

LINE CONCENTRATOR NO. 1A
RYCO 107C TEST SET

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1. GENERAL

1.01 This section describes the RYCO 107C 1A Concentrator Test Set which is a portable test set used to perform various tests at the 1A Concentrator Control Unit.

1.02 Information contained in this section is based on the manufacturers' manual provided by RYCO Engineering, Incorporated.

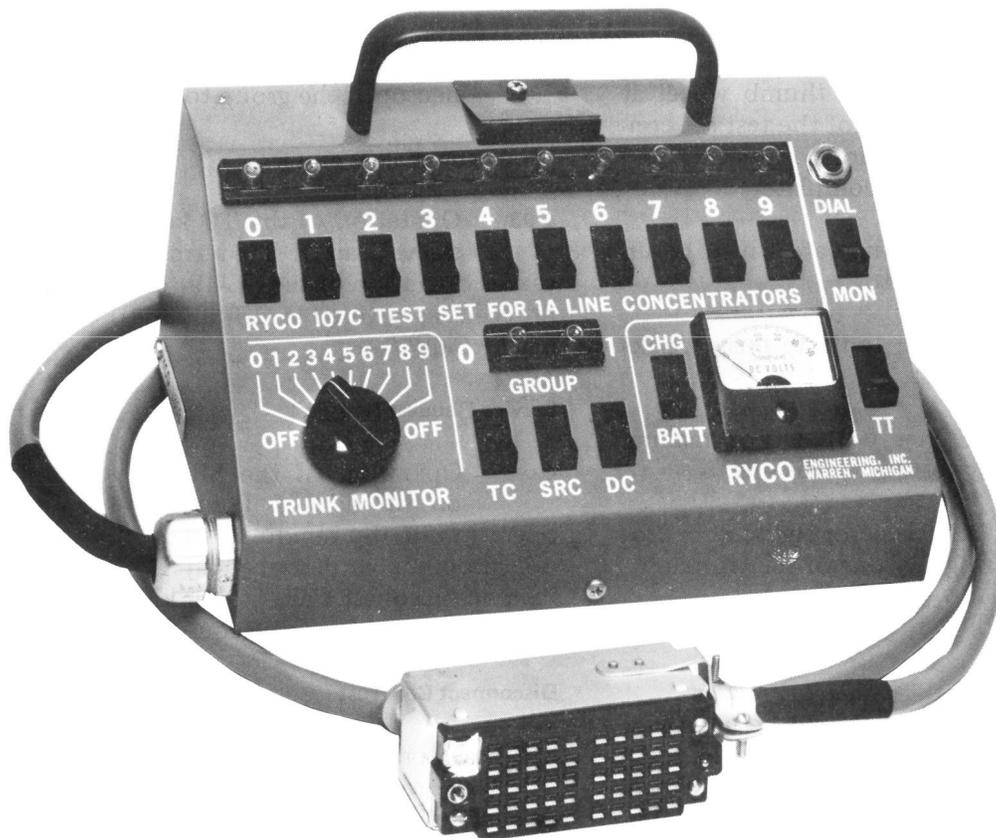
2. DESCRIPTION

2.01 The test set consists of a metal box, approximately 4-inches by 6-inches by 9-inches, with inclined face and carrying handle. (See Fig. 1.)

2.02 It can be mounted on the concentrator control unit frame by using a RYCO 107U test set bracket.

2.03 Features of the test set are:

- (a) Trunk busy lamp indications.
- (b) Selective trunk monitoring.
- (c) Establishing terminating disconnect and service request calls.
- (d) Checking remote battery voltage.
- (e) Placing test calls to any concentrator line.
- (f) Voltage check on individual trunks and particular trunk selection without manually blocking relays.



RYCO 107C Test Set
Fig. 1

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2.04 The following keys, switches, jack, and lamps are located on the top panel of the test set:

- **TC KEY** — For terminating call tests.
- **SRC KEY** — For service request call tests.
- **DC KEY** — For disconnect call tests.
- **TT KEY** — For testing trunk conductor continuity.
- **METER SWITCH** —

CHG — For measuring charge voltage and trunk conductor testing.

BATT — For measuring remote unit battery voltage.
- **DIAL-MON (Switch and Jack)** — With switch in **DIAL** position, test calls can be dialed with a dial test set plugged into the jack (using the test line assigned to Line Terminal No. 49). With switch in **MON** position, monitoring of trunks is possible, with the test set speaker or a dial test set plugged into the jack.
- **VOLUME CONTROL** — A thumb wheel at the lower right rear corner of the test set controls the volume of the monitor speaker and can be used to turn it off completely.
- **GROUP LAMPS 0-1** — Indicate which group the test set is connected to.
- **TRUNK LAMPS 0-9** — Indicate busy trunks of the group under test.
- **TRUNK MB (Switches 0-9)** — For making trunks busy during testing operations.
- **TRUNK MONITOR (Selector Switch)** — Provides for monitoring any one of ten trunks.

3. CONNECTION

3.01 Each 1A concentrator should be equipped with a RYCO 107HC test harness. The test set is connected to the concentrator control unit by connecting the KS-19162, L3 plug-ended cable to the control unit connector at the base of the concentrator frame.

3.02 Where concentrator test sets are provided, only one test line assignment is required in each central office.

3.03 The telephone number and the tip, ring, and sleeve of the line circuit assigned as the concentrator test line are connected, at the distributing frame, to line terminal 49 of the first 1A line concentrator installed in the office. As additional concentrators are installed, line terminal 49 of the first concentrator is cross-connected (tip, ring, and sleeve) to line terminal 49 of the second concentrator, etc. This cross-connection is made at the distributing frame.

3.04 The concentrator test line is made effective to line terminal 49 or 99, depending on the group connected to the test set. This is accomplished in the internal wiring of the test set connections.

4. OPERATION

4.01 Operational tests, as covered in Section 067-105-502, can be performed using the control unit test set.

4.02 Connect the test set cable plug to the connector of the group to be tested.

Terminating Call Test

4.03 Operation of the TC key places ground on sleeve lead of line terminal 49 (or 99). This causes operation of the SL-49 (or 99) relay and call proceeds as covered in CD-96536-01 under "Terminating Call".

Service Request Call Test

4.04 Operation of the SRC key places ground on tip side of Trunk 09 (or 19) causing operation of the remote L-49 (or 99) relay and the call proceeds as described in CD-96536-01 under "Service Request Calls". Trunk 09 and 19 must be idle to make a "Service Request Call".

Disconnect Call Test

4.05 Operation of the DC key operates DP-0 (or 1) relay immediately, if there is a trunk in disconnect condition, which sets up a disconnect call as described in CD-96536-01 under "Disconnect Call".

Trunk Selection

4.06 A particular trunk can be selected by operating the lower numbered test set "TRUNK MADE BUSY" switches and then operate the SRC key. When the trunk is selected, the associated TRUNK BUSY lamp lights and should remain lit until SRC key is released.

- If trunk lamp lights and extinguishes before release of the SRC key, the trunk conductors are reversed or the ring conductor is open.
- If TRUNK BUSY lamp remains lit after release of the SRC key, the trunk conductors are shorted or the ring conductor is grounded.



Caution: Service requirements must be considered when trunks are removed from service by operation of the test set TRUNK MADE BUSY switches. If a call is attempted with all trunks made busy in this manner, a time alarm will result and trunks should be released immediately for service calls.

Remote Unit Battery Voltage Tests

4.07 With Trunks 07 and 09 idle, the operation of the meter switch to BATT connects the test set meter to tip conductors of Trunk 07 and 09. The tip of Trunk 07 is grounded at the remote unit. The top of Trunk 09 is connected through the break contacts of the CO-49 relay of the remote unit to the L-49 relay winding. Thus the voltage indicated on the voltmeter is the voltage of the remote unit battery less the voltage drop of approximately one volt caused by the resistance of the remote unit L-49 winding and the "L" diode. This voltage should read 22 volts minimum under load during the interval of a call being set up.

4.08 When two remote units are served by one control unit, the battery voltage of the second remote unit can be read on Group 1 of the control unit using Trunks 17 and 19 and remote unit L-99 relay.

Cross Point Tests

4.09 Section 067-105-501, Test I, should be reviewed before starting the cross point test. Considerable time can be saved making the cross

point tests for all lines and trunks by using the concentrator test set.

4.10 The test line assignment for line terminal 49 can be used for this test by unlatching the CO-49 (or 99) relays in both the control and remote units. The line terminal to be tested is then cross-connected temporarily at the concentrator control frame (top) terminal strip to line terminal 49 using three W1A1 or similar cords.

4.11 A simple test using the TC key can now be made to each trunk successively, using the test set trunk "MAKE BUSY" switches, to force the calls to each trunk. Cross points should be verified visually on each trunk selected. A more positive operation test can be made by having the assistant at the remote unit make "Service Request Calls" and check for dial tone and then break the dial tone by dialing one digit on the line terminal being tested with each trunk as it is selected.

4.12 After completion of the test, reoperate the CO-49 (or 99) relays in both units.

5. TROUBLE LOCATION

5.01 The battery in the remote unit does not have sufficient capacity to allow blocking a major portion of the apparatus used in making a call or blocking the timing circuit for trouble location. The proper procedure is to:

1. Make repeated calls, observing relay operation.
2. Determine condition of "W" and "Z" relays when operation stops.
3. Determine condition of "RK2" and "CCK" relays when operation stops.
4. On sequence charts, localize trouble to the area limited by "W", "Z", "RK2", and "CCK" relay operation.
5. On functional schematic drawings, pinpoint possible troubles.
6. On equipment, check for troubles pinpointed by these steps.

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Note: Sections 067-105-301 and 067-105-502 may be used to assist in locating trouble experienced during application of this section.

6. COMPLETE TRUNK TESTS

6.01 This test should be conducted only during a period of minimum traffic in order to reduce the possibility of double connections.

1. Operate switches to **CHG** and **DIAL**.
2. Make a disconnect call.
3. Set **TRUNK MONITOR** switch to lowest numbered idle trunk.
4. Operate **TC** and **TT** keys simultaneously.
5. Read meter while keys are held operated.

METER READING	TRUNK CONDITION INDICATED
0-9 Volts	Ring conductor grounded.
10-20 Volts	Tip and ring conductors shorted, or high resistance ground on ring conductor, or tip conductor crossed with a source of battery potential (ie, the ring conductor of another pair).
21 Volts	Trunk OK, or tip and ring reversed. Make a "Service Request Call". If the lamp lights and extinguishes before the key is released, the conductors are reversed. If it stays on until the key is released, the trunk is normal.
22-31 Volts	Trunk open or high resistance ground on tip conductor, or ring conductor crossed with a source of battery potential. Make a "Service Request Call". If the lamp lights and extinguishes before the key is released, the ring conductor is open.

32-37 Volts Tip conductor grounded.

38-48 Volts Possible double connection in central office line links. If this occurs, a "Disconnect Call" will not release the trunk. The trouble must be cleared at the linkage before proceeding with further testing.

6. Release the trunk with a "Disconnect Call" before making it busy and proceeding to test the next higher numbered trunk.

6.02 Meter readings may be shifted up to one volt by local variations in battery voltage and trunk loop resistance. Comparative readings between trunks can be used to make fine distinctions.

7. REMOTE UNIT BATTERY CHARGE VOLTAGE

7.01 When the meter switch is operated to **CHG**, the meter indications, due to test set built-in networks, are lower than the actual voltage on the trunk selected by the **TRUNK MONITOR** switch. If a trunk set up in talking condition is selected, the reading will be about 80 per cent of the talk voltage. If an idle trunk being used to charge the remote unit battery is selected, the meter will normally read about 20 volts. The voltage will vary considerably depending on the condition of the remote battery and the trunk conductor resistance.

7.02 A normal reading for local conditions should be noted for reference on each concentrator.

7.03 If an idle trunk shows about 40 volts, it is set up on a line, and a "Disconnect Call" should release it to the charging condition. Readings on Trunks 07, 09, 17, and 19 may differ from the norm due to remote battery test connections.

8. STANDBY CONDITION

8.01 If the test set is to be left temporarily or stored in a 107U test set bracket and connected to a control unit, certain precautions should be taken.

1. All trunk switches should be off so that trunks are available for service.
2. Leave the trunk monitor switch in an **OFF** position.
3. The meter switch should be operated to **CHG.** In this condition, one group lamp will continue to indicate busy trunks.
4. Lamp service life can be increased by disconnecting the test set from the test harness during storage.