

ZONE REGISTRATION TEST FRAME TEST

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1. GENERAL

1.1 This section describes the method to be used for testing the zone registration and timing test circuit, SD-25311-01. When making the tests described in this section which require a connection to a zone registration circuit, any zone registration circuit may be used by the operation of the particular circuit feature of the test circuit.

1.2 The test of the equipped test frames should be made before starting the routine tests of the zone registration circuits.

1.3 The District Connecting Switch Crosspoint Tests of Section 129 must be completed prior to performing the Operating Tests (Paragraph 8) of this section.

2. RECORD AND REQUIREMENTS

2.1 ID-2202 and ID-1313 trouble records are required as outlined in Handbook 50, Section 3.

2.2 These tests are to be completed before load test starts.

3. TESTING EQUIPMENT

3.1 Test Sets

| Amt | ITE | Description |
|-----|------|-------------|
| 1 | 4145 | S1 Timer |

3.2 Cords Required with Test Sets

| Amt | ITE | Lgth | Cdrs | One End | Other End | With ITE |
|-----|------|------|------|-----------|-----------|----------|
| 2 | 9547 | 12' | 1 | 2455 Plug | 2455 Plug | /4023 |
| 1 | 9548 | 9" | 1 | 2455 Plug | 2455 Plug | /4023 |

3.3 Accessories

| Amt | ITE or Code | Description | With ITE |
|-----|-------------|--------------------|----------|
| 1 | 298A | Make Busy Plug | /4023 |
| 2 | 4109 | Spade Tip | /4023 |
| 4 | 8507 | Alligator Clip | /4023 |
| 4 | 2601 | Insulators, Sleeve | /4023 |

* Crossbar Test Accessory Set

4. FUSING TEST

4.1 Using a test receiver or volt-ohmmeter check each fuse post for absence of battery and ground.

4.2 Using fuses of correct type as indicated by circuit drawings and fuse panel designations install the following fuses one at a time. Check that each fuse is associated with its proper equipment and is free from crosses with other unfused posts on the fuse panel.

| Fuse Posts | Mtg. Plt. | Test Location | Test Point |
|------------|----------------|---------------------|------------|
| A | ADV BSY TMG | Wdg. 5B of TAl Rel. | |
| B | TST TM | " 13B " ZE " | |
| C | PLS CTG | " 8BR " EP2 " | |
| D | EM TR | " 13B " CO-4 " | |
| TBS | (Key&Lp.Panel) | 48V Terminal | |
| 22V.60~ | TST TM | Contact 2T of T1 | |
| (See Note) | | Rel. | |

NOTE: 22V.60~ fuse is located on Misc. Frame.

5. TIMING TEST (TM2 RELAY) SD-25311-012 Figs. 5 & 7)

5.1 Use an ITE-4145 (S1 timer) for this test.

5.11 Insert the plug of the S1 timer into a 110 volt A.C. outlet (60 cycles).

5.12 Connect the timer BP- terminal to a 48 volt battery supply using an ITE-9547 Cord equipped with a spade tip and an insulated alligator clip.

5.13 Connect the timer BP+ terminal to 1 bottom contact of the MR2 relay in the zone registration test circuit. Use an ITE-9547 cord equipped with a spade tip and an insulated alligator clip.

5.2 Using an ITE-9548 cord equipped with two insulated alligator clips, connect 2 bottom contact of relay MR2 to 2 bottom contact of relay TM2.

TABLE 1

| Steps | Key Operations | Lamp Indications | | Connector Switch Operations | | |
|--|---|--------------------|--------------------|-----------------------------|--|--|
| | | Light | Extinguish | Switch No. | Select Operation | Hold Operation |
| 1 | Operate & release PC-ST Key | CS-0,S-0, H-0-5 | | 0 | Sel. 0 operates | Hold 0 & 5 operate |
| 2 | Operate & release SPC Key | S-1 | S-0 | 0 | Sel. 0 releases | Hold 0 & 5 release & reoperate |
| 3 | Operate & release SPC Key | S-2 | S-1 | 0 | Sel. 1 releases Sel. 2 operates | Hold 0 & 5 release & reoperate |
| 4 | Operate & release SPC Key (6 full operations) | S-3,---- S-8 | S-2,---- S-7 | 0 | Sel. 2,----7 rels. Sel. 3,----8 oper. | Hold 0 & 5 release & reoperate |
| 5 | Operate & release SPC Key | S-9 | S-8 | 0 | Sel. 8 releases Sel. 9 operates | Hold 0 & 5 release & reoperate |
| 6 | Operate & release HPC Key | H-1-6 | H-0-5 | 0 | Sel. 9 remains operated | Hold 0 & 5 release Hold 1 & 6 operate |
| 7 | Operate & release HPC Key | H-2-7 | H-1-6 | 0 | Sel. 9 remains operated | Hold 1 & 6 release Hold 2 & 7 operate |
| 8 | Operate & release HPC Key | H-3-8 | H-2-7 | 0 | Sel. 9 remains operated | Hold 2 & 7 release Hold 3 & 8 operate |
| 9 | Operate & release HPC Key | H-4-9 | H-3-8 | 0 | Sel. 9 remains operated | Hold 3 & 8 release Hold 4 & 9 operate |
| 10 | Operate & release HPC Key ★ See Note 1 | CS-1,S-0, H-0-5 | CS-0,S-9, H-4-9 | 0 1 | Sel. 9 releases Sel. 0 operates | Hold 4 & 9 release Hold 0 & 5 operate |
| 11 | Repeat steps 2 to 10 for each connector switch associated with the test frame under test. | | | | | |
| <p>NOTE 1: When step 10 is performed on the last equipped connector switch, the lamp indications and switch operations are as follows: Lamp H-4-9 extinguishes, hold magnets 4 & 9 release & lamp EC lights. (Lamps (CS)- and (S)9 remain lit & select 9 remains operated). Operate & release key RN. The frame restores to normal.</p> | | | | | | |

5.3 Close 1 & 2 top contacts of relay HD1 (TST TMG mtg plt) and 5 & 6 top contacts of relay ST2 (TST TMG mtg plt).

5.4 Operate the timer reset lever and then depress the timer cord switch to position "ON". Check that the timer reads 0 seconds.

5.5 Manually operate relay MR (zone registration test circuit) until relay TM2 has operated. Upon operation of relay TM2, release the MR relay. (The TM2 relay should operate approximately 1/4 second after the manual operation of relay MR).

5.51 Note that the S1 timer has recorded the time required for operation of relay TM2. The timer should read between 23 & 28 on the 1/100's of a second scale. The "second" scale (the term "second" refers to scale designation) should still read 0.

5.6 Remove the blocks from the contacts on relays HD1 and ST2.

5.7 Remove the looping cord from relays MR2 and TM2.

5.8 Disconnect the S1 timer, and restore the box to normal.

6. CONNECTOR CONTROL AND CUT-IN KEYS

6.1 Selection of Connector (SD-25311-011 Figs. 1 & 2)

6.11 Noting that all G relays (CONN mtg plt) are normal, manually operate relay G of the first connector. Relay G locks operated and its associated GP relay will operate.

6.12 Operate the GPC key. Relay G in the second connector will operate and relay GP in the first connector will release.

6.13 Release the GPC key. Relay G in the first connector will release and relay GP in the second connector will operate.

6.14 Repeat 6.12 and 6.13 until relays G and GP of the last equipped connector are operated.

6.15 Momentarily operate relay RN. Relays G and GP in the last equipped connector will release.

6.2 Selecting a Particular Zone Registration Circuit (SD-25311-011 Figs. 1, 2 & 4)

6.21 Determine that the Connector Circuit, the Connector Control Circuit, and the Emergency Transfer Circuit (if equipped) are normal.

6.22 At the CONN CONT mounting plate block normal relay CA and close 6 & 7 bottom contacts of relay ST.

6.23 At the BSY TMG mounting plate block normal relay CA1 and insulate 1 & 3 bottom contacts of relay PBL.

6.24 At the CONN mtg plt. insulate 7 & 8 bottom contacts of each equipped GP relay.

6.25 Perform the operations outlined in Table 1.

6.26 Remove the blocks from relays CA, ST and CA1.

6.27 Remove the insulators from the PBL & GP relays.

7. MISCELLANEOUS CROSS-CONNECTIONS AND LEADS

7.1 OT and IT Cross-Connections (SD-25311-012 Fig. 5)

(The Initial Time and Overtime cross-connections must be installed prior to making this test)

7.11 The purpose of this test is to check the continuity of the OT & IT to M- cross-connections. The job requirement charts are to be used in conjunction with this test in order that the proper arrangement of the x-conn's may be known.

7.12 Close 5 & 6 top contacts of relay ST1 (TST TM mtg plt).

7.13 Check for the absence of battery or ground at 6 top (IT test point) and 11 top (OT test point) contacts of relays ZA to ZE.

7.14 Block operated relay M1 (TST TM mtg plt.).

7.15 Check for the presence of ground on 6T and 11T contacts of relays ZA to ZE. Verify that ground is present only on the contacts which are associated with the M1 relay per the x-connection charts.

7.16 Release relay M1.

7.17 Repeat steps 7.14 to 7.16 for the remaining M- relays (M2 to M5).

7.18 Open 5 & 6 top contacts of relay ST1.

7.2 OR and IR Cross-Connections (SD-25311-012 Figs. 5 & 6)

(The Initial Registration and Overtime Registration cross-connections must be installed prior to making this test)

7.21 The purpose of this test is to check the continuity of the OR and IR to R- cross-connections. The job requirement charts are to be used in conjunction with this test in order that the proper arrangement of the x-conn's may be known.

7.22 Insulate 3 & 4 top contacts of relay EP1 (PLS CTG mtg plt.) and close 5 & 6 top contacts of relay ST2 (TST TM mtg plt.)

7.23 Check for the absence of battery or ground at 6 bottom contact (IR test point) and 4 bottom contact (OR test point) of the ZA to ZE relays.

7.24 Block operated relay R1 (PLS CTG mtg plt.).

7.25 Check for the presence of ground on 4 & 6 bottom contacts of relays ZA to ZE. Verify that ground is present only on the contacts which are associated with the R1 relay per the x-conn. charts.

7.26 Release relay R1.

7.27 Repeat steps 7.24 to 7.26 for the remaining R- relays (R2 to R5 when "B" option is not furnished or R2 to R6 when "B" option is furnished).

7.28 Open 5 & 6 top contacts of relay ST2.

7.29 Remove insulation from 3 & 4 top contacts of relay EP1.

7.3 BC and CI Leads (SD-25311-011 Figs. 3 & 8)

7.31 Insulate 1 & 2 bottom contacts of each (LL)- relay (C GR CONT mtg plt).

7.32 Block operated (LL)0 relay.

7.33 From the job records determine the (CI)- relay (LEAD CONN mtg plt) associated with the operated (LL)0 relay and the location on the connector switches of the Zone Registration Circuits associated with the operated (LL)0 relay.

7.331 At the test frame, connect one side of an R-9572 test receiver to 48V test battery.

7.332 At the connector switch horizontal appearances of the associated zone registration ckts., touch the pick of the test receiver to the CI lead (Spring 2, odd vertical) of each circuit. Note that the associated (CI)- relay operates and releases as the pick is applied and removed.

7.34 Remove the block from the (LL)0 relay.

7.35 Repeat operations 7.32 to 7.34 for each equipped (LL)- relay.

7.36 Remove the insulation from the (LL)- relays.

7.4 BT Lead Ground (SD-25311-011 Figs. 2 & 4)

7.41 Block operated relay BT1 (BSY TMG mtg plt).

7.42 Connect the clip of a test receiver to 48V test battery.

7.43 Touch the pick of the test receiver to 6 bottom contact of relay GP (CONN mtg plt) associated with the first equipped connector switch. Observe that relay BT (BSY TMG mtg plt) operates.

7.44 Manually operate and release relay PBL (BSY TMG mtg plt). Relay BG remains operated.

7.45 Remove the pick from 6 bottom contact of relay GP. The BT relay releases.

7.46 Repeat steps 7.43 to 7.45 for each equipped GP relay.

7.47 Remove the block from relay BT1.

7.5 ECX Punchings (SD-25311-011 Figs. 1 & 2)

7.51 Block operated each GP relay (CONN mtg plt).

7.52 At the MISC terminal strip at the top of the frame, touch ground in turn to punchings (ECX)0-5 and note that lamp EC lights.

7.53 Remove the blocks from the GP relays.

7.6 VT Punchings (SD-25311-011 Figs. 1, 2 & 4)

7.61 Block operated each GB relay (CONN mtg plt).

7.62 At the MISC terminal strip, touch ground in turn to punchings (VT) 0-5 and note that relays CA (CONN mtg plt) and CA1 (BSY TMG mtg plt) operate each time the ground is applied.

7.63 Remove the blocks from the BG relays.

7.7 CSG Leads (SD-25311-011 Figs. 1, 2 & 4)

7.71 Close 11 & 12 top contacts of relay ST (CONN mtg plt).

7.72 Insulate 1 & 2 bottom contacts of relay CA1 (BSY TMG mtg plt).

7.73 Insulate 4 & 5 top contacts and 4 & 5 bottom contacts of relay H (BSY TMG mtg plt).

7.74 Ground in turn the 8 bottom contact of each equipped G relay (CONN mtg plt). Note that the H relay operates at each application of ground.

7.75 Open the contacts of the ST relay.

7.76 Remove the insulation from the CA1 and H relays.

8. OPERATING TESTS

NOTE: Refer to conditions specified in Paragraph 1.3 of this section.

8.1 Zone Selection (SD-25311-012 Fig. 5)

8.11 Block normal relays ZT1 and TC (TST TM mtg plt).

8.12 Close 1 & 2 bottom contacts of relay ZT and 3 & 4 top contacts of relay ST1 (TST TM mtg plt).

8.13 Perform the operations outlined in Table 2.

8.14 Open 3 & 4 top contacts of relay ST1. Lamp ZE is extinguished and relay ZE releases.

8.15 Open 1 & 2 bottom contacts of relay ZT.

8.16 Remove blocks from relays ZT1 and TC.

8.2 Automatic Pass By Feature (APB Key)

8.21 Record the setting of the PB registers.

TABLE 2

| Key Operations | Lamp Indications | | Relay Operations | |
|------------------------------|------------------|------------|------------------|---------|
| | Light | Extinguish | Operate | Release |
| Operate & release the ZA key | ZA | | ZA | |
| Operate & release the ZB Key | ZB | ZA | ZB | ZA |
| Operate & release the ZC Key | ZC | ZB | ZC | ZB |
| Operate & release the ZD Key | ZD | ZC | ZD | ZC |
| Operate & release the ZE Key | ZE | ZD | ZE | ZD |

Lamp ZE remains lit & relay ZE remains operated until 3 & 4 top contacts of relay ST1 are opened. See Paragraph 8.14.

8.22 Insert a make busy plug into the MB jacks of all the zone registration circuits, except the last equipped circuit, associated with connector switch 0. Record the number of circuits made busy.

8.23 Operate the APB key and the ZA key.

8.24 Operate the ST key and check that the test circuit passes by the made busy zone registration circuits and stops on the last equipped circuit and proceeds to test.

8.25 Operate the RN key, noting that the frame restores to normal at the completion of the test.

8.26 When the frame is normal, release the RN key.

8.27 Release keys APB and ZA.

8.28 Record the setting of the PB register, noting that the exact number of circuits made busy were pegged on the register.

8.29 Remove the plugs from the made busy zone registration circuits.

8.3 Repeat Tests (REP Key)

8.31 Operate keys REP and ZA.

8.32 Operate the ST key and note that the test frame seizes a zone registration circuit and proceeds to test.

8.33 At the completion of the test, the test frame does not advance to the next zone registration circuit but repeats the test on the same zone registration circuit.

8.34 Allow the test frame to repeat a number of times and note that at the completion of each complete test the RST register is pegged. (The register scores once per repeat test made on a zone registration circuit regardless of the number of zones checked).

8.35 Operate the RN key. The test in progress will complete and the frame will then return to normal.

8.36 Release the RN key.

8.37 Release keys REP and ZA.

8.4 Timing Release of Zone Registration Control Circuit

8.41 Block ZL relay of the test circuit normal.

8.42 With the T key normal, originate a call to a zone registration circuit associated with an inter-frame group.

8.43 Observe that from 2 to 5 seconds after the CI relay of the test frame operates, lamps ZL, ZRT and TA light, the TA alarm is sounded and the CI relay is released, releasing the (LL)- relay of the test frame associated with the zone registration circuit selected.

8.44 Restore the test circuit to normal and repeat the operation, but using for this test a zone registration circuit associated with an intra-frame group.

8.45 Observe that the release of the CI relay in the test frame releases the R relay in the control circuit associated with the zone registration circuit selected.

8.46 Restore test circuit to normal and remove block from the ZL relay.

8.5 Remote Control (RC) Jack (One Test Frame)

8.51 At the zone registration frame, insert a 298A plug in the RC jack associated with the test frame under test.

8.52 Note that relay CA1 (BSY TMG mtg plt) at the test frame is not operated.

8.53 Operate the REP key. The CA1 relay operates.

8.54 Remove the 298A plug from the RC jack. The CA1 relay releases.

8.55 Release the REP key.

8.6 Remote Control (RC) Jack (Two Test Frames)

8.61 At the zone registration frame, insert a 298A plug in the RC jack associated with the left or No. 0 test frame.

8.611 Note that relay CA1 (BSY TMG mtg plt) at No. 0 test frame is not operated.

8.62 Operate the REP key in 0 test frame. The CA1 relay of test frame No. 0 operates.

8.621 Operate key ETR in No. 0 test frame and ETL in No. 1 test frame. Relay CA1 of No. 0 test frame releases.

8.622 Release the REP key in No. 0 test frame.

8.63 Operate the REP key in No. 1 test frame. Relay CA1 of the No. 1 test frame operates.

8.631 Release keys ETR and ETL. Relay CA1 of test frame No. 1 releases.

8.632 Release key REP in No. 1 test frame.

8.64 Remove the 298A plug from the RC jack associated with the left or No. 0 test frame and insert it in the RC jack associated with the right or No. 1 test frame.

8.641 Note that relay CA1 at No. 1 test frame is not operated.

8.65 Operate the REP key in No. 1 test frame. The CA1 relay of No. 1 test frame operates.

8.66 Operate key ETR in No. 0 test frame and ETL key in No. 1 test frame. Relay CA1 of No. 1 test frame releases.

8.661 Release the REP key in No. 1 test frame.

8.67 Operate the REP key in No. 0 test frame. Relay CA1 of No. 0 test frame operates.

8.68 Release keys ETR and ETL. Relay CA1 of No. 0 test frame releases.

8.681 Release key REP in No. 0 test frame.

8.69 Remove the 298A plug from the RC jack associated with No. 1 test frame.

8.7 Rapid Timing Test (One Zone)

8.71 Operate the ZA and REP keys to confine the test to one zone and one zone registration circuit.

8.72 Operate the ST key and check that the test circuit functions as described in Paragraphs 5, 6 and 7 of CD-25311-01.

8.73 Release the ZA and ST keys.

8.74 Repeat 8.71 thru 8.73 for each of the ZB to ZE keys as equipped.

NOTE: While testing the last equipped zone key, release the REP key and note that the CT register is pegged at the completion of each test.

8.8 Rapid Timing (All Zones)

- 8.81 Operate keys ZA to ZE as equipped.
- 8.82 Operate keys REP and ST. Check that a rapid timing test is made on all zones in consecutive order, ZA to ZE.
- 8.83 Operate key RN.
- 8.84 After the test in progress has completed, release key RN.
- 8.85 Release keys REP and ZA to ZE as equipped.

9. TROUBLE INDICATIONS

- 9.1 Test the trouble indicating features of the test frame as follows:

| Feature To Be Tested | Method of Test | Feature To Be Tested | Method of Test |
|---|--|--------------------------------------|--|
| (a) OBT Lamp (Open BT Lead) | <p>Simulate an open BT lead by insulating 2T and 3T springs of relay HD of a zone registration circuit. (Do not allow aprings 1T and 2T to make.)</p> <p>Make a test call to the zone registration circuit and observe that lamp OBT lights approximately 5 to 12 seconds after the call is originated.</p> <p>Remove the insulator from the HD relay and operate and release the CA key. The test circuit should restore the zone registration circuit to normal and proceed to again apply the test to the zone registration circuit.</p> | (c) BT Lamp (Busy timing) | <p>Insert a 298A make busy plug in the MB jack of the zone registration circuit to be used for test. Originate a call to the zone registration circuit. Observe that lamp BT lights approximately 5 to 12 seconds after the call is originated and that lamp TA lights and the TA alarm operates approximately 5 to 5-1/2 minutes after the call is originated. Operate key ACO and observe that the alarm is silenced but the BT and TA lamps remain lighted. Release key ACO and observe that the alarm again operates. Operate key TA. The alarm is silenced. Remove the busy condition from the zone registration circuit and observe that the regular tests are made on the zone registration circuit but the test circuit does not advance to the next zone registration circuit. Release key TA and observe that the test circuit advances.</p> |
| (b) OBG Lamp (Open busy ground on idle zone register) | <p>Insulate 1T and 2T and 8B and 9B springs of relay HD of a zone registration circuit to simulate the failure of the register circuit to connect ground on lead BT after setting up the zone and hold conditions.</p> <p>Originate a test call to the zone registration circuit and observe that lamp OBG lights and the test circuit times out on trouble timing (20 to 30 seconds - rapid test) lighting the TA lamp and sounding the TA alarm. Remove the insulation from relay HD.</p> <p>Originate a test call to a zone registration circuit. After the HD relay of the zone registration circuit has operated insert a 110 plug (not make busy plug) in jack MB of the zone registration circuit to open the BT lead. Same results as on the above test.</p> | (d) TA Lamp (Trouble timing) | <p>Block normal relay OTP. Originate a call to a zone registration circuit with T key operated. Observe that after a period of time has elapsed, which should be 20 to 30 seconds longer than the total of one initial charge and one over-time period for the particular zone called on the test, the TA lamp lights and the TA alarm operates. Remove the blocking tool from the OTP relay and return the test circuit to normal by operating and releasing the CA key. The TA lamp should be extinguished and the TA alarm should release.</p> |
| | | (e) MRG Lamp (No ground on MR lead) | <p>Insulate 9 & 10 top contacts of relay ST2 (TST TM mtg plt).</p> <p>Originate a call to a zone registration circuit and insulate 2T and 3T springs of relay MR of the register circuit as soon as relay MRG of the test circuit operates. This simulate a failure of the register circuit to maintain ground on the MR lead. Observe that the MRG and TA lamps light and the TA alarm sounds.</p> <p>Remove the insulation from relays MR and ST2.</p> |
| | | (f) HDB Lamp (No battery on HD lead) | <p>Insulate 3B and 4B springs (do not close springs 2B and 3B) of relay HD of a zone registration circuit to simulate a failure of the register circuit to connect battery over the HD lead.</p> |

| <u>Feature To Be Tested</u> | <u>Method of Test</u> | <u>Feature To Be Tested</u> | <u>Method of Test</u> |
|---|---|---|---|
| (f) HDB Lamp (No battery on HD lead)(Cont'd) | Make a test call to the zone registration circuit and observe that lamp HDB lights and the test circuit times out on trouble timing (20 to 30 seconds - rapid test) lighting the TA lamp and sounding the TA alarm. Remove the insulation from relay HD. | (j) DCB Lamp (No battery on DC lead)(Cont'd) | Originate a call to the zone registration circuit and observe that lamp DCB lights and the test circuit times out on ZRT time out (2 to 5 seconds) lighting the TA & ZRT lamps and operating the floor alarm. Remove the insulation from the TC relay. |
| (g) DC Lamp (No ground on DC lead) | Insulate 2T and 3T springs of relay TC of a zone registration circuit to simulate the failure of the register circuit to close ground on lead DC when the circuit is seized. Originate a call to the zone registration circuit and observe that lamp DC lights and the test circuit times out on trouble timing (20 to 30 seconds - rapid test) lighting lamp TA and sounding the TA alarm Remove the insulation from relay TC. | (k) STB Lamp (No battery on ST lead) | Insulate springs 1B and 2B of relay TC of the zone registration circuit to be used for test. This prevents the register circuit from connecting battery to lead ST when relay TC operates. Originate a call to the zone registration circuit and observe that lamp STB lights and the test circuit times out on ZRT time out (2 to 5 seconds) lighting the TA & ZRT lamps and operating the floor alarm. Remove the consultation from the TC relay. |
| (h) BG Lamp (False battery on BG lead) | Block nonoperated relay GB of the group busy circuit associated with the zone registration circuit to be used for test. This simulates the condition of relay GB released falsely connecting battery to the BG lead. Originate a call to the zone registration circuit and observe that lamp GB lights and the test circuit times out on ZRT time out (2 to 5 seconds) lighting the ZRT & TA lamps and operating the floor alarm. Remove the block from relay GB of the group busy circuit. | (l) HDO Lamp (Z.R.ckt. HD relay failed to operate) | Block nonoperated relay HD of a zone registration circuit to be used for test. By preventing relay HD from operating the register circuit cannot remove battery from lead HD and connect ground to it to shunt down the HD relay of the test circuit. Originate a call to the zone registration circuit and observe that lamp HDO lights to indicate the HD relay of the zone registration circuit failed to operate. The test circuit times out on ZRT time out (2 to 5 seconds) lighting the TA & ZRT lamps and operating the floor alarm. Remove the block from relay HD. |
| (i) DCG Lamp (False ground on DC lead) | Connect ground to punching 33 on the terminal strip on the zone registration unit. This falsely grounds the DC lead on the zone registration circuit to be used for test preventing the DC relay of the test circuit from releasing. Originate a call to the zone registration circuit and observe that lamp DCG lights and the test circuit times out on ZRT time out (2 to 5 seconds) lighting the TA & ZRT lamps and operating the floor alarm. Remove ground from punching 33. | (m) ZL Lamp (Ground not connected to ZL lead) | Insulate springs 8B and 9B of the TC relay of a zone registration circuit to be used for test. This prevents the zone registration circuits from connecting ground to the ZL lead. Originate a call to the zone registration circuit and observe that lamp ZL lights and the test circuit times out on ZRT time out (2 to 5 seconds) lighting the TA & ZRT lamps and operating the floor alarm. Remove the insulation from relay TC. |
| (j) DCB Lamp (No battery on DC lead) | Insulate springs 1T and 2T of relay TC of the zone registration circuit to be used for test. This prevents the register circuit from connecting battery over lead DC when relay TC operates. | | |

| <u>Feature To Be Tested</u> | <u>Method of Test</u> | <u>Feature To Be Tested</u> | <u>Method of Test</u> |
|--|---|--|---|
| (n) TA Lamp on failure of Relay TC of Z.R. ckt. to release | <p>Originate a call to a zone registration circuit. When the TC relay of the zone registration circuit operates, block it in the operated position. Observe that the test circuit blocks and times out (20 to 30 seconds - rapid test) lighting the TA lamp and operating the TA alarm.</p> <p>Remove the block from relay TC.</p> | (p) UT Lamp (Under-time trouble indication) (Cont'd) | <p>Remove the ground from N lead at 3B spring of relay T4 and release key ACO.</p> <p>Remove the insulation from the M relay.</p> |
| (o) TA Lamp on failure of Z.R. ckt. HD relay to release | <p>Originate a call to a zone registration circuit (T key normal). When the HD relay of the zone registration circuit operates, block it in the operated position. This prevents the zone registration circuit from returning to normal and when the test circuit checks for this, the test circuit blocks and times out (20 to 30 seconds) lighting the TA lamp and sounding the TA alarm.</p> <p>Remove the block from relay HD.</p> <p>Restore the test frame to normal.</p> | (q) OT Lamp (Over-time trouble indication) | <p>With the T key operated originate a call to a zone registration circuit. After the check has been made of the message register pulses (positions 2 to 10 of the registration circuit selector) and during the time the selector is being stepped at 1/2 second intervals (positions 12 to 22), insulate 9 & 10 top contacts of the zone registration circuit HD relay for 15 or 16 seconds to delay the return of the selector to normal which is the completion of the initial timing period.</p> <p>When the test circuit times out the initial time period, observe that the register circuit selector has not reached normal, that lamps OT and TA light, the test timers stops, and the time alarm operates.</p> <p>Restore the test circuit to normal.</p> |
| (p) UT Lamp (Under-time trouble indication) | <p>With the T key operated, originate a call to a zone registration circuit. After the check has been made of the message register pulses and the selector of the register circuit is being stepped at 15 second intervals, momentarily apply ground a few times to 8 top contact of the HD relay in the zone registration circuit. This will cause the selector to advance and reach the normal position (completion of initial timing period) in a shorter interval than required for the initial timing period.</p> <p>When the register circuit selector reaches normal observe that the test timer stops, lamps UT and TA light and the time alarm operates.</p> <p>Restore the test circuit to normal and make the following manual tests to verify the periods during which an under time check is not made. Operate key ACO to cut off the alarm on these tests.</p> <p>Temporarily ground the N lead at 3 bottom contact of relay T4 (TST TM mtg plt) Lamp UT lights.</p> <p>Momentarily operate the following relays as indicated and observe that their operation extinguishes the UT lamp: (a) M. (b) QM4, (c) QM, (d) M1 & M2, (e) M2 & M3, (f) M3 & M4, (g) M4 & M5, (h) OT (insulate 5 & 6 top of relay M for this operation).</p> | (r) UR Lamp (Less than the required message register pulses received indicating an under registration trouble) | <p>With the T key normal, originate a call to a zone registration circuit after blocking nonoperated the MR relay of the zone registration circuit. Observe that lamp UR lights and the test circuit blocks and times out (20 to 30 seconds) lighting lamp TA and operating the time alarm.</p> <p>Restore the frame to normal.</p> <p>With the T key operated, again originate a call to a zone registration circuit whose MR relay is blocked nonoperated. After relay T4 of the test circuit operates (end of initial registration period), remove the block from relay MR and manually operate and release it the correct number of times required for the initial registration (observe that the correct R relay of the test circuit is operated). Observe that the UR lamp remains lighted, the test circuit blocks at the end of the initial time period and times out lighting lamp TA and sounding the TA alarm.</p> <p>Restore the frame to normal.</p> |

| Feature To Be Tested | Method of Test |
|---|---|
| (s) OR Lamp (More than the required number of pulses received indicating an over registration trouble) | <p>With the T key normal, originate a call to a zone registration circuit. When the MR relay of the zone registration circuit releases after operating for the last charge in the series of charges expected for the zone used for test immediately (within 2 seconds after MR releases) operate relay MR manually and momentarily to simulate an over charge condition. Observe that lamps OR and TA light, the time alarm sounds and the test circuit blocks. Restore the frame to normal. With the T key operated, originate a call to a zone registration circuit. When relay T4 of the test circuit operates (end of initial registration period) manually operate and release the MR relay of the register circuit to simulate an overcharge. Observe that lamps OR and TA light, the time alarm sounds and the test circuit blocks. Restore the frame to normal.</p> |
| (t) Check for Minimum Register Pulse Current | <p>(This test is to simulate a condition in which the register pulse current is not of a value required for operation of the MR relay in the zone registration test circuit)</p> <p>Block normal relay MR in the zone registration test circuit.</p> <p>Originate a call to a zone registration circuit and note that when the test frame starts to make register pulse timing, the test circuit blocks and times out on trouble timing (20 to 30 seconds, rapid test).</p> <p>Remove the block from relay MR and restore the test circuit to normal.</p> |
| (u) TMR Lamp (Insufficient length of register pulses) | <p>(This test is to simulate a condition in which the length of the register pulses are not of the required length, resulting in the operation of relay TM3 before the operation of relay TM2).</p> <p>Block normal relay TM2 of the zone registration test circuit.</p> <p>Originate a call to a zone registration circuit and note that when the MR relay of the zone registration circuit operates, lamps TMR & TA light in the test frame and the floor alarm sounds, blocking the test circuit. Remove the block from the TM2 relay and restore the test circuit to normal.</p> |
| <p>10. <u>FAILURE TO BLOCK OUT CONTROL CIRCUIT</u> (SD-25311-011 Fig. 8, SD-25320-011 Figs. 1, 3, 4 & 7)</p> | |
| <p>10.1 This simulates a condition in which the test circuit is unable to block out the control circuit due to a connected marker. In the meantime, the marker is unable to pick a zone registration circuit because the test circuit has grounded the BT lead of the last available registration circuit but as yet has not operated the zone registration circuit HD relay.</p> | |
| <p>10.2 Using a zone registration circuit for test associated with a common group connector of an interframe grading arrangement block nonoperated the test frame's associated LL relay and block operated relay CC of the associated common group connector circuit. Make a test call and observe that the test circuit blocks and relay CB of the control circuit operates. Remove the blocks.</p> | |
| <p>10.3 Using a zone registration circuit for test associated with an individual group connector of an interframe grading arrangement, block nonoperated relay R of the associated control circuit, block operated relay CT of the individual group connector circuit, and insulate 1 & 2 top springs of relay BT of the individual group connector circuit. Make a test call and observe that the test circuit blocks and the GT relay of the individual group connector circuit operates. Remove the blocks and the insulation.</p> | |
| <p>10.4 Using a common group zone registration circuit for test associated with an individual group connector of an intraframe grading arrangement, block nonoperated relay R of the associated control circuit, block operated relays CT and GT of the individual group connector circuit, and insulate 1 & 2 top of relay BT of the individual group connector circuit. Make a test call and observe that the test circuit blocks and relay CB of the control circuit operates. Remove the blocks and the insulation.</p> | |
| <p>10.5 Using a zone registration circuit associated with an individual group connector of a non-grading arrangement, block nonoperated relay R of the associated control circuit and block operated relay CT of the individual group connector circuit. Make a test call and observe that the test circuit blocks and relay CB of the control circuit operates. Remove the blocks.</p> | |
| <p>11. <u>MATE FRAME OPERATION</u></p> | |
| <p>(This test is to be applied when two test frames are equipped).</p> | |
| <p>11.1 <u>Emergency Transfer</u> (SD-25311-011 Fig. 9)</p> | |
| <p>11.11 Operate the ETR key in the No. 0 or Left Test Frame and the ETL key in the No. 1 or Right Test Frame. Observe that relays C, C-1 to C-4, CO and CO-1 to CO-4 (EM TR mounting plate) operate in each test frame.</p> | |

11.2 Mate Frame Controlled Test

11.21 With the ETR and ETL keys operated as in Paragraph 11.11, operate keys ZA to ZE in the No. 0 or left test frame.

11.22 Operate the ST key in the No. 0 test frame and note that a test is made on all zone registration circuits associated with the No. 1 test frame.

11.23 Release the ST key and operate key RN.

11.24 When the test in progress is completed, release the RN key and also keys ZA to ZE.

11.25 Operate keys ZA to ZE in the No. 1 test frame.

11.26 Operate the ST key in No. 1 test frame and note that a test is made of all the zone registration circuits associated with the No. 0 test frame.

11.27 Release the ST key and operate key RN in the No. 1 test frame.

11.28 When the test in progress completes, release keys RN and ZA to ZE in test frame No. 1.

11.29 Release key ETR in the No. 0 test frame and key ETL in the No. 1 test frame. The frames restore to normal.

12. MISCELLANEOUS CIRCUITS

12.1 Check miscellaneous circuits not checked on other tests as follows:
 (1) test battery supply, (2) fuse alarm (Check that the fuse alarm is not stopped when the FA lamp is burned out or removed)
 (3) spare jack to MDF, and (4) frame line circuit.

Due to extensive changes arrows have been omitted.

R. E. RAHMES

Engineer of Installation

Reason for Reissue:
 To make extensive changes in the test procedures covered under this section.

Replaces Section 128 dated 3-21-46.