MISCELLANEOUS CIRCUIT
RECYCLE FRAME
TESTS
NO. 1 CROSSBAR OFFICES

1. GENERAL

1.01 This section describes a method of testing miscellaneous circuits on recycle frames.

1.02 The tests covered are:

A. Alarm Relay Operation — Trouble Timing, Operating Fuse, and Alarm Release: This test checks the operation of the alarm relays to verify that these relays operate from troubles in the code compressor connector or the code compressor circuit. This test also checks the alarm relay operation if a fuse on the recycle frames operates, and checks that all alarms can be released with the release keys provided. This test further checks that an operated fuse associated with a code compressor or the trouble indicator will cause the code compressor to be made busy to service, and the trouble indicator to be made busy to all code compressors requesting trouble records.

B. Jack and Lamp Functions — Code Compressor Connector, Code Compressor, Code Compressor Trouble Indicator, Traffic Control, and Miscellaneous Testing Jacks: This test checks that the jacks associated with the above circuits, when plugged, will make busy, take out of service, or provide testing facilities for these circuits. This test also checks that lamps associated with the miscellaneous circuit will light, indicating a make-busy condition, operated fuse condition, or removed from service condition, and that the lamps are extinguished when associated release keys are operated.

1.03 The miscellaneous circuit is arranged to serve the subscriber sender recycle circuit, the code compressor connector, the code compressor, and the code compressor trouble indicator, by providing make-busy jacks, alarm connecting relays, lamp indications for make-busy conditions, and testing facilities.

1.04 Since the tests outlined in this section may tend to delay or impede service, precautions should be taken to avoid affecting service adversely.

1.05 Local instructions should be followed with reference to recording any register operations caused by performing these tests.

1.06 *Lettered Steps:* A letter a, b, c, etc, added to a step number in Part 3 of this section indicates an action which may or may not be required depending on local conditions. The condition under which a lettered step or series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

2. APPARATUS

2.01 The apparatus required for each test is shown in Table A. The details of each item are covered in the paragraph indicated by the number in parentheses.

TABLE A

APPARATUS	TESTS	
	A	B
Head Telephone Set (2.02)	–	2
Test Receiver (2.03)	√	–
Test Set 32A (2.04)	–	1
Volt-Ohm-Milliammeter (2.05)	–	1
Cord (2.06)	1	1
Cord (2.07)	1	1
373A (make busy) Plug	–	1
347A (dummy) Plug	–	1
349A (make busy) Plug	–	1
Tool (2.08)	√	√

√ As required.

2.02 Head telephone set 52D or equivalent, consisting of 15A head band, N1 transmitter, HC3 receiver, 15-0-L4AK cord, 289B plug, 10A receiver holder, and 55A transmitter arm.

2.03 Test receiver, 716C test receiver or equivalent, attached to a W2AB cord equipped with two 360A tools (1W13B cord), one KS-6278 connecting clip, and one 411A (test pick) tool (for use in checking the presence or absence of battery or ground).

2.04 Test set 32A or equivalent consisting of two 508A keys (W3F cord) and one 110 plug (intended for use with test circuits in dial equipments).

2.05 Volt-ohm-milliammeter KS-14510 or equivalent, equipped with test leads consisting of one pair of No. 20 flexible test lead wires, two KS-14530 connectors (BL-123324-1 red, BL-123234-2 black) attached to 310 plug; and one pair of No. 20 flexible test lead wires, two KS-14530 connectors (BL-123234-1 red, BL-123234-2 black) attached to 309 plug (intended to measure dc voltages at frames).

2.06 Testing cord, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord), one KS-6278 connecting clip, and one 624B tool (for establishing test connections to the winding terminal and contact terminals of wire spring relays, and to the terminals of a terminal strip).

2.07 Testing cord, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord), one KS-6278 connecting clip, 639A (relay contact connector) tool, and one 651A (relay contact connector holder) tool (for connecting to fixed contacts of wire-spring-type relays).

2.08 Blocking and insulating tools, as required. Use tools and apply as covered in Section 069-020-801.

2.09 Make test connections and apply as covered in Section 069-131-811.

3. METHOD

STEP	ACTION	VERIFICATION
	A. Alarm Relay Operation — Trouble Timing, Operating Fuse, and Alarm Release	
1	At compressor frame — Insulate make contacts 2, 4, 6 of MJC relay.	
2	At first code compressor — Apply ground momentarily to make contact 11 of TIS relay.	At compressor frame — MJC relay operated, locked.
3	At trouble indicator lamp panel — Operate ARC key momentarily.	MJC relay released.
4	Repeat Steps 1 through 3 for second compressor, and third compressor if provided.	Same as Steps 2, 3.
5	At compressor frame — Connect ground momentarily to make contact 10 of ALA relay.	MJC relay operated, locked.
6	At trouble indicator lamp panel — Operate ARC key momentarily.	MJC relay released.
7	At compressor frame — Remove insulating tools from MJC relay.	
8	Connect ground momentarily to make contact 10 of ALB relay.	MJC relay operated, locked. Major alarm sounded.

STEP	ACTION	VERIFICATION
9	At trouble indicator lamp panel — Operate ARC key momentarily.	MJC relay released. Major alarm silenced.
10	At connector frame — Insulate make contacts 4, 6, 8 of MJN relay.	
11	At first connector — Connect ground momentarily to make contact 8 of RCA relay.	At connector frame — MJN relay operated, released.
12	Repeat Step 11 for second, third, etc, connectors until all connectors have been tested.	Same as Step 11.
13	At connector frame — Remove insulating tools from MJN relay.	
14	At first connector — Connect ground to make contact 8 of TRS1 relay.	At connector frame — MJN relay operated. Major alarm sounded.
15	Remove ground from TRS1 relay.	MJN relay released. Major alarm silenced.
16	At compressor frame — Insulate make contacts 4, 6, 8 of MNC relay.	
17	Insulate make contacts 2, 4, 6 of MJC relay.	
18	At trouble indicator — Connect ground to make contact 7 of ON relay.	At compressor frame — MNC relay operated.
19	At compressor frame — Operate manually MJC relay momentarily.	MNC relay released. MJC relay remains operated.
20	At trouble indicator lamp panel — Operate ARC key momentarily.	MJC relay released.
21	At compressor frame — Remove insulating tools from MNC relay.	
22	Operate manually MNC relay momentarily.	Minor alarm sounded, silenced.
23	Remove insulating tools from MJC relay.	
24	At sender recycle frame — Connect −48 volt battery to terminal A of B fuse for first recycle circuit, using test receiver.	At sender recycle frame — FA lamp lighted. Fuse alarm sounded. Aisle pilot alarm lamp lighted. Fuse alarm board class lamp lighted.
25	Remove −48 volt battery from B fuse for first recycle circuit.	At sender recycle frame — FA lamp extinguished. Fuse alarm silenced. Aisle pilot, fuse alarm board, class lamp extinguished.

STEP	ACTION	VERIFICATION
26	Repeat Steps 24, 25 for all B fuses associated with second, third, etc, recycle circuits.	Same as Steps 24, 25.
27	Repeat Steps 24, 25 for all C, D fuses for all recycle circuits.	Same as Steps 24, 25.
28	Connect −48 volt battery to terminal A of PFN fuse, using test receiver.	At sender recycle frame — FA lamp lighted. Fuse alarm sounded.
29	Remove −48 volt battery from PFN fuse.	FA lamp extinguished. Fuse alarm silenced.
30	At connector frame — Connect −48 volt battery to terminal A of A fuse for first connector, using test receiver.	At connector frame — FA lamp lighted. Fuse alarm sounded.
31	Remove −48 volt battery from A fuse for first connector.	FA lamp extinguished. Fuse alarm silenced.
32	Repeat Steps 30, 31 for all A fuses associated with second, third, etc, connectors.	Same as Steps 30, 31.
33	Repeat Steps 30 through 32 for all B fuses associated with all connectors.	Same as Steps 30, 31.
34	Connect −48 volt battery to terminal A of PFN fuse, using test receiver.	Same as Step 30.
35	Remove −48 volt battery from PFN fuse.	Same as Step 31.
36	At compressor frame — Connect −48 volt battery to terminal A of C fuse for traffic control circuit, using test receiver.	At compressor frame — FAN relay operated. FA lamp lighted. Fuse alarm sounded.
37	Remove −48 volt battery from C fuse.	FAN relay released. FA lamp extinguished. Fuse alarm silenced.
38	Repeat Steps 36, 37 for D fuse for traffic control circuit.	Same as Steps 36, 37.
39	Connect −48 volt battery to terminal A of G fuse for first connector, using test receiver.	FA lamp lighted. Fuse alarm sounded.
40	Remove −48 volt battery from G fuse for first connector.	FA lamp extinguished. Fuse alarm silenced.
41	Repeat Steps 39, 40 for all G fuses associated with second, third, etc, connectors.	Same as Steps 39, 40.
42	Connect +130 volt battery to terminal A of B fuse (+130V) for connectors, using test receiver.	At connector frame — FA2 relay operated. FA lamp lighted. Fuse alarm sounded.

STEP	ACTION	VERIFICATION
43	Remove +130 volt battery from B fuse (+130V).	FA2 relay released. FA lamp extinguished. Fuse alarm silenced.
44	Repeat Steps 42, 43 for C fuse for connectors.	Same as Steps 42, 43.
45	Connect −48 volt battery to terminal A of A fuse for first compressor, using test receiver.	At first compressor — FA, FA1, CCB, CCB1, CCB2 relays operated. At compressor frame — FA lamp lighted. Fuse alarm sounded.
46	Remove −48 volt battery from A fuse for first compressor.	At first compressor — FA relay released. At compressor frame — FA lamp extinguished. FG lamp lighted. Fuse alarm silenced.
47	At trouble indicator lamp panel — Operate ARC key momentarily.	At first compressor — FA1, CCB, CCB1, CCB2 relays released. At compressor frame — FG lamp extinguished.
48	Repeat Steps 45 through 47 for B through F fuses for first compressor.	Same as Steps 45 through 47.
49	Repeat Steps 45 through 48 for second compressor, and third compressor if provided.	Same as Steps 45 through 48.
50	At compressor frame — Connect +130 volt battery to terminal A of A fuse (+130V) for first compressor, using test receiver.	Same as Step 45.
51	Remove +130 volt battery from A fuse (+130V).	Same as Step 46.
52	At trouble indicator lamp panel — Operate ARC key momentarily.	Same as Step 47.
53	Repeat Steps 50 through 52 for second compressor, and third compressor if provided.	Same as Steps 45 through 47.
54	At compressor frame — Connect −48 volt battery to terminal A of A fuse for trouble indicator, using test receiver.	At trouble indicator — FA, FA1, MB0, MB1, MB2 relays operated. At compressor frame — FA lamp lighted. Fuse alarm sounded.
55	Remove −48 volt battery from A fuse for trouble indicator.	At trouble indicator — FA relay released. At compressor frame — FA lamp extinguished. FG lamp lighted. Fuse alarm silenced.

STEP	ACTION	VERIFICATION
56	At trouble indicator lamp panel — Operate ARC key momentarily.	At trouble indicator — FA1, MB0, MB1, MB2 relays released. At compressor frame — FG lamp extinguished.
57	Repeat Steps 54 through 56 for B through K fuses for trouble indicator.	Same as Steps 54 through 56.
58	At compressor frame — Connect −48 volt battery to terminal A of PFC fuse for first code compressor, and third code compressor if provided, using test receiver.	At first compressor, and third compressor if provided — FA, FA1, CCB, CCB1, CCB2 relays operated. At compressor frame — FA lamp lighted. Fuse alarm sounded.
59	Remove −48 volt battery from PFC fuse.	At first compressor, and third compressor if provided — FA relay released. FA lamp extinguished. FG lamp lighted.
60	At trouble indicator lamp panel — Operate ARC key momentarily.	At first compressor, and third compressor if provided — FA1, CCB, CCB1, CCB2 relays released. At compressor frame — FG lamp extinguished.
61	At compressor frame — Connect −48 volt battery to terminal A of PFC′ fuse for second compressor and trouble indicator, using test receiver.	At second compressor — FA, FA1, CCB, CCB1, CCB2 relays operated. At trouble indicator — FA, FA1, MB0, MB1, MB2 relays operated. At compressor frame — FA lamp lighted. Fuse alarm sounded.
62	Remove −48 volt battery from PFC′ fuse.	At second compressor — FA relay released. At trouble indicator — FA relay released. At compressor frame — FA lamp extinguished. FG lamp lighted. Fuse alarm silenced.
63	At trouble indicator lamp panel — Operate ARC key momentarily.	At second compressor — FA1, CCB, CCB1, CCB2 relays released. At trouble indicator — FA1, MB0, MB1, MB2 relays released. At compressor frame — FG lamp extinguished.

STEP	ACTION	VERIFICATION
	B. Jack and Lamp Functions — Code Compressor Connector, Code Compressor, Code Compressor Trouble Indicator, Traffic Control, and Miscellaneous Testing Jacks	
1	At connector frame — Insert make-busy plug into CB- jack of first connector for first compressor.	At compressor frame — CB- relay associated with first compressor operated. At connector frame — CB0 lamp lighted.
2	Remove make-busy plug from CB- jack for first compressor.	At compressor frame — CB- relay associated with first compressor released. At connector frame — CB0 lamp extinguished.
3	Insert make-busy plug into CB- jack of first connector for second compressor.	At compressor frame — CB- relay associated with second compressor operated. At connector frame — CB1 lamp lighted.
4	Remove make-busy plug from CB- jack for second compressor.	At compressor frame — CB- relay associated with second compressor released. At connector frame — CB1 lamp extinguished.
5a	If three compressors are provided — Insert make-busy plug into CB- jack for first connector for third compressor.	At compressor frame — CB- relay associated with third compressor operated. At connector frame — CB2 relay operated.
6a	Remove make-busy plug from CB- jack for third compressor.	At compressor frame — CB- relay associated with third compressor released. At connector frame — CB2 lamp extinguished.
7	Repeat Steps 1 through 4, and 5a, 6a if three compressors are provided, for second, third, etc, connectors.	Same as Steps 1 through 4; and 5a, 6a if three compressors are provided.
8	At trouble indicator lamp panel — Insert make-busy plug into MBC- jack for first compressor.	At first compressor — CCB, CCB1, CCB2 relays operated. At trouble indicator lamp panel — CCB0 lamp lighted.
9	Remove make-busy plug from MBC- jack for first compressor.	At first compressor — CCB, CCB1, CCB2 relays released. At trouble indicator lamp panel — CCB0 lamp extinguished.
10	Repeat Steps 8, 9 for second compressor, and third compressor if provided.	Same as Steps 8, 9. CCB1, CCB2 lamps lighted.

STEP	ACTION	VERIFICATION
11	Insert dummy plug into MBA jack.	MBA lamp lighted.
12	At any connector — Connect ground to make contact 2 of TM relay.	At compressor frame — TCA relay does not operate.
13	Remove ground from TM relay.	
14	At trouble indicator lamp panel — Remove dummy plug from MBA jack.	At trouble indicator lamp panel — MBA lamp extinguished.
15	Repeat Steps 11 through 14 for MBB jack connecting ground to make contact 4 of TM relay.	Same as Steps 11 through 14. MBB lamp lighted.
16	Insert make-busy plug into MBP0 jack.	At trouble indicator — MB0 relay operated.
17	At trouble indicator — Connect ground to terminal 41 on terminal strip A.	DL0 relay operated. At trouble indicator lamp panel — DL0 lamp lighted.
18	Remove ground from terminal strip A.	
19	At trouble indicator lamp panel — Operate RLS key momentarily.	At trouble indicator — DL0 relay released. At trouble indicator lamp panel — DL0 lamp extinguished.
20	Remove make-busy plug from MBP0 jack.	At trouble indicator — MB0 relay released.
21	Repeat Steps 16 through 20 for MBP1, MBP2 jacks, grounding terminal strips B and C.	Same as Steps 16 through 20.
22	Insert make-busy plug into MBI jack.	At trouble indicator — MB0, MB1, MB2 relays operated.
23	Remove make-busy plug from MBI jack.	MB0, MB1, MB2 relays released.
24	Insert 32A test set plug into SDT- jack.	
25	At subscriber sender test frame — Set up recycle class test call to be dialed on a step-by-step basis.	
26	Operate sender test start key.	At sender test frame — Sender test circuit advances to position to start dialing ACA digit.
27	At trouble indicator lamp panel — Operate white button of 32A test set momentarily.	Sender test circuit dials ACA digit, prepares to dial ACB digit.
28	Operate white button of 32A test set momentarily.	Sender test circuit dials ACB digit, prepares to dial ACC digit.
29	Operate red button of 32A test set momentarily.	Sender test circuit cancels advance, returns to normal, restarts.

STEP	ACTION	VERIFICATION
30	At sender test frame — Release start key.	
31	Operate CA key.	Sender test circuit returns to normal.
32	At trouble indicator lamp panel — Remove 32A test set plug from SDT- jack.	
33	At subscriber sender frame — Insert head telephone set plug into TEL A — TEL B jacks.	
34	At trouble indicator lamp panel — Insert head telephone set plug into TEL A — TEL B jacks.	Test conversation is established between frames by testers.
35	Remove head telephone set plug from TEL A — TEL B jacks.	
36	Repeat Steps 34, 35 for TEL A — TEL B jacks at connector and recycle frames.	Same as Step 34.
37	At subscriber sender frame — Remove head telephone set plug from TEL A — TEL B jacks.	
38	Turn multimeter switch to 60-volt scale.	
39	Insert leads into multimeter jacks to read negative voltage using 310 plug.	
40	At recycle frame — Insert 310 plug of multimeter leads into A jack.	Voltage at multimeter reads −45 to −50 volts.
41	Remove 310 plug from A jack.	Voltage at multimeter reads 0 volt.
42	Repeat Steps 40, 41 for connector frame and trouble indicator lamp panel A jacks.	Same as Steps 40, 41.
43	Remove multimeter leads from jacks.	
44	Turn multimeter switch to 300-volt scale.	
45	Insert leads into multimeter to read positive voltage using 309 plug.	
46	At connector frame — Insert 309 plug of multimeter leads into C jack.	Voltage at multimeter reads +125 to +135 volts.
47	Remove 309 plug from C jack.	Voltage at multimeter reads 0 volt.
48	Repeat Steps 46, 47 for trouble indicator lamp panel C jack.	Same as Steps 46, 47.
49	At first connector — Connect ground to make contact 2 of TST relay.	At connector frame — TST lamp lighted.

STEP	ACTION	VERIFICATION
50	Remove ground TST relay.	TST lamp extinguished.
51	Repeat Steps 49, 50 for second, third, etc, connectors.	Same as Steps 49, 50.
52	At connector frame — Block nonoperated MJN relay.	
53	At first connector — Operate RCA relay manually.	At connector frame — RCA lamp lighted.
54	Release RCA relay.	RCA lamp extinguished.
55	Operate TRS1 relay manually.	TRS lamp lighted.
56	Release TRS1 relay.	TRS lamp extinguished.
57	Repeat Steps 53 through 56 for second, third, etc, connectors.	Same as Steps 53 through 56.
58	At connector frame — Remove blocking tool from MJN relay.	
59	At compressor frame — Block nonoperated MJC relay.	
60	Connect ground to make contact 11 of ALA relay.	At trouble indicator lamp panel — ALA lamp lighted.
61	Remove ground from ALA relay.	ALA lamp extinguished.
62	Connect ground to make contact 11 of ALB relay.	ALB lamp lighted.
63	Remove ground from ALB relay.	ALB lamp extinguished.
64	At trouble indicator lamp panel — Operate area code switches, and select test switches for normal recycle service call.	
65	Insert plug of 32A test set into RC jack.	
66	Operate white key of 32A test set momentarily.	At trouble indicator lamp panel — Display lamps lighted indicating normal recycle service call. At trouble indicator — CST relay operated, released. ON relay operated.
67	Operate red key of 32A test set momentarily.	At trouble indicator lamp panel — Display lamps extinguished. At trouble indicator — RC relay operated, released. ON relay released.
68	Return all area code switches, and test switches to normal.	
69	Remove 32A test set plug from RC jack.	