designation of the position to which the key is to be operated. Before operating the MIL-AMPS key, a current flow which approximates the desired value should be set up on the normal (.750 ampere) scale of the milammeter; then the MIL-AMPS key may be operated to the position required.

(A) Line Relays

Test Set Arrangement

3.03 Arrange the keys and switches of the test set as follows:

Keys	Position	Switches	Position
1	Open	G	See Text
2	Open	L	Open
3	Open	Res.	0
4	Open		
BATT & GRD CO	Operated		
REV	See Text		

3.04 For lines not arranged for prepayment coin service and P.B.X. trunks with battery on the ring and ground on the tip, the REV key should be normal and switch G should be open. See Fig. 1.

3.05 For prepayment coin lines and P.B.X. trunks with battery on the tip and with the ring open, the REV key should be operated and switch G should be closed. Connect an idle subscriber cord to the TEST BATT & GRD jack of the test set. See Fig. 2.

3.06 For P.B.X. trunks with battery on the ring and with the tip open, the REV key should be normal and switch G should be closed. Connect an idle subscriber cord to the TEST BATT & GRD jack of the test set. See Fig. 3.

3.07 With a P3F cord connect the T&R jack of the test set to the answering jack of the line to be tested.

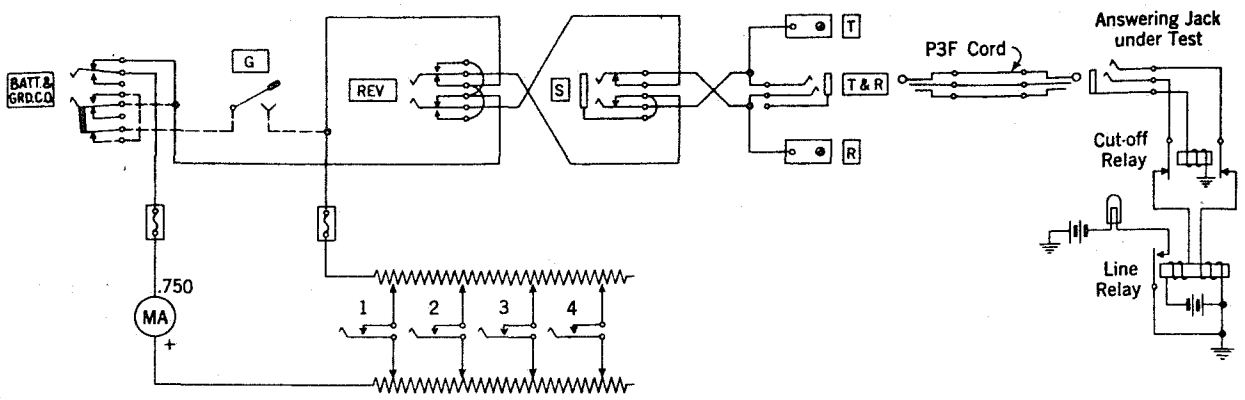

Fig. 1 - Line Relay - Battery on Ring, Ground on Tip.

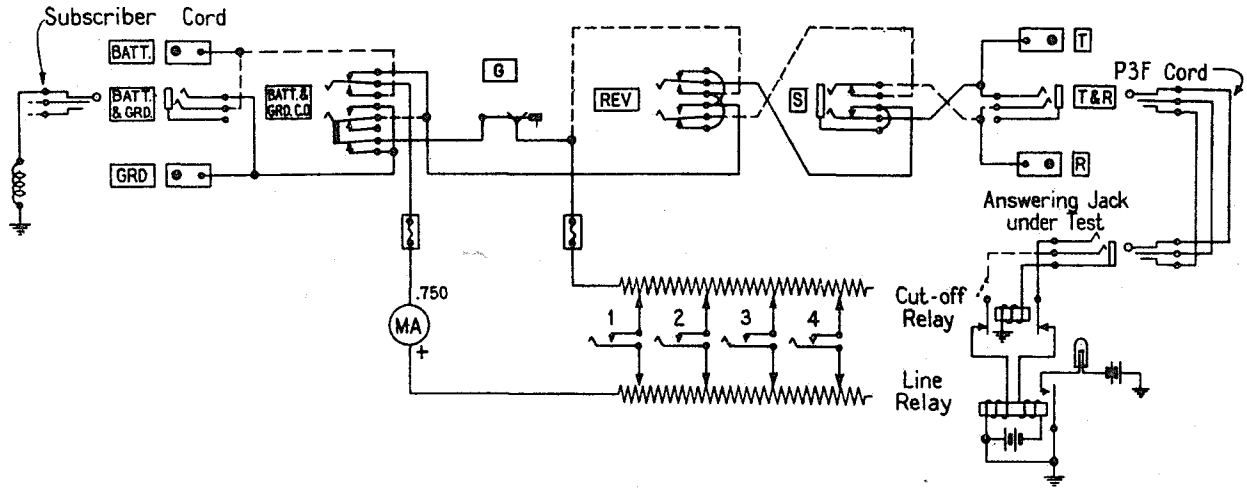

Fig. 2 - Line Relay - Battery on Tip, Ring Open.

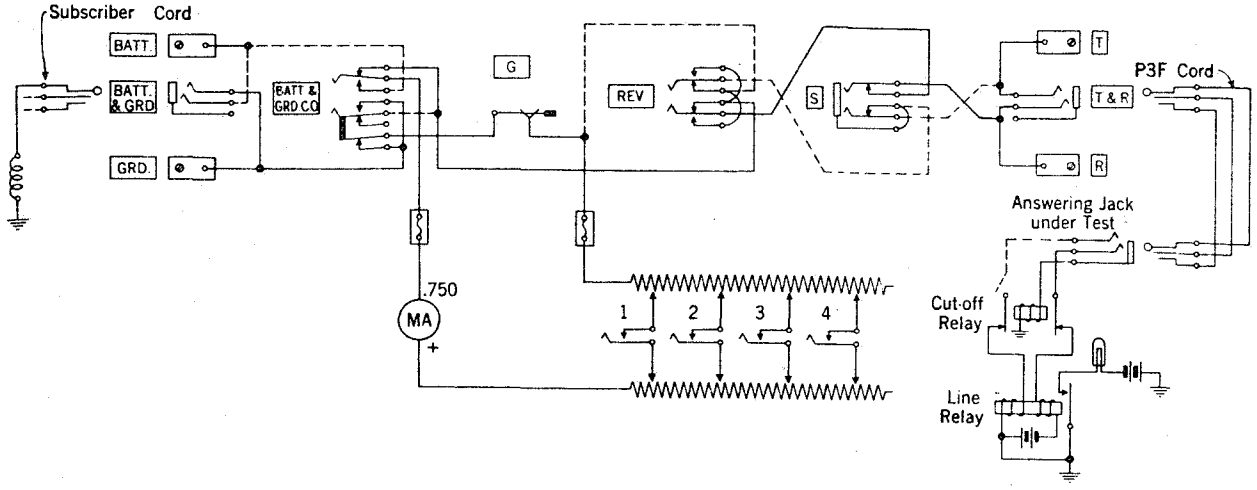

Fig. 3 - Line Relay - Battery on Ring, Tip Open.

Adjustments for Current Values

3.08 Depress key 4 and move the No. 4 resistance slides to the left until the specified "release" value is observed on the milammeter. On lines having 48 volts on the relay, it will be necessary to use the No. 4 resistance switches to cut in sufficient resistance.

Note: If a release value is not specified for the relay, omit the use of key 4.

3.09 Depress key 1 and also key 4 if a release value is to be used in the test, and move the No. 1 resistance slides to the left until the specified "operate" value is observed on the milammeter.

3.10 Depress key 2 and also key 4 if a release value is to be used in the test, and move the No. 2 resistance slides to the left until the specified "non-operate" value is observed on the milammeter.

Relay Requiring Operate and Release Tests

3.11 With the locking lever of key 4 operated continuously depress key 1 and observe that the line and pilot lamps associated with the line under test light and that they are not dim. Release key 1 and observe that lamps are extinguished.

Relay Requiring Operate and Non-Operate Tests

3.12 Depress key 2 and observe that the line and pilot lamps associated with the line under test do not light. Release key 2 and depress key 1. Observe that the line and pilot lamps associated with the line under test light and that they are not dim. Release key 1 and observe that the lamps are extinguished.

Relay Requiring Operate, Non-Operate and Release Tests

3.13 With the locking lever of key 4 operated continuously, depress key 2 and observe that the line and pilot lamps associated with the line under test do not light. Release key 2. Depress key 1 and observe that the line and pilot lamps associated with the line under test light and that they are not dim. Release key 1 and observe that lamps are extinguished.

(B) Cut-Off Relays

Test Set Arrangement

3.14 Arrange the keys and switches of the test set as follows:

Keys	Position	Switches	Position
1	Open	G	Open
2	Open	L	Open
3	Open	Res.	0
4	Open		
BATT & GRD CO	Normal		
REV	Normal		

3.15 Connect a subscriber cord to the TEST BATT & GRD jack of the test set.

3.16 With a P3F cord connect the S jack of the test set to the answering jack of the line to be tested.

3.17 Depress key 1 and move the No. 1 resistance slides to the left until the specified "operate" value is observed on the milammeter.

Lines Not Arranged for Prepayment Coin Service and P.B.X. Trunks With Battery on the Ring and Ground on the Tip

3.18 With a P3F cord connect the T&R jack of the test set to a spare answering jack. See Fig. 4. The line lamps associated with the line under test and with the spare answering jack should light.

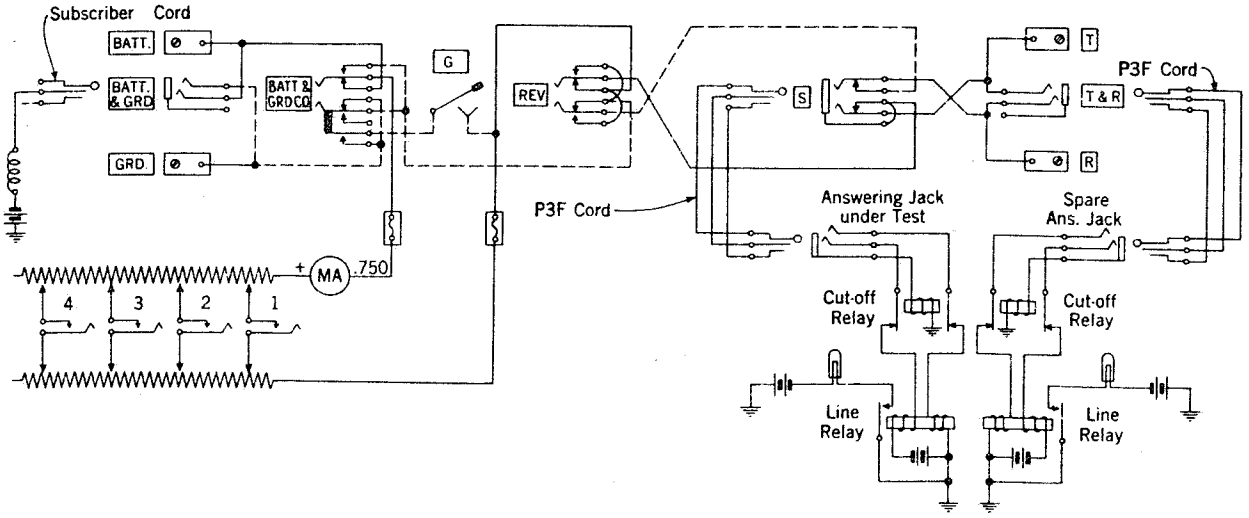

Fig. 4 - Cut-Off Relay - Battery on Ring, Ground on Tip.

3.19 Depress key 1. Both line lamps should be extinguished. Failure of either or both to do so generally indicates that the cut-off relay springs do not break properly. Release key 1. Both line lamps should light.

Prepayment Coin Lines and P.B.X. Trunks With Battery on Tip and With Ring Open

3.20 Insert the plug of the W2W cord into the T&R jack of the test set and connect the No. 365 tool attached to the ring (black) conductor to the tip of a subscriber cord. The line lamp associated with the answering jack under test should light. See Fig. 5.

3.21 Depress key 1 and observe that line lamp is extinguished. If the line lamp is not extinguished it generally indicates that the cut-off relay springs associated with the tip side of the line do not break properly. Release key 1. The line lamp should light.

P.B.X. Trunks With Battery on Ring and With Tip Open

3.22 Insert the plug of the W2W cord into the T&R jack of the test set, and connect the No. 365 tool attached to the tip (white) conductor to the tip of a subscriber cord. The line lamp associated with the answering jack under test should light. See Fig. 6.

3.23 Depress key 1 and observe that line lamp is extinguished. If the line lamp is not extinguished it generally indicates that the cut-off relay springs associated with the ring side of the line do not break properly. Release key 1. The line lamp should light.

4. REPORTS

4.01 The required record of these tests should be entered on the proper form.

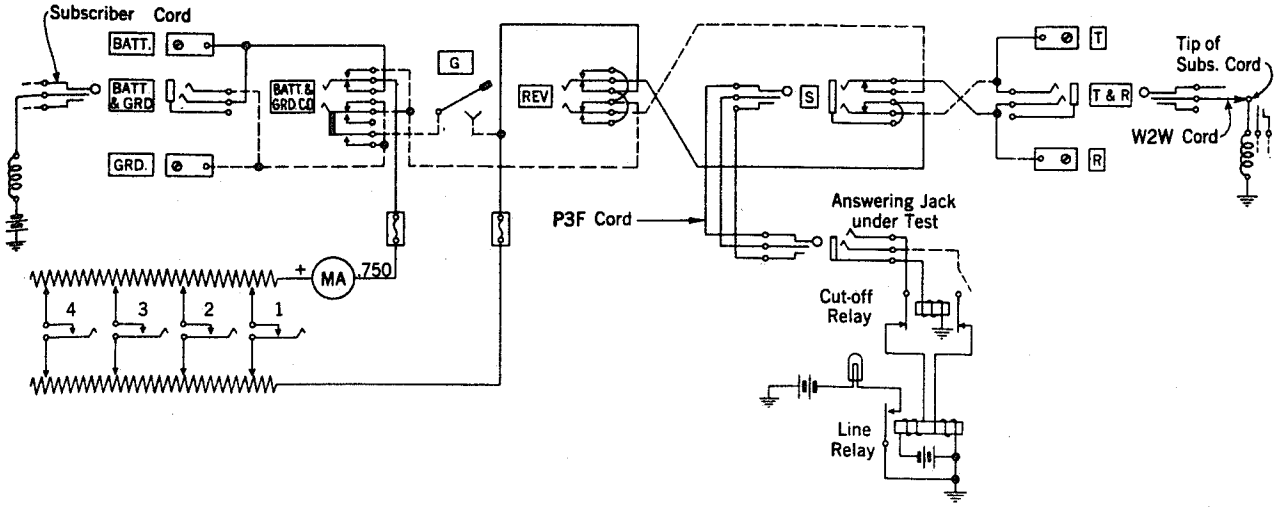

Fig. 5 - Cut-Off Relay - Battery on Tip, Ring Open.

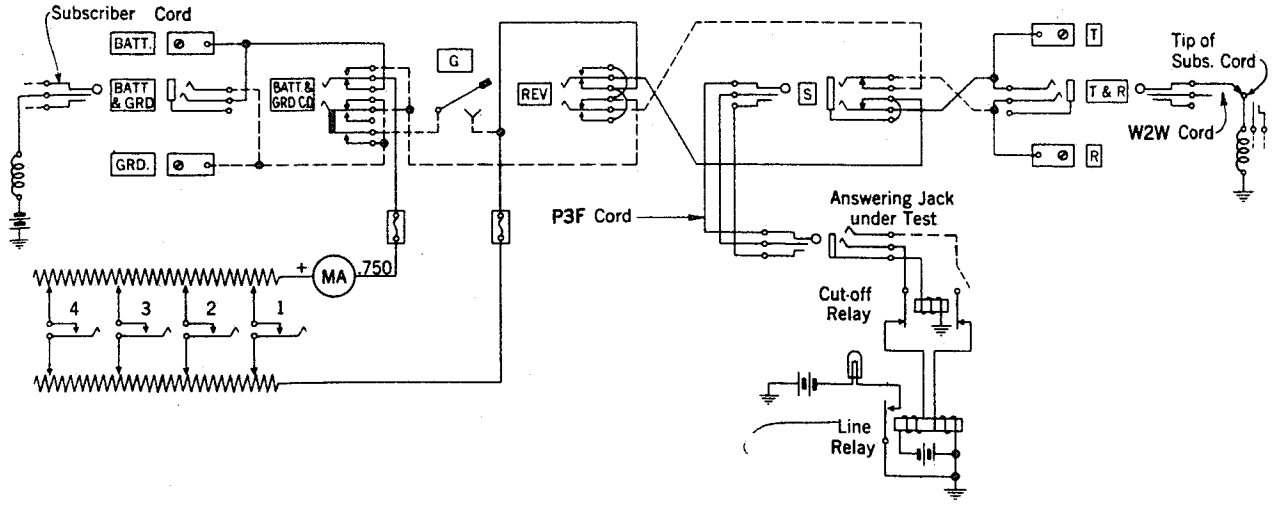

Fig. 6 - Cut-Off Relay - Battery on Ring, Tip Open.